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THE
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A

CYCLOPÆDIA

OF

PRACTICAL RECEIPTS,

AND COLLATERAL INFORMATION.

THE [illegible] COLLEGE

A

CYCLOPÆDIA

OF

PRACTICAL RECEIPTS,

AND

COLLATERAL INFORMATION

IN THE

ARTS, MANUFACTURES, PROFESSIONS, AND TRADES,

INCLUDING

Medicine, Pharmacy, and Domestic Economy.

DESIGNED AS A COMPREHENSIVE

SUPPLEMENT TO THE PHARMACOPŒIAS,

AND

GENERAL BOOK OF REFERENCE

FOR THE MANUFACTURER, TRADESMAN, AMATEUR, AND
HEADS OF FAMILIES.

BY

ARNOLD J. COOLEY,

AUTHOR OF THE "ANATOMY OF QUACKERY," ETC., ETC.

THIRD EDITION.

ENTIRELY REWRITTEN AND GREATLY ENLARGED.

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TO

THE RIGHT HONORABLE

THE EARL OF DUNDONALD,

ADMIRAL OF THE WHITE,
REAR ADMIRAL OF THE UNITED KINGDOM,
G.C.B., F.R.S., ETC., ETC.,

AS

AN HUMBLE TRIBUTE OF ADMIRATION AND RESPECT
FOR
HIS PUBLIC CHARACTER,
HIS HIGH INTELLECTUAL ENDOWMENTS,
AND
HIS ARDUOUS, DISINTERESTED, AND WELL-DIRECTED EFFORTS
THROUGH A LONG LIFE
TO PROMOTE THE PROGRESS OF ART AND SCIENCE IN GREAT BRITAIN
AND ITS COLONIES,

This Work,

BY HIS KIND PERMISSION,

IS RESPECTFULLY DEDICATED

BY HIS LORDSHIP'S
MOST OBEDIENT AND HUMBLE SERVANT.
THE AUTHOR.

PREFACE.

The design of the present work is briefly, but not completely expressed in its title page. Independently of a reliable and comprehensive collection of formulæ and processes in nearly all the industrial and useful arts, it contains a description of the leading properties and applications of the substances referred to, together with ample directions, hints, data, and allied information, calculated to facilitate the development of the practical value of the book in the shop, the laboratory, the factory, and the household. Notices of the substances embraced in the Materia Medica of our national pharmacopœias, in addition to the whole of their preparations, and numerous other animal and vegetable substances employed in medicine, as well as most of those used for food, clothing, and fuel, with their economic applications, have been included in the work. The synonymes and references are other additions which will prove invaluable to the reader. Lastly, there have been appended to all the principal articles referred to, brief, but clear directions for determining their purity and commercial value, and for detecting their presence and proportions in compounds.

The sources from which I have derived the vast mass of materials forming this volume, are such as to render it deserving the utmost confidence. I have invariably resorted to the best and latest authorities, and have consulted almost innumerable volumes, both British and foreign, during its compilation. Secondary channels of information have been scarcely ever relied on, when original authorities were within my reach. A large portion of the work has been derived from my personal experience and observations in the departments of applied chymistry and hygiène, and from the processes of various laboratories and manufactories, many of which I can the more confidently recommend, from having either inspected or witnessed their employment on an extensive scale. The indiscriminate adoption of matter, without examination, has been uniformly avoided, and in no instance has any formula or process been admitted into this work, unless it rested on some well-known fact of science, had been sanctioned by usage, or came recommended by some respectable authority. The settlement of doubtful or disputed points has often occupied me a greater number of hours, and not unfrequently, a greater number of days, than that of the lines of letter-press which convey the results to the public. In all cases precedence has been given to the standard formulæ of our national pharmacopœias, and to those processes which long experience, or well-conducted experiments, have shown to be the most successful, profitable, and trustworthy. In general, the sources of information have been indicated, for the purpose of enabling the reader to form a better estimation of their value. Wherever this is not the case, in reference to borrowed formulæ and data, the omission has arisen from the impossibility of determining to whom the merit is justly due.

I have endeavoured, as much as possible, in the present work, to avoid confusion of the medical weights with those commonly used in trade and commerce; an attempt which, so far as I am aware, has not been successfully carried out in any other quarter. For this purpose I determined to entirely abandon the usual arbitrary signs or characters employed to represent the divisions of the apothecaries' pound, and to distinguish the two weights from each other, by simply printing, in different type, the plain English names and abbreviations representing their several denominations. The medical signs for the imperial gallon and its sub-divisions, have also been abandoned for their common English names. It would have afforded me pleasure to have reduced all the quantities to one uniform standard, had it been practicable, or, in all cases, advisable.

Under the names of most of the leading diseases that could be profitably noticed in the present work, such explanations and directions have been given as accord with the prevailing opinions and practice of the faculty at the present day. These, when judiciously applied, will prove invaluable to emigrants, travellers, voyagers, and other parties beyond the reach of legitimate medical assistance; and, under opposite circumstances, will, in general, enable those who have the care of the sick, the better to second and carry out the instructions and efforts of the physician for the benefit of their charge. Here, however, it may be useful to repeat the cautions given in other parts of this volume, as to the impropriety of unnecessarily meddling with the healing art, or neglecting a prompt application to a duly qualified practitioner, in all cases demanding either medical or surgical aid. It is an indubitable fact, that the best efforts of the inexperienced and uninitiated in the mysteries of medical science, must be always enormously behind those of parties whose whole lives and study have been devoted to the subject.

The nature of a condensed alphabetical arrangement not permitting numerous articles to come under distinct heads, or to be referred to under all their synonymes, the casual reader may often be led to suppose that this book is most deficient where in reality it is the most copious. In general, I have attempted, as much as possible, to bring together subjects of a closely allied character, and compounds which are analogous to each other, either in constitution, or the mode of their preparation. Thus, most of the formulæ for Mixtures, Ointments, Pills, &c., follow, in alphabetical order, the general articles under these heads; whilst those for the Oxides, Salts, &c., follow the names of their respective bases. In like manner, a notice of a number of preparations will be found included in that of their principal ingredients. The names under which the leading substances appear, are generally those which are most familiar to well-informed practical men, and which have commonly reference to either their acknowledged chemical constitution, or to some long-known and easily recognised quality. The following extract conveys an important lesson on this subject, with which I perfectly agree:—"We have been unwilling to make any unnecessary changes in the nomenclature of substances whose names are sanctioned by the usage of the present day; for these names have been, for the most part, rightly assigned by our predecessors, or confirmed by lapse of time. We are indeed aware, that every improvement in the knowledge of things ought to be embodied in their names; but we must be careful, in selecting or forming these names, not to make those points appear certain and established which are as yet doubtful, for it is safer to be in the rear than in advance of natural history."*

I have exerted myself to the utmost to ensure the accuracy and completeness of this volume, but I feel conscious that after all my efforts for this purpose, some errors have crept into it, that many subjects which deserve insertion in it have been omitted, and that many others have been either imperfectly or too briefly noticed. "Yet these failures, however frequent, may," I trust, "admit of extenuation and apology. To have attempted much is always laudable, even where the enterprise is above the strength that undertakes it. To rest below his aim is incident to every one whose fancy is active, and whose views are comprehensive; nor is any man satisfied with himself because he has done much, but because he conceives little." When I commenced this work, I resolved to leave nothing within its legitimate limits unexamined or unelucidated; and I flattered myself with a prospect of the hours which I should thus "revel away" in a pursuit so congenial to my desires—"the treasures with which I expected every search into those neglected mines to reward my labour—and the triumph with which I should display my acquisitions to mankind.

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* Preface to the Ph. L. 1851.

But these were the dreams of a poet, doomed at last to wake a" Cyclopædist. The long task which I had undertaken soon exhibited its truly onerous character, and daily grew in urgency, until that which promised to be a pleasure, had been transformed into an exhausting and continuous labour. At first, a sacrifice of the hours of leisure only, seemed necessary to the undertaking,—next, those assigned to professional and business avocations were demanded, and absorbed,—but, ere long, one by one, the hours usually devoted to repose were sucked into the insatiable vortex, until the bright beams of the rising sun not unfrequently illumined the lamp-lit study or the gloomy laboratory, and surprised the author, no longer an enthusiast, at his still-enduring task. But long ere this I had learned, that to carry out my original resolutions in all their completeness and entirety was impossible, and "that to pursue perfection was, like the first inhabitants of Arcadia, to chase the sun, which, when they had reached the hill where he had seemed to rest, was still at the same distance from them." * All I can further say in reference to this point, is simply to assure the reader, that three of the elements usually deemed essential to give value to a technological work,—viz., zeal, industry, and capital, have not been wanting in the production of the present one;—the first two depending on the author, and the other chiefly on the liberality and enterprise of the publisher.

As heretofore, I beg to solicit my readers to apprise me of any inaccuracies or omissions in this volume which may come beneath their notice. I shall also thankfully receive any hints or suggestions tending to the improvement of future editions of this work. Such communications to be useful, must, however, be written on only one side of the paper. Parties who may thus kindly afford me assistance, will, in due course, have their services publicly acknowledged; and their names and addresses, unless when otherwise requested, will be published in full.

I have endeavoured to render the present volume as self-explanatory as possible, and, in general, have appended ample directions to the several formulæ and processes that seemed to me likely to cause embarrassment to those inexpert in chemical manipulation; but should any party find it otherwise, I shall be happy to reply, gratuitously, to any reasonable questions tending to elucidate the difficulty.

In conclusion, I may add that, having now for nearly a quarter of a century devoted my attention to the applications of chymistry in most of the useful arts and manufactures, both British and Foreign, and in sanitation, I am in possession of many valuable processes and formulæ, hitherto wholly unknown, or but partially developed, with various improved plans of

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* Dr. Samuel Johnson's Preface to his English Dictionary.

factories, laboratories, ventilation, &c., which the limits of this work will not permit me to describe in its pages, but on which I should be happy to communicate with parties interested in the same. Persons desirous of establishing any new branch of manufacture, or of improving an existing one, or of determining the purity or value of articles of food, wines, liqueurs, medicines, &c., or of obtaining formulæ or processes which are not contained in this work, may, in like manner, have their wishes complied with, by inclosing to me samples, or the requisite information.*

ARNOLD J. COOLEY.

LONDON; *February* 1, 1856.

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* Communications for the Editor, in the *first case* addressed to him through the publisher, will be duly attended to.

ABBREVIATIONS, ETC., USED IN THIS WORK.

These, for the most part, consist of the first syllable, or the initial letter or letters of the words they stand for. As *Prep.*, preparation; *Pur.*, purity; *Purif.*, purification, &c. —*Obs.*, (in Italics,) at the commencement of a paragraph or sentence, stands for *observations;*—Obs., (in Roman letters,) following names or synonymes, means *obsolete.* —Ph., stands for *pharmacopœia;* Cod., for *codex.*—L., E., D., P., U. S., &c., associated with the last two abbreviations, are the initial letters of the cities and countries which produced the respective works; as, London, Edinburgh, Dublin, Paris, United States, &c. When no dates are given, the last editions of the pharmacopœias are referred to.

lb., *oz.*, *dr.*, respectively represent the *pound*, *ounce*, and *drachm* ($\frac{1}{8}$ *oz.*), AVOIRDUPOIS WEIGHT. This is the only weight employed in the new Dublin Pharmacopœia.

℔, oz., dr., and gr., refer to the *pound*, *ounce*, *drachm*, and *grain*, APOTHECARIES' or TROY WEIGHT.

The word "*drop*" in all cases indicates a measured drop or minim.

The *names of individuals* which appear in this work, are those to whom the immediately attached information or formula is usually attributed, or on whose recommendation or authority it has been selected.

ERRATUM.

Page 1029, 2d col., 17th line from the bottom, *after*—residuum tested as before, *add*—The alkaline liquid, from which the ether has been decanted, is then separated from any precipitate which may have formed, and both of these separately tested for alkaloids.

For another correction see *page* 1189, col. 2.

A
CYCLOPÆDIA OF PRACTICAL RECEIPTS
AND
COLLATERAL INFORMATION.

ABBREVIATIONS. Before the invention of printing, a great variety of abbreviations were employed, which are now disused. Those still retained in medicine, pharmacy, and chemistry, usually consist of the initial letters, or the first two or three letters of the words they stand for; but when necessary, a larger number are taken. *Ex.*—O., *octarius*, a pint; Aq., *aqua*, water; Man., *manipulus*, a handful; Coch., *cochleare*, a spoonful. Sometimes both the initial and final letters of a word are employed; as, No., *numero*, in number; āā, *ana*, of each; and in a few cases, z, is added to an initial letter to mark a contraction; as, oz., *ounce;* Zz., *zingiberis*, ginger. See *Prescriptions*, *Symbols*, *&c.*

ABERNETHY MEDICINES. These medicines originally consisted of a mercurial pill, to be taken overnight, followed by an aromatised black draught in the morning. The quantity of the first, for an adult, was about three grains and a half, increased a little in bulk by the addition of some liquorice powder; that of the last, from one ounce to one ounce and a half. As, however, when frequently taken, they sometimes occasioned salivation, which proved prejudicial to their sale, a little compound extract of colocynth (Ph. L. 1836) was introduced into their composition, by which this objection was obviated. Ultimately, their composition was settled at *three grains* of *mercurial pill*, and *two grains* of *compound extract of colocynth;* and these proportions are still followed as the best by those who prepare them. For persons who object to *black draught*, a dose of *castor oil*, or of any other mild purgative medicine that may be more agreeable to them, will be found equally efficacious. The *occasional* use of these medicines seldom fails to prove highly beneficial to the plethoric, bilious, and dyspeptic. In ordinary cases of constipation, headache, &c., arising from deranged stomach or liver, wherein the administration of mercurials is not contra-indicated, they will be found of great service. It need scarcely be added that these medicines are named after Mr. Abernethy, the celebrated surgeon, who is *said* to have frequently employed them in his practice.

ABERRATION (of mind). Mental alienation or wandering; insanity. This term is frequently applied to a mild form of incipient insanity or dementia, which is more or less occasional or continual, trifling or severe, according to circumstances. The studious, nervous, inactive, and those who are engaged in sedentary occupations and spend much of their time in ill-ventilated apartments, or who indulge in irregular or vicious habits, as well as "fast livers," are the most liable to this affection. It also frequently arises from disordered physical health. Change of scene, out-door exercise, agreeable company, pleasing and continual mental occupation, and due attention to diet, clothing, ventilation, &c., with the judicious use of some mild aperient medicine and tepid bathing, will generally alleviate, and frequently effect a cure.

ABIETIC ACID. An acid found by M. Baup in the resin of the pinus abies, or spruce fir.

Prep. Digest the *resin*, first in *dilute*, and afterwards in *strong alcohol;* mix the two liquors, filter, and evaporate; dissolve the residuum in *pure alcohol*, and again filter and evaporate. It may be purified by re-solution, the addition of a solution of *acetate of copper* to saturation, and subsequent decomposition by *hydrochloric acid.*

Prop., &c. Square crystalline plates; soluble in alcohol; with the bases it forms salts termed *abietates.* (See *below.*)

ABIETIC ACID (of Caillot). *Prep.* Digest the *resin* of the *abies picea* or *pectinata* (Strasburg turpentine), in *absolute alcohol,* and neutralize the residuum by digestion with *carbonate of potassa,* when *abietate of potassa* will be obtained, from which the abietic acid may be separated by saturating the alkali with another acid, as before.

Neither of the above compounds deserves to be ranked as a distinct acid.

ABIETIN. A crystallizable resin found by Caillot in Strasburg turpentine, and sometimes improperly called *abietic acid.*

ABIETINE. A name often absurdly given to the finer varieties of Strasburg turpentine. When thinned with a little oil of turpentine, it is used, like Canadian balsam, for attaching microscopic objects to slips of glass.

ABLUTION. The value of frequent and copious affusions of pure water to the surface of the body is well known. During life, the skin is continually subjected to abrasion, and the processes of reproduction and decay, by which its exterior portion, or the cuticle, is being constantly thrown off as effete and useless matter, in the shape of very minute scales or dust. This, mingling with the oily and saline products of the skin, acquires sufficient adhesiveness to attach itself to the surface of the body and clothing, as well as to attract the waste particles of our dress, and the dust and soot floating in the atmosphere. In this way, if occasional ablution be not had recourse to, the channels of perspiration will become choked, and the clothing itself rendered unwholesome and unfit for use. The consequence of the pores of the skin being obstructed, is impeded transpiration, by which its functions, as a respiratory organ, are interfered with or suspended. This adhering pellicle of refuse matter also acts both as a mechanical and chemical irritant, and forms a medium favourable for the absorption and transmission into the body, of effluvia, miasmata, poisonous gases, and the infectious and contagious vapours of disease. "The greater part of (contagious) poisons are conveyed to us through the external surface of our bodies; and it is fully proved, that poison, already communicated, has been by cleanliness removed, before it could actually produce any bad effects. I here allude, in particular, to frequent washing, bathing, rinsing the mouth, combing and brushing the hair, and often changing the linen, clothing, and bedding." (Hufeland.) Such are the immediate effects of neglected ablution of the skin; the further consequences are of an equally serious character. The blood being deprived of one of its sources of oxygen, and one of the outlets for its carbon, the functions of nutrition become imperfect, and the animal temperature lessened. The matters which would be thrown out of the system in the form of perspiration are retained, and must be eliminated by other channels. The lungs, the kidneys, the liver, and the bowels, are each in their turns "taxed" to perform the functions of another organ. The oppressed viscera suffer from exhaustion and incipient disease. Their particular offices are languidly performed, the equilibrium of health is disturbed, and skin-diseases, or consumption, diarrhœa, dropsy, liver-complaints, visceral obesity, or some other serious diseases of the vital organs, ensue. What further considerations need be offered to enforce the necessity of personal cleanliness? And when it is added, that *no dirty or imperfectly-washed skin can long continue healthy,* and *ceasing to be healthy must also cease to be agreeable or beautiful,* the argument in favour of the daily use of pure water to the whole surface of the body will surely be complete. See *Baths, &c.*

ABORTION. The expulsion of the human fœtus after the sixth week, and before the sixth month of pregnancy. Prior to the sixth week it is usually called *miscarriage;* and after the sixth month, *premature labour.*

Treat., &c. Avoid exciting causes, and seek a recumbent posture, quiet, and repose. A dose of castor oil, confection of senna, or other mild aperient, will be found advantageous; and when there is much hæmorrhage, injections of cold water or black tea may be had recourse to. A cold hip or sponge bath, to which a little vinegar may be added, has been recommended. Should these measures prove ineffectual, medical assistance should be at once called in.

ABRASION. A superficial injury of the skin, by the partial removal of the cuticle by friction. When the injured surface is large or exposed, it should be protected from dirt and further injury, by applying a piece of lint or soft linen rag, covered with spermaceti or some other simple ointment, over which a piece of strapping, or bandage of any sort, may be placed, to keep it on. In many cases, the application of a piece of common sticking-plaster, or soft rag, will be found sufficient.

ABRUS. The seeds of the *abrus precatorius,* (Linn.) constitute the *Angola Seeds* or *Jumble Beads,* of the shops. They are innocuous, but are reputed to be nervine, ophthalmic, and cephalic. They are made into rosaries, and necklaces for children, and are used for food in Egypt.

ABSCESS. A tumour or swelling in some membranous or fleshy part of the body, containing pus or purulent matter, resulting from suppuration consequent on inflammation. Abscesses have been divided into *acute* and *chronic.*

Acute Abscess is accompanied by active inflammation rapidly terminating in the formation of pus or matter, and the increase of the tumour. The former may be felt *fluctuating* within the part, if near the surface; an uneasy sensation of weight follows; the swelling assumes a conical shape, and what is popularly termed a head, or point; the skin reddens, and gradually becomes thinner, until at last it breaks, and the imprisoned matter escapes. In favourable cases, healthy action follows, the injury is repaired, and the wound heals; in others, instead of the matter escaping, the whole of it is absorbed into the circulation, and the swelling disappears; a circumstance which it is often conceived to be prudent to prevent, by encouraging the maturation of the tumour.

Chronic Abscess, until the discharge of matter commences, presents similar symptoms to those just described, but there is less inflammation. At this point, however, the latter heightens, fever is excited, and the discharge increases, producing debility and sometimes fatal results. The healing and reparative processes are also much more tedious than in the acute variety, often *barely keeping pace* with the *injurious effects* of the ulcer, even when in an improving condition.

Treat. In the early stages, cooling applications, friction, and continued gentle pressure may be had recourse to; if ineffectual, suppuration must be promoted by warm poultices and fomentations, and a liberal diet until the rupture of the tumour. The ulcer must then be kept perfectly clean, and dressed twice a day with simple ointment; a light nutritious diet being at the same time adopted, and the bowels kept gently open with mild aperients. When the abscess is situate in any part of the body where its presence might be productive of serious injury from pressure or diffusion, it should be cautiously opened with a lancet as soon as mature.

ABSINTHATE. A salt containing absinthic acid. The *absinthates* may be procured by double decomposition, from a mixture of solutions of absinthate of ammonia and the salts of the metallic oxides.

ABSINTHIC ACID. A peculiar acid found by Braconnot in the *artemisia absinthium,* or common wormwood. It exists in the plant in the state of *absinthate of potassa.*

Prep. To a *watery infusion of the plant,* add *solution* of *acetate of lead;* wash the precipitate in pure *cold* water, suspend it in water contained in a tall, narrow glass vessel, and pass *sulphuretted hydrogen gas* through the liquid until all the lead is thrown down in the form of sulphuret; lastly, decant, filter, and evaporate.

Prop., &c. Sour, uncrystallizable, deliquescent; forming salts with the bases called *absinthates,* some of which are crystallizable. It greatly resembles impure succinic acid, and when prepared as above, appears to consist of absinthic acid and absinthin.

ABSINTHIN. Syn. *Absinthia, Absinthina,*—Lat. A bitter substance found by Caventou in common wormwood, and called by him its "*pure bitter principle.*"

Prep. Digest *crude absinthic acid* (procured by the above process) in a mixture of *alcohol* and *ether,* and abandon the solution to spontaneous evaporation. The brown product may be purified by re-solution in alcohol, digestion with animal charcoal, and careful evaporation.

Prop., &c. White, semi-crystalline, and very soluble in alcohol. Its physiological effects are similar to those of extract of wormwood.

Dose. ½ to 1 grain, or more; as a remedy for dyspepsia, and as a substitute for quinine in intermittents.

ABSORBED. A term in use among French connoisseurs to represent that state of a picture in which the oil has sunk into the canvas or ground, leaving the colours flat, and the touches indistinct. The remedy consists in rubbing the surface of the picture, previously well cleaned, with a soft sponge dipped in a little *drying oil,* and after some days, varnishing it, when it should be kept in a warm room until perfectly dry.

ABSORBENT GROUND. Picture grounds prepared chiefly in *distemper* or *water-colour,* in order that the redundant oil may be immediately absorbed, for the purpose of expedition and imparting brilliancy to the colours.

ABSORBENTS. Among *chemists*, substances which possess the power of withdrawing moisture from the atmosphere, as *soils*, *argillaceous earths*, &c.; or which neutralize acids, as *chalk*, *lime*, and *magnesia*. They differ from deliquescent salts. The latter attract moisture and dissolve therein; whilst the former suck it into their pores, as a sponge does water. See *Absorption.*

ABSORBENTS. Medicines that remove acidity from the stomach and bowels. The principal absorbents are—*Magnesia* and *carbonate of magnesia*, *prepared chalk*, and the *carbonates* and *bicarbonates of soda*, *potassa*, and *ammonia*. The first three are popularly called EARTHY, and the others ALKALINE ABSORBENTS. See *Antacids*, *&c.*

ABSORPTION. The power possessed by soils of absorbing moisture. The more a soil is divided by labour and vegetation, the greater is its absorbent power, and consequently its fertility. The latter, indeed, chiefly depends on its capacity for imbibing moisture, and may be illustrated by reference to recent and disintegrated lava. (Leslie.) The finely divided state, most penetrable by the delicate fibres of plants, appears to derive its superior power of acting on atmospheric vapour from the augmentation of its surface and the multiplication of its points of contact. (Ure.) This method of increasing the fertility of a soil is well known to scientific farmers, and seldom neglected by them. (Loudon.) That soil must be regarded as the most fertile which possesses this power in the greatest degree. Garden mould has the highest absorbent power of any mineral substance. (Leslie.)

Process of ascertaining the absorbent power of soils, and other substances. Thoroughly dry the article by a moderate heat, and transfer it, whilst still warm, to a clean dry phial, furnished with a ground-glass stopper. When cold, remove it to a large wide-mouthed glass bottle, the atmosphere of which has previously been rendered as damp as possible, by suspending moistened rag or filtering paper in it. It must now be kept closed for some time. A delicate hygrometer being subsequently introduced, will indicate the degree of dryness of the enclosed air.

Obs. Experiments of this nature are only relatively correct, and must be performed under *exactly* similar circumstances, to furnish reliable comparative results. With this reserve, they will be found invaluable to the agriculturist. See *Absorbents*, *Agriculture*, *&c.*

ABSTINENCE. The advantages of *rational abstinence*, or *abstemiousness* in eating and drinking, both as regards the health and welfare of the individual, need scarcely be insisted on here. That, under certain circumstances, it conduces to longevity, there can be but little doubt. When excessive, its effects cannot fail to be prejudicial, and productive of debility, suffering, and disease. The instances of extreme abstemiousness, or abstinence, in persons who have reached a very great age, are far from few; but, on the other hand, we have no record of the number who have died from complaints thus produced, and depending on insufficient nutrition. *St. Anthony* is said to have lived to the age of 105 on twelve ounces of bread daily, and drank no other liquor than water. *James, the Hermit*, on a like diet, lived to 104; *St. Epiphanius*, to 115; *Simeon, the Stylite*, to 112; and *Kentigern*, or *St. Mungo*, to 185 years. (Spottiswood.) In opposition to this it would be useless to attempt to show the multitudes who have died from starvation, or from the use of an insufficient quantity of food; although this number would probably not equal the myriads who have expiated the follies of intemperance and gluttony by prematurely sinking into the grave. There can be no doubt that all the numerous reports of long fasting and excessive abstinence above referred to, have originated in imposture and credulity.

ACACIA. There are upwards of 300 species of acacia, many of them yielding products highly useful or agreeable to mankind; as catechu, gum arabic, perfumes, &c. The flowers of some of the species are used by the Chinese in dyeing yellow; those of the *Acacia farnesiana* (Willd.) growing in the E. and W. Indies, yield a delicious perfume, which is one of the principal ingredients in Italian perfumery.

ACACIA. The inspissated juice of the unripe fruit of the Mimosa nilotica, brought from Egypt, in roundish masses, enclosed in bladders. Astringent. The substance usually sold for it, is inspissated sloe-juice. A similar article is prepared from the Acacia Germanica, and sold in Germany under the name of *German Acacia*, or *Acacia Nostras*. They are little used.

ACARUS, (Lat.) A mite or tick. The following are well-known varieties,—*Acarus autumnalis*, the harvest bug; *Acarus domesticus*, the domestic tick; *Acarus dysenteriæ*, the dysentery tick; *Acarus* *ricinus*, the dog tick; *Acarus sacchari*, the sugar mite; *Acarus scabiei*, the itch insect; *Acarus siro*, the mite. Most of these animals are either microscopic or extremely minute, and possess such tenacity of life as to resist for some time the action of boiling water, and to live with comparative impunity in alcohol. The *irritation of the skin*, caused by them, may be relieved by a lotion of equal parts of sal volatile and water; and *they may be destroyed* by tobacco water, or a lotion or ointment of stavesacre.

ACCIDENTAL COLOURS. Syn. *Complimentary Colours.* If we look for some time, with one eye, on a bright coloured object, as a wafer, placed on a piece of paper, and subsequently turn the same eye to another part of the paper, a similarly shaped spot or mark will be seen, but the colour will vary, though it will be always the same under like circumstances. Thus, if the original spot or wafer be of a red colour, the imaginary one will be green; if black, it will be white: the imaginary colour being always "complimentary" of that first gazed upon. An attention to this subject is of the utmost importance in the art of dress, as the colour should be chosen with reference to the complexion. That best adapted to the particular individual can be easily determined, on scientific principles, before making a purchase or a trial. See *Dress, &c.*

ACCIDENTS. As no situation or condition in human life is not liable to a great variety of serious accidents, against which it is impossible always to guard, even by the greatest care and foresight, it becomes of the utmost importance to remember, that one of the most powerful assistants in dangerous or trying circumstances, is *presence of mind.* A certain amount of self-possession would have saved many lives which from its absence have been lost, and would have averted the mischiefs arising from various accidents, which without it, have become irretrievable. The mind overwhelmed by fear, or astounded by alarm, is utterly incapable of deliberately guiding us in securing either our own safety, or the safety of those who happen to be dependent on us, or in the same predicament as ourselves. It is, therefore, a proof of the truest wisdom to cultivate, and endeavour to preserve as much as possible, in all extraordinary and unexpected situations of danger or calamity, those invaluable mental requisites —*coolness*, *judgment*, and *determination;* in short—PRESENCE OF MIND.

ACERBITY. Acidity, with bitterness and astringency. See *Malt Liquors*, *Wines*, *&c.*

ACERIC ACID. Syn. *Maple Acid; Acidum Acericum,*—Lat. An acid found by Scherer, in combination with lime, in the milky sap of the common maple.

Prep. Keep *maple juice* in a warm situation for about a fortnight, that it may undergo fermentation; then filter, add a solution of *acetate of lead* as long as a precipitate forms; collect this on a filter, and wash it with *very cold water.* Next, carefully pour on a large quantity of *boiling* water, and receive it in glass vessels. *Acerate of lead* will be deposited as the liquor cools, under the form of brilliant crystals. These must be washed in *cold* water, dried, reduced to fine powder, and decomposed by *sulphuretted hydrogen,* as directed under absinthic acid.

Prop. &c. Crystalline; soluble; its salts are termed *acerates.* It resembles malic acid, with which it is probably identical. (Gmelin.)

ACESCENCY. The souring of fermented liquors, &c., by spontaneous decomposition, or the acetic fermentation. Fermented liquids that have been badly stored or kept too long, frequently become *acescent,* or acquire acescency. See *Wine, Beer, &c.*

ACETA MEDICATA, (Lat.) Medicated vinegars. See *Vinegars.*

ACETAL. An etherial fluid discovered by Dobeireiner, and at first named *oxygen ether.* It is one of the products of the slow combustion of alcohol by spongy platinum.

Prep. (Liebig.) Pour *alcohol,* to the depth of one inch, into a tall, wide-mouthed, glass bottle, and suspend three or four watch-glasses or capsules containing the *black powder of platinum,* (previously moistened with water,) to the depth of about two lines, close to the surface of the spirit. Place the apparatus in a warm situation for some weeks. Acetal, aldehyde, acetic acid, and acetic ether will be formed. Next neutralize the liquor with *chalk,* (or carbonate of potassa,) and carefully distil, (the first fourth only being collected.) The product treated with powdered *chloride of calcium,* until the latter is no longer moistened, decanted, and (very slowly) redistilled, yields pure acetal, as soon as the boiling point reaches 202° Fahr.

Prop. &c. Liquid, colourless, inflammable; alcoholic; miscible with ether and alcohol; soluble in 18 parts of water; unchanged in the air; decomposed by strong alkalies and acids; convertible by slow combustion into acetic acid. *Sp. gr.* ·821, at 72° Fahr.; boiling point, 204° F. Its odour resembles that of Hungary wines.

ACETAMIDE. A crystallizable substance soluble in water and alcohol, obtained by treating pure *acetic ether* with *ammonia.* Alkalies and acids reconvert it into ammonia and acetic acid.

ACETATE. Syn. *Acetas,*—Lat. A salt of acetic acid. The individual acetates are noticed under the respective bases.

Prep. By direct solution of the *carbonate, hydrate,* or *oxide of the base* in the *dilute acid;* or from a *solution of an acetate* and of a *salt of the base,* by double decomposition.

Prop., &c. The acetates are soluble in water, several so much so as to be uncrystallizable; many dissolve in alcohol; by distillation at a moderate red heat, they yield acetone and water, or acetone and acetic acid, and leave a carbonaceous residuum. The aqueous solutions of the *alkaline acetates,* suffer decomposition and turn mouldy. No more of them should, therefore, be dissolved at once, than is required for immediate use.

Tests. The acetates are recognised by—1. Evolving fumes of acetic acid on the addition of sulphuric acid;—2. Striking a deep red colour with the sesqui-salts of iron;—3. Yielding acetone, by destructive distillation. See *Acetic Acid.*

ACETETYL. A substance formed by the action of *pentachloride* of *phosphorus* on *acetate of soda.* See *Acids.*

ACETIC ACID. Syn. *Hydrated Acetic Acid, Monohydrated Acetic Acid, Hydrated Acetylic Acid, Acetous Acid, Pyroligneous Acid* (pure); *Acidum Aceticum,*—Lat. Acetic acid, strong enough to deposit crystals on cooling, is also termed—*Glacial Acetic Acid; Acetum Glaciale, Acidum Aceticum Glaciale,*—Lat.; *Radical Vinegar, Essence of Vinegar, Spirit of Verdigris, Spiritus Veneris, Esprit de Venus,* —*Obs.* The well-known acid principle of vinegar. Acetic acid is peculiar to the organic kingdom. It is one of the common products of fermentation, of the oxygenation of alcohol and of the destructive distillation of wood and other vegetable matter. It has been detected in several animal fluids, as the milk, urine, and perspiration, and is frequently generated by a morbid process in the stomachs of dyspeptic patients. In the vinegars of commerce, it is found in combination with mucilage, sugar, colouring matter, vegetable extractive, and water.

Var., &c. Commercial acetic acid occurs under the forms of the *pure acid* of the chemist and pharmaceutist, (*glacial* and *dilute,*) and of *vinegar.* Of the *latter* there exist several varieties—1. *Malt vinegar;*—2. *Wine vinegar;*—3. *Sugar vinegar;*—4. *Wood vinegar;*—5. *Alcohol vinegar.* The first three are formed by the acetous fermentation, which converts the alcohol of the wine, beer, or fermented sugar into acetic acid, by the absorption of oxygen; the fourth, by the destructive distillation of wood in iron retorts; and the last by the absorption of atmospheric oxygen, by the alcohol contained in the liquor. *Distilled vinegar* is another variety, produced by the simple distillation of either of the first three above referred to.

Prep. PURE ACETIC ACID is principally obtained from the *acetates,* either by the *action of a strong acid,* which seizes on the base, setting the acid free; or, by *dry distillation,* in which the high degree of heat employed separates the acetic acid from the base in the form of vapour. The following are the principal processes at present adopted for the purpose:—

1. (Liebig.) Take of *pure acetate of soda,* (thoroughly dried and finely powdered,) 3 parts; *pure sulphuric acid,* 9·7 parts. Pour the *acid* on the *acetate,* previously placed in a capacious retort. One-eighth of the acetic acid will then pass over by the heat developed by the reaction of the ingredients. The retort may next be placed in a sand-bath, until its contents become quite liquid. The product, carefully rectified, yields two parts of pure acid, containing only 20 per cent. of water. By exposing the latter portion which comes over in a closed vessel to a temperature below 40° Fahr., crystals of hydrated acetic acid will be deposited. The weaker, or liquid portion, being poured off, the crystals may be again melted and re-crystallized by cooling. The crystals of the last operation, separated from the liquid, are perfectly pure.

(*Obs.*) A good process for producing perfectly pure hydrated acetic acid.

2. (Mollerat.—*Without distillation.*) Take of *acetate of soda,* (pure commercial, powdered,) 100 *parts; concentrated sulphuric acid,* 35 or 36 *parts; acetate of lime,* q. s. Pour the *acid* gradually and cautiously on the *acetate of soda,* previously placed in a hard glazed stoneware or glass pan or receiver, so that the acid may flow *under* the powder, and little heat be generated by the operation. The whole must then be allowed to remain in contact (covered) for some hours, when crystalline grains of sulphate of soda will be found covering the bottom and sides of the vessel, and hydrated acetic acid, partly liquid and partly in crystals, the upper portion. The temperature being now slightly raised to a point barely sufficient to cause the liquefaction of the crystals of acetic acid, the fluid

is poured off, and a very small quantity of pure acetate of lime added to it gradually, until it yields no trace of free sulphuric acid on evaporation. After sufficient repose it may be decanted for use.

Obs. An excellent *commercial* glacial acetic acid is thus obtained *without distillation*, owing to the insolubility of sulphate of soda in acetic acid. If, however, the process is badly managed, or the proportions of the ingredients are not carefully observed, the product is contaminated with either a little sulphuric acid or saline matter. It is also important to success that it should be performed in a cool apartment, and in well-cooled vessels.

3. (Ph. Hann. 1831.) Take *acetate of soda*, (as last), 12 oz.; *strong sulphuric acid*, 9 oz.; *peroxide of manganese*, 2 oz. Mix, and distil as before. Rectify the product with *peroxide of manganese*, and *dried acetate of soda*, of each, 1 oz. Superior to the last, but more expensive.

4. (*Acidum Aceticum*,—Ph. L. 1836; *A. A. Fortius*,—Ph. L. 1824.) *Prep.* (Ph. L. 1836.) Take of *acetate of soda*, 2 lbs.; *sulphuric acid*, 9 oz.; *distilled water*, 9 fl. oz. Mix the *acid* with the *water*, and proceed as before.

Obs. The product is 165½ parts of liquid acid of the sp. gr. 1·048, containing 30·8% of real acetic acid for every equivalent, or 137 parts of crystallized acetate of soda employed, being within 1½% of the estimated product. 100 gr., of this acid saturate exactly 87 gr. of crystallized carbonate of soda. 15 parts added to 85 parts of distilled water is equal in strength to the distilled vinegar of the London Pharmacopœia. 1 part of acid to 6 parts of water are the proportions commonly employed in trade for this purpose. It is not strong enough to dissolve camphor, resin, or essential oils, in any quantity.

5. (*Acidum Aceticum*,—Ph. L. 1851.) This acid is now placed in the materia medica; the *same strength* being ordered as in Ph. L. of 1836.

6. (Ph. Bor. 1847.) Take of *crude sulphate or bisulphate of potassa*, 13 oz.; *sulphuric acid*, 7½ oz.; thoroughly dried *acetate of soda*, 12 oz. Mix the *first two*, and cautiously evaporate to dryness; cool, powder, mix with the *acetate*, and distil 7 oz., as before.

Obs. Sp. gr. of product, "1·068 to 1·070." "It contains from 84 to 85% of real acetic acid." (Redwood.)

7. (Lowitz' *Acetic Acid*.) Take of *sulphate of potassa*, 12 oz.; *sulphuric acid*, 6 oz.; *water*, 18 oz.; *acetate of soda*, (as last) 9 oz.; *oxide of manganese*, ½ oz. Mix the *sulphate*, *acid*, and *water*, evaporate, powder, mix with the other ingredients, and proceed as before. Resembles the last.

8. (Ph. D. 1826.) Take of *acetate of potassa*, 100 parts; *sulphuric acid*, 52 parts. Mix, and distil to dryness. *Prod.* 50 to 51 parts of liquid acetic acid, sp. gr. about 1·074, containing about 65·6% of real acetic acid.

9. (Ure.) Take of *acetate of potassa*, (fused and powdered), 2 parts; *strongest sulphuric acid*, 1 part; *dried acetate of lead*, q. s. Mix the *first two*, distil to dryness, and rectify, adding a little of the dried acetate of lead.

Obs. Stronger than the last, from the acetate being fused.

10. (*Acidum Aceticum*,—Ph. E. 1841.) Take of *acetate of lead* (prepared as under,) 6 oz.; *pure strong sulphuric acid*, 9½ fl. dr.; *red oxide of lead*, a few grs. The *acetate of lead*, previously dried and powdered, is to be heated to 320°, in a porcelain basin, placed in a bath of oil or fusible metal, and constantly stirred, until the powder ceases to concrete; it must then be weighed, mixed with the acid, and distilled to dryness, at a heat of 320°. The product is agitated with a few grains of red oxide of lead, the clear portion decanted, and redistilled.

Obs. Sp. gr. 1·063 to 1·065; but must not exceed 1·0685. It contains about 80·5% of real acetic acid. "20 per cent. of water added to it should increase its density. 100 minims neutralize at least 216 grains of carbonate of soda." It crystallizes when cooled to about 50° Fahr.

11. (Ure.) Take of *dried acetate of lead*, 4 parts; *strong oil of vitriol*, 1 part. Distil slowly to dryness. Nearly equal to the last.

12. (Baup.) As the last, putting a little peroxide of manganese into the retort before distillation.

13. (Liebig.) *Acetate of lead*, 3 parts; *sulphuric acid*, 8 parts.

14. (Fresenius.) Take of *crystallized neutral acetate of lead*, 10 parts; *effloresced sulphate of soda*, 3 parts; *sulphuric acid* and *water*, of each 2½ parts. Mix the *acid* and *water*, and when cold, pour the mixture on the *acetate* and *sulphate*, previously triturated together, and placed in a retort, and distil to dryness in a sand bath. Very pure; used as a test-acid in chemical analysis.

15. (Dollfuss' *Concentrated Acetic Acid*.) Take of *dried acetate of lead*, 12 oz.; *sulphuric acid*, 6 oz.; distil 7 oz.

16. (*Acidum Aceticum Glaciale, Glacial Acetic Acid,*—Ph. D. 1851.) *Prep.* Expose *finely powdered acetate of lead* (previously dried at a temperature of about 300° Fahr. until it ceases to lose weight) to an atmosphere of *dry hydrochloric acid* in a flask or retort, until "nearly the whole of it exhibits a damped appearance." Then connect it with a Liebig's condenser, and apply heat by means of a chloride of zinc bath, until "the whole of the acid shall have distilled over."

Obs. The hydrochloric acid may be prepared in the usual way, (See *Hydrochloric Acid,*) but must be dried before being used, by causing it first to bubble through a vessel containing *oil of vitriol,* and then to pass through a long tube containing small fragments of *fused chloride of calcium.* The sp. gr. of this acid is 1·065. It contains about 98% of hydrated acetic acid. The process, though apparently complicated, is not at all difficult to manage.

17. (*Acidum Aceticum Forte, Strong Acetic Acid,*—Ph. D. 1851.) *Prep.* Take of *glacial acetic acid,* (Ph. D.) 6 fl. oz.; *distilled water,* 4 fl. oz.; mix.

Obs. Sp. gr. 1·066. It contains about 59% of the hydrated or glacial acid.

18. (Christl.) From *commercial acetate* or *pyrolignate of lead,* in the same way as from pyrolignate of lime, using equivalent proportions, (See below.) The product in the retort is *muriate of lead* or *patent yellow.*

19. (Ure.) Take of *sulphate of iron* (gently calcined), 2 parts; *acetate of lead* (dried), 5 parts; mix, and carefully distil into a well-cooled receiver. An economical process under certain circumstances.

20. (Bardollier's *Strong Acetous Acid.*) *Dried acetate of lead,* 10 oz.; *calcined green vitriol,* 12 oz.; mix and distil as last.

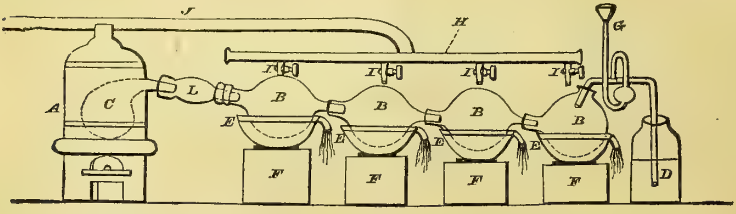
21. By using *acetate* or *binacetate of copper* (instead of sugar of lead), and *sulphate of iron,* as in the last two.

22. (Christl.) Take of *raw acetate* or *pyrolignate of lime,* (prepared by Völckel's process,) 100*lb.*; *hydrochloric acid,* (20° Baumé, or sp. gr. 1·1515), 120*lb.* Mix, and after 12 hours, distil in a copper vessel, with a gradually applied heat.

Obs. The product is 100*lb.* of acetic acid, of 8° Baumé, or sp. gr. 1·0556, containing about 47% of hydrated acid, only slightly coloured and empyreumatic, fit for many manufacturing purposes. By rectification from a little fresh-burnt wood charcoal and *pure* acetate of lime or soda, and dividing the products, an acid of any degree of purity and concentration may be obtained. The advantage of this process is the present low price of muriatic acid, and the product not being contaminated with sulphuric acid. It will be found that pyrolignate of lime generally contains 90% of neutral acetate, but should it contain either more or less, a proportionate quantity must be employed. If the hydrochloric acid used has the sp. gr. 1·16, a less quantity being employed, the product will have the sp. gr. of 1·058 to 1·061. The resin sometimes found floating on the mixed ingredients, should be removed by skimming, before distillation.

23. (Völckel.) Take of *acetate of lime,* (as last), 100 parts; *hydrochloric acid,* (sp. gr. 1·16), 90 to 95 parts; *water,* 25 parts; mix, and proceed as before. *Prod.* 96 to 98 parts of an excellent acetic acid (sp. gr. about 1·050,) well adapted to trading purposes.

24. Syn. *Radical Vinegar, Aromatic Vinegar, Spirit of Verdigris, Spiritus Veneris,—Obs. Esprit de Venus,*—Fr. *Acidum Aceticum,*—Ph. L. 1787. Carefully dry *crystallized verdigris* or *binacetate of copper* by a very gentle heat, and introduce it into a large stoneware retort, (See *Engraving,*)



A, Furnace.
B B B B, Glass receivers.
C, Stoneware retort.
D, Bottle containing vinegar.
E E E E, Basins containing water.
F F F F, Supports for basins.
G, Welter safety-tube.
H, Supply-pipe of cold water.
I I I I, Cocks to supply water to the basins.
J, Water main.
L, Adopter connecting retort and globes.

the bottom of which has been previously coated with a mixture of clay and horse-dung to render it more capable of standing the fire. Next place it in a suitable furnace, and connect it, by an adopter tube, with 3 or 4 double tubulated globes, the last of which must be furnished with a vertical tubulature, to which a double Welter's safety tube should be adapted, the other end being immersed in a basin half-filled with distilled vinegar or water, while the funnel portion communicates with the atmosphere. Then place each globe in a basin of water, kept cool by a stream constantly passing through it; and cover the upper portion with cloths, kept continually wetted with cold water. After 15 or 20 hours, fire may be applied, and must be so regulated that the drops follow each other with considerable rapidity from the end of the adopter tube, whilst the bubbles of air cause no inconvenience at the other end of the apparatus. If otherwise, the fire must be damped. The operation should be continued, and the fire gradually increased, until vapour ceases to come over, known by the globes gradually cooling, notwithstanding the heat of the furnace. The operation is now concluded, and the whole may be allowed to cool, and the acid collected, ready for being rectified for sale. The rectification may take place in a similar apparatus to the above, but it must be wholly of glass, and the retort should not be much more than half-filled. The operation must now be very carefully conducted, and discontinued before *barely* the whole of the acid has distilled over, as the last portion is apt to injure the flavour and colour of the rest. The first portions which come over are very weak, and should be kept separate, until the sp. gr. reaches 1·072, when the receiver should be changed, and the product may be collected in separate portions, as noticed below.

Obs. Good binacetate of copper yields, by careful management, at a temperature of 400° to 560° Fahr., about one-half its weight, of a greenish coloured acid, of the sp. gr. of about 1·061, containing about $50\frac{0}{0}$ of hydrated acetic acid. 20*lb.* of the ordinary acetate yields $9\frac{3}{4}$*lb.* of this rough acid, leaving a residuum of about $6\frac{1}{2}$*lb.* of metallic copper mixed with a little charcoal, in the retort, the remainder (nearly $\frac{2}{10}$ths of the acid in the acetate,) being decomposed by the heat and loss. This $9\frac{3}{4}$*lb.* of crude acid yields by rectification, and dividing the products, $\frac{1}{2}$*lb.* of acid of the sp. gr. 1·023; 3*lb.* of the sp. gr. 1·042; and 6*lb.* of the sp. gr. 1·065; exclusive of a little acetone which comes over with it. The strongest acid is found in the third receiver, and the weakest in the first. The acid obtained in this way contains a little fragrant pyroacetic spirit; which renders it preferable for aromatic vinegar and perfumery. It dissolves camphor, resins, and essential oils with facility. Well-dried *acetate of lead*, as well as several other acetates, may be substituted for acetate of copper in the above process; but are less economical and convenient. In all cases, great care must be taken to avoid over-firing, as thereby the quantity obtained is lessened, and the quality injured. The residuum of the distillation is pyrophoric, and frequently inflames spontaneously, on exposure to the air. Due caution must be therefore observed regarding it.

25. (Döbereiner.) Syn. *Alcohol Vinegar, German Acetic Acid.* In a bell glass or oblong glass case, arrange shelves, a few inches apart, one above another, on which place small flat dishes of earthenware or wood; fill these dishes with *spirit of wine* or *dilute alcohol*, and suspend over each, in small trays or capsules, a portion of the *black powder of platinum;* and hang strips of porous paper in the case, with their bottom edges immersed in the spirit to promote evaporation. Set the apparatus, loosely covered, in a light place at a temperature of from 70° to 90° Fahr.,—the sunshine, when convenient. In a short time the formation of acetic acid will commence, and the condensed vapours will be seen trickling down the sides of the glass and collecting at the bottom, whence it may be removed once or twice a day.

Obs. A case of 12 cubic feet content, with 7 or 8 oz. of platinum powder, is capable of producing, if well managed, nearly $1\frac{1}{9}$*lb.* of absolute acetic acid from 1*lb.* of absolute alcohol daily; 25*lb.* of platinum powder and 300*lb.* of alcohol in like manner will give daily nearly 350*lb.* of *pure acid*, and of other strengths in proportion. Theoretically, the product should be 110·6 of anhydrous, or 130 parts of hydrated acetic acid for every 100 parts of alcohol consumed; but this cannot be quite obtained in practice, as a small portion of the alcohol mixes with the newly-formed acid, and escapes decomposition. The platinum powder does not *waste*, and the most *inferior* spirit may be employed. By the above elegant and economical process, perfectly pure acetic acid of considerable strength may be produced from pure alcohol, but it is impossible in this way to obtain a concentrated acid, without a subsequent operation. Unfortunately the revenue laws of this country forbid the adoption of this beautiful process, but there is no statute that prevents any individual employing it on the small scale for private consumption. In Germany, and the United States of America, vinegar is manufactured on this plan, and from the low price of crude alcohol there, it will no doubt prove ultimately to be the *cheapest source of both pure acetic acid* and culinary vinegars; more particularly of the latter.

26. *An excellent acetic acid* of considerable strength may be made by soaking fresh burnt and perfectly *dry charcoal* in *common vinegar,* and then subjecting it to distillation. The water comes over first, and on increasing the heat, the acid follows. Vinegar-bottoms and waste vinegar may be used.

27. By exposing vinegar or dilute acetic acid to the air in very cold weather, or to freezing mixtures, the water separates in the form of ice, and the strong acetic acid may be obtained by draining it into suitable glass vessels, observing to do so at a temperature sufficiently low to keep the water solid. Adapted to cold climates.

28. Acid containing 20% of water may be deprived of a good deal of its superfluous water by standing over dry sulphate of soda. (Liebig.) It may then be used either with or without distillation.

29. Acetic acid of ordinary strength, may be concentrated to any degree, by rectification once or oftener from dry acetate of potassa or soda, rejecting the first and last portions. The same acetate may be used repeatedly. The heat must not exceed from 500° to 570° Fahr.

Prop. Pure hydrated acetic acid is liquid above 62° Fahr.; at 50° to 55° it crystallizes in brilliant, colourless, transparent needles and plates; at 40° it is a crystalline solid. *Sp. gr.* 1·063, (Mollerat;) 1·0629, (Brande;) 1·062, (Ure.) *Sp. gr.* of *crystals,* 1·135 at 55° Fahr. (Ure.) *Odour,* grateful, fragrant, pungent, and refreshing; *taste,* intensely sour and acrid; volatile; colourless; inflammable, burning with a white flame; oxidizes iron, zinc, copper, nickel, and tin; dissolves camphor, resins, gum resins, volatile oils, gliadine, and albumen; miscible with alcohol, ether, and water in all proportions; combines with the bases forming salts called *acetates;* boils at 230°, (Ure;) 240°, (Fownes;) and is decomposed at a red heat.

Tests, &c. When free, it reddens litmus paper, and may be readily recognised by its odour and volatility. For its detection when combined, see *Acetate.* A very delicate test is to separate and neutralize the suspected acid with *carbonate of potassa,* and to distil the acetate thus formed along with a little *arsenious acid,* in the dry way, when Cadet's fuming liquor (*alkarsine*) will be driven over, the horrible odour of which cannot be mistaken for anything else. For the determination of the quantity of pure acetic acid in commercial samples of liquid acid, see *Acetimetry.* Organic mixtures that cannot be thus tested, or from which the acid cannot be obtained by simple distillation, may be neutralized, if acid, with *carbonate of lime,* boiled for a few minutes, cooled, filtered, the lime precipitated with *dilute sulphuric acid,* and the whole submitted to distillation, when the acid content may be estimated as above.

Pur. "By heat, it escapes (entirely) in vapour; nothing is precipitated on the addition of either nitrate of silver or chloride of barium. When a thin plate of silver is digested in it, and hydrochloric acid subsequently dropped in, no precipitate is formed. Its colour is unchanged by the addition of hydrosulphuric acid, or ammonia, or by ferrocyanide of potassium, added after the ammonia." (Ph. L.) Sometimes it is accidentally contaminated with a little sulphurous acid, which may be recognised by carefully inhaling the fumes, and by a white precipitate being formed on the addition of a little peroxide of lead.

Adult. The acetic acid of the shops is chiefly adulterated with water. The vinegars of commerce are scarcely met with pure. See *Acetimetry* and *Vinegar.*

Uses. Acetic acid is largely used by the chemist and pharmaceutist, for the manufacture of various preparations, and in analysis; by the perfumer, for the production of several of our most refreshing and choicest scents; and in medicine, as an antiseptic, stimulant, rubefacient, alterative, refrigerant, and escharotic. The acetic acid (Ph. L.) applied by means of a piece of rag tied to the end of a small stick, is said to be a certain cure for ringworm or scaldhead—one or two applications generally effect a cure; as a caustic, it removes warts and corns; a piece of lint or blotting-paper wetted with it and applied to the skin, (evaporation being prevented,) forms an extemporaneous blister; it was once employed as a disinfectant, but is now only used as a fumigation, to remove the unpleasant smell of the sick room or crowded assemblies. It is a popular refreshing scent in faintings, asphyxia, and nervous headache; and is a valuable rubefacient, astringent, and local stimulant. It is also used as a rubefacient and caustic in *veterinary practice.* In its stronger forms it acts as a corrosive poison. The *antidotes* and *treatment* are similar to those directed for poisoning by the other acids.

In the *dilute state,* (vinegar,) a little added to water forms a useful drink in fever, scurvy, and phthisis. Added to clysters, it is useful in obstinate constipation; mixed with honey it forms a common gargle in ulcerated sore-throat; a few drops mixed with water make an excellent collyrium for chronic ophthalmia, and for removing lime-dust from the eye; in sprains and bruises it forms a valuable fomentation.

In the arts, it is used by the engraver to etch his plates; as an antiseptic in pickling and preserving animal and vegetable food, and anatomical preparations; in dyeing and calico printing; and in the manufacture of medicated vinegars and other pharmaceutical preparations.

As a *condiment,* vinegar promotes the appetite and assists digestion, but its habitual or excessive use is said to produce emaciation.

Dose, &c. Water soured with acetic acid or vinegar may be taken ad libitum as a refrigerant beverage. In *enemas,* 1 to 2 oz. of distilled vinegar is the proper quantity; for a *lotion,* 3 oz. of the latter to 5 or 6 oz. of water; and for a *collyrium,* 1 oz. to about a pint of distilled water.

Concluding Remarks. Acetic acid, *on the large scale,* is principally prepared from *acetate of soda,* which yields a sufficiently strong and pure acid for commercial purposes, without the trouble of rectification. In this process shallow vessels of wood, or of copper formed without rivets or solder in those parts exposed to the action of the acid, are employed for the purpose of the distillation. A coil of *drawn* copper pipe, heated by steam, having a pressure of 30 to 40*lb.* to the inch, traverses the bottom of the apparatus. The refrigeratory consists of well-cooled earthenware, Berlin ware, or glass vessels, and the adopter pipe is also of the same materials. *Stills* of earthenware are also frequently employed; and even worms and condensers of silver, or silvered copper, are sometimes used. The crystallized acetate of soda is placed in the still, and 35 to 36$\frac{0}{0}$ of strong oil of vitriol is added; the whole stirred together with a wooden spatula, the head luted on, and the distillation soon afterwards commenced. The product has the sp. gr. of about 1·050, and after being agitated with a little animal charcoal, and passed through a prepared calico filter, is fit for sale. A little acetic ether is added by some manufacturers. In this way 4*lb.* of acid of the above strength is obtained for every 3*lb.* of the acetate of soda employed. Should rectification be had recourse to, the addition of about 2 or 3 per cent. of *bichromate of potassa, peroxide of manganese,* or *red oxide of lead,* will prove useful in removing empyreuma, if present. In distilling the weaker acids and vinegars, it is found useful to add from 25 to 30$\frac{0}{0}$ of chloride of sodium, which, by raising the boiling point of the liquid, allows the acid the more freely to pass over, (Stein;) but this addition proves disadvantageous if any sulphuric acid be present, in which case sulphate of soda may be employed instead.

On the *small scale,* glass retorts are usually directed to be used, but glass alembics are more convenient and safe, as the product is less likely to be contaminated by the spirting of the ingredients over the brim of the vessel. In preparing the pure acid, care should be taken that the acetate of soda does not contain common salt, as the carbonate of soda, prepared by calcination, and frequently used to form the acetate, is generally contaminated with it, and yields up its muriatic acid during the process of distillation, thus vitiating the product. In all the methods given, the product becomes more concentrated in proportion to the dryness of the acetate and the strength of the oil of vitriol. By using the one *dry,* and the other *concentrated,* glacial acid may always be obtained by *collecting separately* the last two fifths that come over. The crystallized acetate loses about $\frac{2}{5}$ths of its weight by being thoroughly dried. See *Acetimetry, Vinegar, &c.*

ACETIC ACID (Anhydrous). Syn. *Dry Acetic Acid, Gerhardt's Acetic Acid, Acetylic Acid, Acetate of Acetetyle.* This is the preceding acid free from water, as it exists in the dry acetates.

Prep. 1. Mix, in a glass retort, well-fused *acetate of potassa,* with half its weight of *chloride of benzoyle,* apply a gentle heat, collect ~~the~~ liquid that distils over, and submit it to careful rectification.

2. Add *oxychloride of phosphorus* to a considerable excess of *acetate of soda,* agitate, and proceed as before. The product is *chloride of acetyle,* and *dry acetic acid.*

Prop., &c. A limpid, colourless, oily liquid; smelling of acetic acid and hawthorn; sp. gr. 1·073; boils at 278½° Fahr.; hot water resolves it into hydrated acetic acid. See *Acids.*

ACETIC ACID (Aromatic). Syn. *Aro-*

matic Vinegar; Acidum Aceticum Aromaticum,—Lat. *Prep.* (Ph. E. 1839.) *Dried rosemary* and *origanum,* of each, 1 oz.; *lavender flowers,* ½ oz.; *bruised cloves,* ½ dr.; *acetic acid,* (sp. gr., 1·068,) 1½ pint; macerate 7 days, express, and filter. A fragrant and refreshing perfume.

2. (Ph. E. 1817.) As above, using distilled vinegar instead of the strong acid of the Pharmacopœia. Inferior.

3. (Ph. Bor. 1847; Cod. Med. Hamb. 1845.) *Prep. Oil of cloves,* 1 dr.; *oils of lavender* and *citron,* of each 2 scrup.; *oils* of *bergamot and thyme,* of each 1 scrup.; *oil of cinnamon,* 10 drops; *strongest acetic acid,* 1 oz.; mix. Limpid; yellow-brown; highly fragrant and refreshing. See *Camphorated Acetic Acid* and *Aromatic Vinegar.*

ACETIC ACID (Camphorated). Syn. *Acidum Aceticum Camphoratum,*—Ph. E. & D. *Prep.* 1. (Ph. E.) *Camphor,* ½ oz.; pulverize by means of a few drops of *spirit of wine,* and dissolve in *acetic acid,* (Ph. E.), 6½ fl. oz.

2. (Ph. D.) *Camphor,* 1 *oz.*; *rectified spirit,* 1 *fl. dr.*; pulverize, and dissolve in *strong acetic acid,* (Acid. Acet. Forte—Ph. D.), 10 *fl. oz.*—*Obs.* Fragrant and refreshing; useful as an embrocation in rheumatism and neuralgia; and as a fumigation in fevers, &c.

ACETIC ACID (Dilute). Syn. *Acidum Aceticum Dilutum,*—Ph. L. & D. *Prep.* 1. (Ph. L.) *Acetic acid,* (Ph. L.), 23 fl. dr.; *distilled water,* q. s. to make the whole accurately measure 1 pint. Sp. gr. 1·008. "One fluid ounce is saturated by 57 grains of the crystals of carbonate of soda." It contains about 6% of hydrated acetic acid.

2. (Ph. D.) *Acetic acid of commerce,* (sp. gr. 1·044), 1 pint; *distilled water,* 7 pints; mix. Sp. gr. 1·006. It contains about 4% of the hydrated acid.

ACETIC ACID (Strong). Syn. *Acidum Aceticum Forte,*—Ph. D. *Prep.* 1. (Ph. D.) *Glacial acetic acid,* (Ph. D), 6 fl. oz.; *distilled water,* 4 fl. oz.; mix. Sp. gr. 1·066. It contains 59% of the hydrated acid.

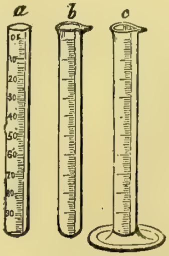
2. *Acidum Aceticum Fortius,*—Ph. L. 1824. See *Acidum Aceticum,*—Ph. L. 1836.

ACETIC ACID (from wood). Syn. *Acidum Aceticum e Ligno Venale,*—Ph. E. & D. The acetic acid of commerce; purified pyroligneous acid; sp. gr. 1·044.

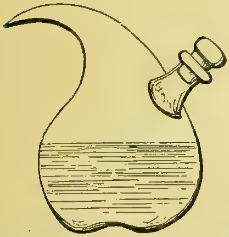
ACETIFICATION. The oxygenation of alcohol in the process of making vinegar. To be capable of acetification or conversion into vinegar, it is necessary that the liquid should contain alcohol in some state or other, or some substance, as sugar, which, by the process of fermentation, is capable of producing alcohol. The presence of a ferment or nitrogenous vegetable matter, and a temperature between 70° and 100° Fahr., facilitates the operation. In the conversion of wines, beer, wort, &c., into vinegar, the sugar is first transformed by fermentation into alcohol, and in this state becomes oxygenized or acidified, by the absorption of atmospheric oxygen. This transmutation is operated by a species of catalytic action, which the researches of chemists have as yet left unexplained. Manufacturers should always remember that such is the true nature of this process. See *Fermentation,* and *Vinegar.*

ACETIMETRY. The art of determining the strength of acetic acid and vinegar. Several methods are employed for the purpose, based on the—*saturating power of the acid;* the—*specific gravity after the liquid has been neutralized with hydrate of lime;* and the—*simple specific gravity.*

Proc. 1. Take of *pure crystallized bicarbonate of potassa,* 196½ grs.; dissolve in *a little water,* and then add *water* to make up *exactly* 1000 parts by measure; as, for instance, 1000 minims, or the 100 divisions of an acetimeter, or graduated glass tube. A solution is thus formed, which, when cautiously added to *one hundred minims* or *measures* of acetic acid or vinegar, until the latter is *exactly* saturated, indicates the exact amount of acid present in the sample. The quantity of test liquor employed may be read off from the scale of the acetimeter, every division of which represents 1% of dry acetic acid. If the sample under inspection be the stronger acid, it will be found convenient, previously to testing it, to dilute it with 2 to 8 times its weight of distilled water, according to its degree of concentration. The dilute acid and vinegars require no such addition. Care must be taken to avoid the effervescence following each addition of the bicarbonate, vitiating the result. By using only 98¼ grains of the *bicarbonate of potassa,* we obtain a test liquid of still greater susceptibility. Every acetimeter division will then represent only half a grain of real acetic acid. The acetimeter employed is commonly one or other of those represented in the engraving.



2. *Crystallized bicarbonate of potassa,* 196½ grs.; *distilled water,* q. s. Dissolve in a suitably shaped bottle, previously carefully weighed, and see that the solution is *exactly* equal to 1000 grs. This test liquor is used like the last, but in this case the quantity tested must be 100 grs. instead of 100 measures. Every grain of the test liquor indicates $\frac{1}{10}$th of a grain of real acetic acid, and every ten grs. are equal to 1$^0_0$. A convenient bottle for the purpose is Schuster's Alkalimeter. (See *engr.*) The weight of the bottle and solution, after the process, deducted from their previous weight, gives the exact weight of the test liquor consumed, and by dividing this number by 10, the quantity of acetic acid per cent. in the sample is immediately found. This method admits of great accuracy.



3. To 100 or 1000 parts of the sample under inspection, cautiously add from a *weighed* quantity of powdered *pure dry bicarbonate of potassa,* sufficient to produce exact neutralization, as before; and carefully re-weigh the bicarbonate unconsumed. Double the loss in grains will indicate the quantity of acid in the liquid tested.—Less accurate than the last, but more convenient, particularly to the traveller and man of business.

4. (Ure.) To 100 grains of the sample (as above), very slightly reddened with *neutral* (blue) *tincture of litmus,* add, cautiously, *liquor of ammonia* (ammonia water), sp. gr. 0·992, (from an acetimeter holding 1000 water-grains measure, divided into 100 divisions,) until precise neutralization be effected, indicated by the neutral or blue colour of the litmus being restored. The number of the acetimeter divisions of the test liquor expended, multiplied by 51 or 60, and the first two right-hand figures of the product cut off as decimals, will give a number which will represent respectively the exact quantity of *dry* and *hydrated* acetic acid in the sample.—*Ex.* I find a sample of vinegar takes 10 divisions of test liquor for complete neutralization; then 10 × 51 = 5·10, or 5$\frac{1}{10}$ $^0_0$ of dry acid; or, 10 × 60 = 6·00, or 6$^0_0$ of hydrated acetic acid. If the number of grain-measures be employed as the multiplier instead of the divisions of the acetimeter, then the first three right-hand figures must be pointed off. Thus, 175 grain-measures of test liquor being used, it would be, 175 × 51 = 8·925, or nearly 9$^0_0$ of real acid; 175 × 60 = 10·500, or 10½ $^0_0$ of glacial acetic acid. In practice, it is found more convenient to keep the ammonia water ready tinged with litmus, in which case it is added to the acid until it ceases to change colour, from blue to red. Great care must also be taken to have the ammonia water of the proper specific gravity. With care, this method gives very accurate results, and is easily applied.

5. Instead of bicarbonate of potassa, directed above, 104 grs. of *dry,* or, 281 grs. of *crystallized carbonate of soda,* or, 135 grs. of *dry carbonate of potassa,* may be employed, the usual precautions as to their purity being observed.

Obs. A matter essential to success in testing acetic acid or vinegar, in the way directed above, is hitting the exact point of neutralization; neither adding too little nor too much of the given test, from both of which inaccurate results must alike be obtained. It will be found greatly to simplify the operation to tint with litmus, either the sample under examination, or the test liquor, in the manner suggested above. Towards the end of the experiment, a gentle heat may be applied to the sample, in order to expel the free carbonic acid in the liquor, which of itself possesses the property of reddening litmus. A glass, with a rounded bottom inside, will be found most convenient to hold the sample, and a *glass* or *wooden* rod only should be used as a stirrer.

6. (*Revenue System.*) *Common hydrate of lime,* (powdered fresh-slaked lime,) is added gradually to the sample until it is saturated, when the sp. gr. of the resulting clear solution of acetate of lime is taken by the acetimeter of the Messrs. Taylor. This instrument resembles the common hydrometer in form, and stands at the mark on the stem called proof, in a solution containing 5$^0_0$ of real acid (No. 24 vinegar), 100 grs. of which are saturated by 14½ grs. of crystallized carbonate of soda. For vinegars stronger than proof, small weights are provided, each of which indicates an additional 5$^0_0$ up to 35$^0_0$, the greatest strength at which the duty is levied by the gallon. To ascertain the per-centage of real acid, 5$^0_0$ must therefore be added to the acetimeter number. Thus: without being loaded, the instrument, on floating to the proof mark, indicates a vinegar of 5$^0_0$; with *one* weight, a vinegar of 10$^0_0$; with *two* weights, 15$^0_0$; &c.: the starting-point, or proof, being an acid of 5$^0_0$. According to this system of notation, which is now generally adopted in

trade, each 5% is called a vinegar. An acid of 10% is said to contain *two* vinegars; one of 15%, *three* vinegars, &c. It is also common to speak of the degrees of the acetimeter as *proof* or *overproof.* Thus: No. 24 vinegar is said to be proof; one of 5 acetimeter degrees—5 overproof; one of 10 degrees—10 o. p., &c. For malt and wine vinegars, which contain gluten and mucilage, this method is not strictly accurate, as these substances alter the specific gravity. A small weight marked, M, is therefore supplied by Mr. Bate with the acetimeters made by him for trying such vinegars.

7. By carefully ascertaining the *specific gravity* by any of the usual methods, and then seeking for the corresponding number in one of the following tables. This method furnishes reliable results when the liquid does not contain above 50% of glacial acid, or has a higher sp. gr. than about 1·060. By carefully diluting a strong acid with two, three, or four times its weight of water, and allowing it again to acquire its normal temperature, the sp. gr. may be taken as a guide; in which case, all that is necessary, is to multiply the indication furnished in the tables by 2, 3, or 4, as the case may be.

TABLE I.—*Adapted to the specific gravities of common vinegar.* By Messrs. TAYLOR.

Revenue Proof Acid, called by the manufacturer No. 24, or

sp. gr.		per cent.
1·0085	contains of anhydrous or real acetic acid	5
1·0170	,, ,,	10
1·0257	,, ,,	15
1·0320	,, ,,	20
1·0470	,, ,,	30
1·0580	,, ,,	40

TABLE II.—*Exhibiting the sp. gr. of pure Acetic Acid of successive strengths; the liquid crystallizable hydrate being reckoned* 100. By Dr. URE.

Hydrated Acid per cent.	Sp. Gr.	Hydrated Acid per cent.	Sp. Gr.
100	1·0620	82	1·0740
98	1·0650	80	1·0750
96	1·0680	78	1·0748
94	1·0700	76	1·0743
92	1·0715	74	1·0740
90	1·0728	72	1·0733
88	1·0730	70	1·0725
86	1·0735	68	1·0716
84	1·0738	66	1·0712
64	1·0701	40	1·0512
62	1·0687	35	1·0459
60	1·0675	30	1·0405
58	1·0665	25	1·0342
56	1·0647	20	1·0282
54	1·0634	15	1·0213
52	1·0617	10	1·0147
50	1·0603	5	1·0075
45	1·0558		

TABLE III.—*Exhibiting the sp. gr. of pure hydrated or glacial Acetic Acid.* By M. MOHR.

Per cent. of Glacial Acid, ($C_4H_3O_3$, Aq.)	Sp. Gr.	Per cent. of Glacial Acid, ($C_4H_3O_3$, Aq.)	Sp. Gr.
100	1·0635	63	1·068
99	1·0635	62	1·067
98	1·067	61	1·067
97	1·0680	60	1·067
96	1·069	59	1·066
95	1·070	58	1·066
94	1·0706	57	1·065
93	1·0708	56	1·064
92	1·0716	55	1·064
91	1·0721	54	1·063
90	1·0730	53	1·063
89	1·0730	52	1·062
88	1·0730	51	1·061
87	1·0730	50	1·060
86	1·0730	49	1·059
85	1·0730	48	1·058
84	1·0730	47	1·056
83	1·0730	46	1·055
82	1·0730	45	1·055
81	1·0732	44	1·054
80	1·0735	43	1·053
79	1·0732	42	1·052
78	1·0732	41	1·0515
77	1·073	40	1·0513
76	1·072	39	1·050
75	1·072	38	1·049
74	1·072	37	1·048
73	1·071	36	1·047
72	1·071	35	1·046
71	1·071	34	1·045
70	1·070	33	1·044
69	1·070	32	1·0424
68	1·070	31	1·041
67	1·069	30	1·040
66	1·069	29	1·039
65	1·068	28	1·038
64	1·068	27	1·036

Per cent. of Glacial Acid, $(C_4H_3O_3, Aq.)$	Sp. Gr.	Per cent. of Glacial Acid, $(C_4H_3O_3, Aq.)$	Sp. Gr.
26	1·035	12	1·017
25	1·034	11	1·016
24	1·033	10	1·015
23	1·032	9	1·013
22	1·031	8	1·012
21	1·029	7	1·010
20	1·027	6	1·008
19	1·026	5	1·0067
18	1·025	4	1·0065
17	1·024	3	1·004
16	1·023	2	1·002
15	1·022	1	1·001
14	1·020	0	1·0000
13	1·018		

Concluding Remarks. Before applying any of the above processes, account should be taken of any mineral acid, which may have been added, (as is common with vinegars,) to impart artificial strength; and in those depending on the sp. gr., gum, gluten, &c. must also be allowed for. The methods depending on the saturating power of the acid will be found appropriate to acetic acid of all strengths, when unadulterated with the mineral acids; the *revenue system* is well adapted to commercial vinegars and all crude samples of acetic acid, within the limit of its scale, (40% of dry acid,) whether they be adulterated with oil of vitriol or not; as if the latter be present, it is precipitated, as sulphate of lime, by the hydrate of lime employed in the process. The method based on the sp. gr. is also very convenient, and is sufficiently accurate for distilled vinegars and pure acids of moderate strength.

It is found that the decimal fraction of the sp. gr. of pure or nearly pure vinegar, is doubled by its conversion into acetate of lime. Thus: 1·0085 in vinegar becomes 1·0170 when converted into a solution of acetate of lime. In malt vinegar, however, 0·005 may be deducted from the sp. gr. for mucilage and gluten. The quantity of foreign matter present in vinegar may therefore be approximatively ascertained, by deducting the decimal of the sp. gr. of the solution of acetate of lime from double that of the decimal part of the sp. gr. of the vinegar. Thus:—the sp. gr. of a sample of vinegar being 1·014, and after saturation with hydrate of lime 1·023, the sp. gr. of the *pure* vinegar would be 1·009, and that due to foreign matter ·005.

As both *dry* and *glacial* acetic acid are unavoidably referred to in speaking of strengths, it may be convenient to know that 51 parts of the *former* are equal to 60 parts of the *latter;* or, what is the same thing, the weight of *glacial* or *hydrated acetic acid,* multiplied by ·8512, gives the weight of the DRY OR ANHYDROUS ACID which it contains; and that of the *anhydrous acid,* multiplied by 1·1748, gives a number representing an equivalent weight of GLACIAL ACID, (nearly.) See *Acidimetry* and *Vinegar.*

ACETO-BENZOIC ACID. See *Organic Acids.*

ACETO-CINNAMIC ACID—

ACETO-CUMINIC ACID. Both these compounds for the most part resemble acetobenzoic acid, and are obtained in a similar manner.

ACETOMETRY. See *Acetimetry.*

ACETONE. Syn. *Pyroacetic Spirit, Pyroacetic Ether; Spiritus Pyroaceticus,*—Lat. *Acétone, Esprit Pyro-acétique,*—Fr. An ethereal liquid, chiefly obtained by the dry distillation of the acetates, the bases of which retain carbonic acid at a red heat.

Prep. Submit the *acetate,* placed in very shallow retorts, or other suitable vessels, to dry distillation, at as low a temperature as possible, compatible with its decomposition; slowly and cautiously increasing the heat, until no more spirit comes over. The product, after repose and separation from the empyreumatic oil with which it is mixed, must be rectified over carbonate of potassa, or chloride of calcium, or better still, over quick lime, to which some animal charcoal may be added, and the process repeated until the liquid be sufficiently pure, and its boiling point constant. The *product* is about 2 to 2¼ gallons of pyroacetic spirit for every cwt. of acetate of baryta or lime employed. Theoretically, the product should be about 20%, but such a quantity is unattainable in practice, owing to the decomposition of a portion of the newly formed acetone during the process. The *acetates* of *baryta, lime, potassa,* and *soda,* are the only ones adapted for the purpose; the preference being given to them in the order in which their names appear above. It may also be obtained in large quantities from *beech-tar,* and by distilling the *tarry deposit of crude pyroligneous acid.*

Prop. Limpid, colourless; miscible with water, alcohol, and ether, in all proportions; taste, pungent and acrid at first, afterwards cooling, somewhat like that of peppermint; odour, penetrating, aromatic, and slightly empyreumatic; sp. gr. 0·7922; boils at 132°;

very inflammable, giving a brilliant flame without smoke; dissolves resins and essential oils.

Uses. It is burnt in lamps, for which it is as good as spirit of wine, but requires more care; and is used to dissolve resins (gums) by the hatters, but for this purpose it is now almost superseded by wood-naphtha.

ACETONITRILE. A colourless, aromatic, volatile, liquid, obtained by distilling acetate of ammonia with anhydrous phosphoric acid.

ACETOUS ACID. It was formerly supposed there were two vinegar acids, containing different proportions of oxygen, which were accordingly named the *acetous* and *acetic;* the salts of the former being termed *acetites*, those of the latter, *acetates.* Modern research has shown their identity.

ACETOUS FERMENTATION. See *Acetification* and *Fermentation.*

ACETYLE. Syn. *Acetyl, Acetule.* The hypothetical radical of the acetic compounds. Neither acetyle nor its oxide has, as yet, been obtained alone. The *hydrated oxide of acetyle* is *aldehyde. Chloride of acetyle* is formed by the lengthened exposure of *chloride of ethyle* to the action of *chlorine* and *light*, and also in the process of making anhydrous acetic acid. It is a heavy, colourless, fuming liquid, decomposed by water, yielding acetic and hydrochloric acid. *Oxychloride of acetyle,* is prepared by saturating *anhydrous ether* with perfectly *dry chlorine gas,* exposure to external cold, and afterwards to a gentle heat. These are transparent colourless fluids. *Sub-oxychloride of acetyle* is a gas formed by heating the last article in contact with *potassium. Oxysulphuret of acetyle* is made by passing *sulphuretted hydrogen* through the *oxychloride,* until an oily liquid forms, which by exposure becomes semi-crystalline. This is dissolved in hot alcohol, and separates in crystals on cooling.

ACETYLIC ACID. Anhydrous acetic acid; so called on the presumption that it is a compound of acetyle and oxygen.

ACHILLEINE. A peculiar bitter principle obtained from the achillea millefolia, or common milfoil. See *Alkaloids.*

ACID. Syn. *Acidum,*—Lat. *Acide,*—Fr. In *familiar language,* any substance possessing sourness or acidity; in *chemistry,* an electro-negative compound, capable of uniting in definite proportions with bases, forming salts, and which, when either liquid or in solution, possesses a sour taste, and reddens litmus.

Class, &c. The acids have been variously classed by writers into *animal, vegetable,* and *mineral; organic* and *inorganic; metallic* and *non-metallic; oxygen acids,*(oxacids,) *hydrogen acids,* (hydracids,) and *acids destitute of either of these elements,* the names being applied according to the kingdom of nature, or class of bodies, to which the "radical" belongs, or after the "element' which was presumed to be the acidifying principle. The only useful general classification of these compounds is into *organic* and *inorganic* acids.

Gen. Prop., &c. Forms, various;—*gaseous,* as carbonic acid; *liquid,* as nitric and acetic acid; and *solid,* as citric and oxalic acid. Some under peculiar conditions assume more than one of these forms. Those which are soluble or liquid, taste sour, are corrosive when concentrated, change vegetable blues to red, and restore the original colours to vegetable blues turned green, or yellows turned brown, by an alkali. Most of the acids are soluble in water in all proportions, and some of them (as the sulphuric) have so strong an affinity for it, as to absorb it from the atmosphere. They neutralize the alkalies, effervesce with the carbonates, and combine with the bases generally, forming compounds termed *salts.* Most of the acids are either volatilized or decomposed by a moderate degree of heat, but some resist a considerable temperature.

Tests, &c. The method of testing for the individual acids will be found under their respective names. In most cases the mere presence of an acid may be known by the sourness of the compound, by its reddening blue litmus paper, and exhibiting the other general properties of acids already described. The *organic acids* are decomposed upon ignition, carbonized, and destroyed; their salts (particularly those with the alkalies and earths) also suffer carbonization, and are mostly resolved into carbonates of the respective bases. The *inorganic acids* deport themselves in a different manner when thus treated. Hence these two great classes of acids are readily distinguished from each other.

Ant., &c. All the stronger acids act as poisons, and some are very poisonous even when considerably diluted with water. The following is the treatment usually recommended when they have been swallowed.—Administer tepid water or other diluents (milk, broth, &c.) abundantly, mixed with chalk, magnesia, carbonate of magnesia, or the carbonates or bicarbonates of potassa (except for oxalic acid) and soda. Salad oil, oil of almonds, &c., may also be given, followed by a strong emetic; and subsequently by emollients, warm baths, and, (to allay nervous excitability,) small doses of morphia or opium. The diet during convalescence should be light and digestible. When the poison is *oxalic acid*, chalk or magnesia should *alone* be used, as this acid forms a *poisonous* salt with the alkalies. See *Oxalic Acid* and *Hydrocyanic Acid.*

Uses. The acids are employed as escharotics, anti-alkalines, astringents, styptics, lithontriptics, tonics, refrigerants, &c. Water rendered slightly acidulous with them, is drank to lessen the perspiration and tendency to putrescence in fevers, and to allay the irritation in prurigo and other skin-diseases; and combined with bark, quinine, and bitters, as an alterative and tonic in the depraved condition of the body occurring in scurvy, secondary syphilis, mercurial disease, &c. The acids are also extensively employed in *veterinary practice.* In the *arts*, in *pharmacy*, *chemistry*, and *domestic economy*, the uses of the acids are numerous, various, and important.

Concluding Remarks. From the corrosive nature of all the strong liquid and soluble acids, they should be kept in glass bottles, furnished with perfectly tight ground-glass stoppers; glass vessels should be used in measuring them, and they should be dispensed in stoppered phials, whenever the compound containing them is more than very weakly acidulous. Too much care, also, cannot be observed in their administration, to prevent mere local action on the tissues before their secondary effects can occur. This is best prevented by the plentiful addition of pure water. For measuring the doses, glass or silver should alone be used, and it will be found advantageous either to take them from a "medical spoon," or to suck them up through a small glass or silver tube. The mouth should then be immediately rinsed with water, (especially after the mineral acids,) to prevent erosion of the teeth, which, when these acids are long taken, is often of a very extensive and serious description. See *Acidimetry.*

ACIDS (Anhydrous). Acid compounds free from combined water. See *Organic Acids.*

ACIDS (Mineral). Acids derived chiefly or wholly from the mineral kingdom. The sulphuric, muriatic, and nitric acids are commonly so called.

ACIDS (Organic). Those which are formed by or derived from organic substances, in opposition to those which originate from inorganic matter. The organic acids have recently been obtained by Gerhardt in the dry or anhydrous state. His process consists in adding *oxychloride of phosphorus* to an excess of a *soda salt* of the given acid, when the anhydrous acid may be separated by distillation, crystallization, or decantation, as the case may be.

The hydrous organic acids exhibit little disposition to combine with each other. In the anhydrous state the reverse is the case. Thus, chloride of acetyle and benzoate of soda, yield *aceto-benzoic acid;* and chloride of benzoyl and cinnamate of soda, *benzo-cinnamic acid.* Several other double organic acids may be obtained in the same way. Most of the above compounds, when treated with the alkalies or hot water, are reduced to the hydrated form, and several cannot be volatilized without suffering decomposition.

ACIDS (Oxygenised). Acids to which an apparent surcharge of oxygen is given by means of deutoxide of barium.

Prep. (M. Thènard.) Perfectly pure and freshly prepared *deutoxide of barium* is moistened with *water*, and after it has fallen to powder, (which it does without much increase of temperature,) it is mixed with seven or eight times its weight of *water*, and the *given acid*, in a dilute state, poured in, until the liquid becomes neutral, and neither acts on litmus nor turmeric paper, the solution during the whole time being promoted by constant agitation. The liquor, after being filtered or decanted, consists of pure water, holding in solution the oxygenized acid, or deutoxide of hydrogen combined with the acid operated on.

Obs. For the success of this process it is absolutely necessary that the deutoxide of barium be free from manganese and iron. The presence of a little silica and alumina, which usually occurs in the deutoxide prepared by decomposing the nitrate, is not material. See *Deutoxide of Barium.*

ACIDIMETRY. The estimation of the quantity of an acid contained in any given sample. *Acidimetrical processes* are founded chiefly on the capacity of the acids to saturate the bases; and in some of the liquid acids, on the specific gravity.

1. The *sample for examination*, (one hundred grains, or any convenient aliquot part thereof,) is placed in a suitable glass or tube, (*acidimeter*,) and if one of the stronger acids, diluted with six or eight times its weight of water, or if solid, (as oxalic, or citric acid,) dissolved in a like quantity. The liquid is then *exactly* neutralized with an alkali. The quantity of

the latter consumed for this purpose, represents an equivalent quantity of acid, from which the acid content of the sample is readily ascertained. The common practice is to dissolve *one equivalent* of the *alkaline test* in *water*, and to make up the solution to either *exactly* 1000 parts by measure, or 1000 grs., (100 acidimetrical divisions.) The equivalent value of the test liquid is then=100; and hence the *quantity* of the *sample tested* will bear the same proportion to the *equivalent number* of the *acid* under examination, that the *acidimeter divisions consumed*, bear to the *per-centage of acid sought*. Thus:—suppose 50 grs. of a sample of sulphuric acid, take 30 acidimeter divisions, (300 parts or grains) of the test-liquid, what is its content of real acid?—The equivalent of dry sulphuric acid is 40, therefore by the rule of proportion—

50 : 40 :: 30 : 24

It therefore contains 24 per cent. of dry sulphuric acid. If the 1000 parts or grs., instead of the number of the acidimeter divisions, be taken for the calculation, it will of course be necessary to point off the first right-hand figure of the result as a decimal. If 100 grs., instead of the *equivalent* weights of the given tests, be employed in making the solutions, *each grain*, or 1000th part, will then represent $\frac{1}{10}$th, and *each acidimeter degree*, 1 grain of the alkali or carbonate employed, when a similar proportion will obtain.

The following table represents the quantities of *ammonia*, of the *carbonates* and *bicarbonates of soda* and *potassa*, and of *carbonic acid*, equivalent to the given weights of the principal acids, (omitting fractions.)

Table.

17	grs. of pure ammonia, (*a.*)
53	,, dry carbonate of soda, (*a a.*)
143	,, crystallized ditto, (*b.*)
84	,, crystallized bicarbonate of ditto, (*c.*)
69	,, dry carbonate of potassa, (*a a.*)
100	,, crystallized bicarbonate of ditto, (*d.*)
44	,, dry carbonic acid (when the bicarbonate of potassa or soda is used for testing in the process of Fresenius & Will).
22	,, ,, ,, (when a carbonate is used).

Grains.	are equivalent to
51	Acetic acid (anhydrous).
60	,, ,, (crystallized or glacial).
113	Benzoic acid (dry).
122	,, ,, (crystallized).
35	Boracic acid (dry).
62	,, ,, (crystallized).
22	Carbonic acid (dry).
58	Citric acid (dry).
67	,, ,, (crystallized).
36½	Hydrochloric acid (dry).
109	,, ,, (liquid, sp. gr. 1·16).
58	Malic acid (dry).
54	Nitric acid (dry).
67	,, ,, (liquid, sp. gr. 1·5).
90	,, ,, (sp. gr. 1·42).
36	Oxalic acid (dry).
63	,, ,, (crystallized).
40	Sulphuric acid (dry).
49	,, ,, (liquid, sp. gr. 1·845).
66	Tartaric acid (dry).
75	,, ,, (crystallized).

(*a.*) 1000 grains measure of pure water of ammonia, sp. gr. 0·992, contain exactly 17 grs., or one equivalent of pure gaseous ammonia.

(*a a.*) Prepared by gradually heating the crystallized carbonate to redness.

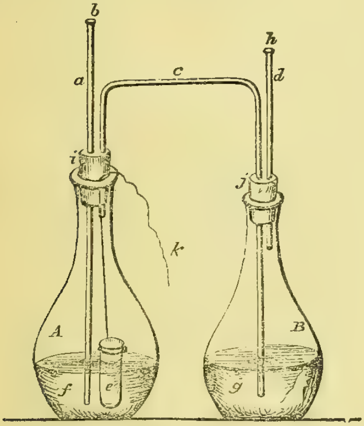
(*b.*) The crystals must be free from attached water, but not the least effloresced.

(*c.*) The salt must be perfectly pure for this purpose.

(*d.*) Ditto.

2. (Fresenius and Will.) This method depends on the quantity of carbonic acid gas which a given weight of acid is capable of expelling from an alkaline bicarbonate, which is estimated by the loss of weight in the apparatus, after the gas, rendered perfectly dry by passing through sulphuric acid, has escaped into the air. The sample of *acid* is accurately weighed into the flask *A* (*see* Engr.), and if concentrated or solid, mixed with or dissolved in 6 or 8 times its weight of water. The little glass tube (*e*) is then nearly filled to the brim with *pure bicarbonate of soda* in powder, and a fine silken thread is tied round the neck of the tube, by means of which it is lowered down into the flask (*A*), so as to remain perpendicularly suspended when the cork is placed in the latter, the cord being held between the cork and the mouth of the flask. The flask (*B*) is next about half filled with *oil of vitriol*, and the tubes being arranged in their places, as represented in the engraving, the whole apparatus is accurately weighed, time having been allowed for the mixture of acid and water to *cool completely*, should it have become hot by mixing. The cork in the flask (*A*) is then slightly loosened, so as to allow the little tube containing the bicarbonate of soda to fall into the acid, and is again immediately fixed *air-tight* in its place. The evolution of carbonic acid now commences, and continues until the acid in the flask (*A*) is

neutralized. When this takes place, which is easily seen by no bubbles being emitted on shaking the apparatus, the flask *A* is put into hot water, (120° to 130° Fahr.) and kept there with occasional agitation until the renewed evolution of gas has completely ceased. The little wax stopper is then taken off the tube *a*, the apparatus taken out of the hot water, wiped dry, and suction applied by means of the mouth to the end of the tube (*d*,) until the sucked air no longer tastes of carbonic acid. The whole is then allowed to become *quite cold*, when it is replaced in the balance, (the other scale still containing the original weights,) and weights added to restore the equilibrium. The loss of weight represents the exact quantity of dry carbonic acid gas that has been expelled from the bicarbonate of soda, by the action of the acid in the sample examined. The quantity of *real acid* it contained may then be deduced by the following calculation:—*Two equivalents of carbonic acid gas* (= 44), bear the same proportion to *one equivalent of the acid* in question, as the amount of the *carbonic acid expelled*, does to the amount of the *acid* sought. Thus, suppose a dilute sulphuric acid gives 3 grs. of carbonic acid, the arrangement would be 44 : 40 :: 3 : 2·727, or, 2·73 grs. (nearly) of dry sulphuric acid. By multiplying the weight of the carbonic acid lost by the corresponding number in the *following* table, the *per-centage* strength of the sample will be at once obtained, provided 100 grs. have been examined. When only 50, 25, 20, or 10 grs. have been tested, this number must, of course, be doubled, quadrupled, &c., as the case may be.



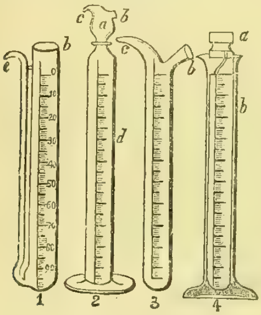
(*A.*) A wide-mouthed flask, capable of holding 2½ to 3 oz., containing sample for trial, (*f.*)
(*B.*) Ditto, capable of holding 1½ to 2 oz., partly filled with oil of vitriol, (*g.*)
(*a, c, d.*) Tubes fitting air-tight in the flasks by means of the corks (*i*) and (*j.*)
(*b.*) Piece of wax fitting air-tight on the end of (*a.*)
(*e.*) Small tube capable of holding about 1 drachm of powdered bicarbonate of potassa.
(*h.*) Open end of the tube (*d.*)
(*k.*) Silk cord fastened to the tube (*e.*)

Table.

Acetic acid (dry)	1·159
„ „ (hydrated) . . .	1·364
Citric acid (crystallized) . .	1·523
Hydrochloric acid (dry) . .	·829
„ „ (sp. gr. 1·16)	2·478
Nitric acid (dry)	1·227
„ „ (sp. gr. 1·5) .	1·523
„ „ (sp. gr. 1·42) .	2·045
Oxalic acid (crystallized) .	1·432
Sulphuric acid (dry) . . .	·909
„ „ (sp. gr. 1·825)	1·114
Tartaric acid (dry) . . .	1·500
„ „ (crystallized) .	1·705

Concluding Remarks. In proceeding as described under (1,) the choice of the re-agent must depend on the operator. Some parties prefer the ammonia-test, before alluded to, (Ure,) which certainly is very convenient and easily applied; whilst others give a preference to one of the bicarbonates or carbonates of potassa or soda. "The proportion of any one free acid in any substance may be determined (by the ammonia-test) with precision, or to 1-50th of a grain, in five minutes." (Ure.) Whichever re-agent is adopted, care must be taken that it be perfectly pure, so far as the points already mentioned are concerned. A test solution once carefully prepared of the proper strength may be kept unharmed for any length of time, in a stoppered bottle, and will be always ready for application wherever a good pair of scales or a graduated tube is to be found. The only danger to be dreaded is over-saturation. Great care must be taken not to exceed the precise point of neutralization of the acid. After adding each portion, the solution should be well stirred up, and as soon as the effervescence becomes languid, the greatest caution must be observed in adding more. The proper point is arrived at when the liquid, after being slightly heated, ceases to *redden litmus*, and does not *alter the colour* of *turmeric paper;* if it turns the latter *brown*, too much of the test-liquid has been added, and the operation becomes useless. A good method is to tint either the acid sample or the test-liquid with a few drops of litmus, as before recommended, when the reddish shade will gradually deepen into purple as the point of saturation is approached, and the blue colour be restored as soon as this point is reached.

The common forms of acidimeters have been already figured under *Acetimetry.* In using them the operator must be careful to pour the test-liquid out in drops, as occasion may require, without allowing the smallest portion to be wasted, by running over the outside. For this purpose the lip of the tube may be smeared with tallow. In practice, the simplest forms of acidimeters are the best, and have the advantage of being *less* costly and *more* durable than the others. When extreme accuracy is desired, or if the operator is inexpert at chemical manipulations, one or other of those figured in the margin may be used.



References.

1. Gay-Lussac's Pouret.
2. Normandy's modification of Schuster's alkalimeter.
    - (*a.*) Hollow stopper or bulb.
    - (*b.*) Thumb hole.
    - (*c.*) Capillary opening for test liquid.
    - (*d.*) Glass tube, with neck ground to fit the bulb or stopper, (*a.*)
3. Binks's alkalimeter; (*b*) and (*c*) as last.
4. Tube, with lip and grooved stopper to control the delivery of the test-liquid.

The ingenious and elegant method (2) is admirable in the hands of persons accustomed to chemical manipulations, and, though *apparently* complicated, is, in reality, very simple and easy to perform, when once well understood. The application of heat after the completion of the operation is indispensable, as if it were neglected, from 0·3 to 0·4 of a grain of carbonic acid would be retained in the liquid. The bicarbonate of soda must be *perfectly pure*, and *free* from any neutral carbonate or sesquicarbonate of soda. To ensure this, the bicarbonate of commerce is directed to be reduced to an uniform powder, put into a glass jar, and covered with its own weight of *cold* distilled or rain water, and allowed to stand for twenty-four hours, with frequent stirring. It is then placed upon a funnel, the tube of which is stopped with loose cotton, so as to allow the ley to drain off. It is next washed several times with small quantities of *cold* distilled or rain water, and after being dried between some sheets of blotting-paper, without the aid of heat, is kept for use in a well-closed glass-bottle. Before use, it may be tested to ascertain its purity. If pure, it should neither redden turmeric paper, nor give a brick-red precipitate with a solution of bichloride of mercury. Bicarbonate of potassa may be used instead of bicarbonate of soda, provided it be pure; but in either case it is always proper to use an excess, so as to leave some undecomposed after the operation is concluded. A piece of litmus paper plunged into the liquid in *A*, will not be reddened when the process has been properly managed. The results, when this process is properly conducted, are unimpeachable.

In commerce, the strength of acids is frequently reckoned with reference to a standard, termed 100 acidimetric degrees. This is taken from the circumstance that 91 grs. of commercial oil of vitriol, of a sp. gr. of 1·845, exactly saturate 100 grs. of dried carbonate of soda. An acid requiring only 35, 50, or any other number of grains of the carbonate to saturate it, is in like manner termed of so many degrees strong, the number of grains representing in each case an equal number of degrees. This method originated with the French chemists, and though only conventional, and principally confined to commercial purposes, is especially adapted to practical men.

The strength of all the liquid acids may be estimated, with more or less accuracy, from their specific gravity. Where this plan is applicable, it will be described under the respective acids. See *Acetimetry* and *Alkalimetry.*

ACIDITY (of Stomach). A common symptom of weak or disordered digestion.

Treat. Small doses of the carbonates or bicarbonates of potassa, soda, or ammonia, or of sal volatile, or ammonia water, three or four times daily, to which some tonic bitter may be added. Diet light and nutritious, and as much out-of-door exercise as possible. The bowels should be kept regular by the occasional use of some mild aperient. See *Dyspepsia, &c.*

ACNE. An eruption of distinct, hard, inflamed tubercles (or pimples), which are sometimes permanent for a considerable length of time, and sometimes suppurate very slowly and partially. (Bateman.) This affection generally appears on the forehead or the chin, and less frequently on the other parts of the face. Occasionally it attacks the neck, shoulders, and breast, but seldom extends lower down the trunk. This disease is generally of a local character, and is commonly excited by heat, violent exercise, excessive indulgence, &c. It has been regarded by some as symptomatic of a failing constitution.

Treat., *&c.* There are four varieties of this affection mentioned by nosologists:—*Acne simplex*, *punctata*, *indurata*, and *rosacea.* The first three merely require cooling laxatives, a light diet, and stimulating lotions or ointments to the parts. For this purpose, a lotion of benzoin, sulphate of zinc, or bichloride of mercury, may be used; or the ointment of sub-acetate of lead, when there is much inflammation. An appropriate purgative is the compound powder of sulphur. *Acne rosacea* is of a more serious character, frequently attacking the nose and cheeks, producing tubercles, enlargement, and ulceration, which sometimes permanently disfigure the features. Occasionally the whole nose, and even a portion of the adjacent face, is covered by it, and marked by large veins, which spread out their branches like the tributary streams of a large river. When the circulation is active, the diseased surface is fully distended and brightly red. In cold weather, it becomes bluish, and even assumes a livid hue. This variety of acne is a frequent consequence of hard drinking, and is hence sometimes called "*acne bacchia,*" but it often arises from other causes. Extreme temperance and an unstimulating diet must here be adopted, together with some weak cooling lotion (as that of Goulard water) to the inflamed parts. It sometimes becomes necessary to press out the contents of the pustules, which often resemble small grubs in appearance; or to apply small poultices to promote suppuration.

ACONITE. Syn. *Wolfsbane, Monkshood; Aconitum,*—Lat. The whole of this plant possesses deleterious properties, and acts as an acrid drastic purgative, even in small quantities. The leaves are the portion commonly employed in medicine.

Pois., *Ant.*, *&c.* Antimonial emetic, and a purgative glyster; followed by decoction of galls or cinchona bark, or even of oak bark; afterwards, vinegar-and-water, and mucilaginous drinks. If the poison arises from a wounded surface, dry cupping or ligatures may be had recourse to at once. If in the early period cerebral congestion threatens, blood should be taken.

ACONITIC ACID. Syn. *Equisetic Acid; Acidum Aconiticum,*—Lat. An acid existing in the juice of the aconite, combined chiefly with lime.

Prep. It is obtained from the filtered *expressed juice of aconitum napellus*, in the way described under absinthic acid, page 3. It may be purified by solution in ether, and careful evaporation.

Prop. A white, odourless, semi-crystalline mass; soluble in alcohol, ether, and water; with the alkalis it forms soluble *aconitates*, and with the metallic oxides, salts that are wholly or nearly insoluble in water. It appears to be identical with the pyrocitric acid.

ACONITINA. Syn. *Aconitin, Aconitine; Aconita, Aconitia,*—Lat. An alkaloid discovered in 1833, by Gieger and Hesse, in the aconite, in combination with aconitic acid.

Prep. 1. (Ph. L. 1836.) Take of the *root of aconite* (aconitum napellus), dried and pounded, 2 ℔; *rectified spirit*, 3 gals.; *dilute sulphuric acid*, *solution of ammonia*, purified *animal charcoal*, of each q. s. Boil the aconite with a gallon of the spirit for an hour in a retort to which a receiver is annexed; decant; and again boil with another gallon of the spirit and the recently distilled spirit. Let the same be done a third time. Then express the aconite; and the liquors being mixed and strained, let the spirit distil; and evaporate what remains to the consistence of an extract. Dissolve in water, filter, and again evaporate by a gentle heat to the consistence of a syrup; and to this add of the sulphuric acid mixed with water, q. s., to dissolve the aconitine. Next precipitate with the ammonia, and dissolve the precipitated aconitine in the acid, mixed with water as before. Then add the animal charcoal, agitate every quarter of an hour; strain, again precipitate with the ammonia, and wash and dry the precipitated aconitine.

2. (M. Hesse.) By adding *hydrate of magnesia* to the decoction of the *dried leaves of the aconitum napellus*, washing the precipitate with water, drying and then treating it with *boiling alcohol*, which dissolves out the aconitina and deposits the greater part of it again on cooling, and the remainder by gentle evaporation.

3. (Headland.) Evaporate *a tincture*, prepared with *rectified spirit* from the *root of the aconitum ferox* to the consistence of a syrup; dilute with twice its volume of water, *acidulate* with *dilute sulphuric acid*,

filter, and again evaporate to the consistence of a syrup by the heat of a water-bath; place the residuum in a stoppered bottle, add *strong liquor of ammonia* in excess; agitate, and to the white mass add *an equal bulk* of *ether;* place the bottle in a damp cloth, and agitate briskly for several minutes; and after repose, decant the ether. Repeat the agitation with *fresh ether*, a *second* and a *third time;* lastly, let the clear decanted ether evaporate spontaneously in an open basin. The residuum is perfectly pure aconitina.

Prop., &c. A white odourless powder, or semi-transparent, glassy mass, soluble in 150 parts of water at 60°, and in 50 parts at 212° Fahr. Freely soluble in hot alcohol and ether, and in the dilute acids forming salts. When quite pure, it may be obtained in crystals from its alcoholic solution, but much of the alkaloid is lost in the mother liquid. It is "largely soluble in sulphuric ether, less so in alcohol, and nearly insoluble in water. It is *totally* destroyed by heat, leaving *no salt of lime.*" (Ph. L. 1836.) The foreign aconitina, which sells about threepence per grain, is a spurious article. Mr. Morson is the only English manufacturer. His article fetches an extremely high price, (3*s.* 6*d.* a grain.) The "$\frac{1}{50}$th of a grain of Mr. Morson's aconitina killed a moderate-sized dog, whereas 1 or 2 grs. of the spurious alkaloid only produced slight sickness." (Garrod.) This small quantity has even endangered the life of an individual. (Pereira.) The pharmaceutical chemist cannot, therefore, be too careful in dispensing this article. It was formerly recommended by Dr. Turnbull, in very minute doses, in neuralgic affections, but is now only used externally, made into an embrocation and an ointment.

ACORN. Syn. *Okecorn: Glans Quercus.* In the early ages of the world, acorns formed one of the principal articles of the food of man. (Ovid, Virgil.) In modern times, during periods of scarcity they have been consumed as food on the Continent. We are told that the first settlers of Boston were reduced to the necessity of eating clams, muscles, ground nuts, and *acorns.* (Trumbull.) Husked, dried, and roasted, they have been used as a substitute for coffee.

ACORUS CALAMUS. Syn. *Sweet Flag, Sweet Rush, Sedge; Calamus Aromaticus,*—Ph. E. *Calamus Acorus, A. Verus, A. Asiaticus, A. Calamus,*—Lat. var. This plant is abundant in the marshy counties of England, and flowers in May and June. The root (rhizome) is officinal in the Edinburgh Pharmacopœia. It possesses a fragrant, warm, bitterish, aromatic taste, and an odour resembling that of a mixture of cinnamon and allspice, depending on the presence of a fragrant essential oil, and an aromatic bitter principle. Part of its aroma is lost by desiccation. Though now seldom employed in medicine, it might frequently be substituted for other and more costly aromatics, (Pereira;) especially in cases of dyspepsia, and as an adjunct to tonics and purgatives. (Lindley.) It is generally taken in the form of *infusion or powder.* The former is made by digesting 1 oz. of the *bruised root* in 1 *pint* of *boiling water* for an hour, in a covered vessel. The dose is a teacupful. *The powder* is given in doses of 10 grs. to 1 dr. once or twice a day. The root and its *essential oil* are used in perfumery and for flavouring spirit. 14 ℔ of the dried rhizomes yield 22 drs. of volatile oil. (Volter and Dann.) The oil is sometimes given in stomach complaints: 1 drop on a piece of sugar. A *fragrant water*, also used for similar purposes to the infusion and oil, is made by distilling 1 ℔ of the root along with 2 gallons of water, drawing over only 1 gallon. In Constantinople the rhizomes are made into a species of candy or confection, which is held in great repute as a pectoral and stomachic. In England it is chiefly used by the perfumers to scent hair-powder, and the composition for their scent-bags, (*sachets;*) and by the brewers, as a substitute for hops in the manufacture of bitter beer and ale. The London druggists are chiefly supplied from Norfolk, which produces an article fully equal in quality to that imported from the Levant.

ACROLEINE. When the fat oils are exposed to a heat sufficient to produce ebullition, acroleine, mixed with carburetted hydrogen, is given off. By passing the vapour through a series of well-cooled bottles, partly filled with water, and by re-distilling the contents of the second and third bottles, this substance is obtained in the form of an oily liquid, possessing a very disagreeable odour. It is best prepared by distilling *glycerine* with *bisulphate of potassa,* and purifying the product; but the process is attended with great difficulty.

Prop., &c. Pure acroleine is a thin, colourless, volatile liquid, lighter than water, boiling at 126° Fahr.; soluble in alcohol and ether, and sparingly so in water. Its vapour is irritating beyond description. It is decomposed by exposure to the air, contact with alkalies, &c.

ACRYLIC ACID. An acid formed by

the long exposure of acroleine to air, or by mixing it with oxide of silver. It greatly resembles the acetic and propionic acids.

ADEPS. Fat. The *adeps* ordered in the London Pharmacopœia is hog's-lard. "That which has been cured by chloride of sodium (common salt) is not to be employed." (Ph. L. 1851.) "It is not to be used without being carefully washed with water." (Ph. L. 1836.)

ADEPS (Magnetic). See *Magnetic Adeps.*

ADIPIC ACID. Syn. *Acidum Adipicum*,—Lat. A new acid discovered by Laurent, among the products of the oxidation of oleic acid.

Prep. Gently evaporate the *mother liquor, left from the process of preparing pimelic acid,* set it aside for some days, and then collect the crystals deposited; repeat this operation until the liquor ceases to yield crystals. Then dissolve them in *hot water*, skim off the oil, filter, evaporate, and crystallize. Dissolve in *ether*, and evaporate to one half; collect the crystals and repeat the process a second time; next dissolve the two crops of crystals separately in alcohol, when ADIPIC ACID, *in roundish crystalline grains,* and LIPIC ACID, *in plates,* will be obtained.

Prop. Colour, brown; soluble in hot water, volatile above 266°. Its salts are called *adipates.*

ADIPOCERE. Syn. *Grave Wax; Adipocera*,—Lat. *Adipocire*,—Fr. A substance resembling a mixture of fat and wax, resulting from the exposure of the flesh of animals in moist situations, or under water. It was proposed by Lavoisier to produce this substance artificially, for the purposes of the arts. Attempts have since been made to convert the dead bodies of cattle (carrion) into adipocere, for the purposes of the candle-maker and the soap-boiler, but without success. Besides, dead animal matter can be worked up more profitably than in making artificial adipocere.

ADRAGANTHINE. A name given by Bucholz to the pure mucilage of gum tragacanth. See *Tragacanthine.*

ADULTERATION. In proportion to the rapid strides made in every department of science and productive industry during the last half-century, has been the progress of the arts of sophistication and adulteration. The poor man's necessities and the rich man's luxuries—every article of food, medicine, and clothing, of trade, commerce, and manufactures, are now more or less mixed, adulterated, falsified, or drugged. The time has arrived when purity and wholesomeness can no longer be ensured by the payment of the fair price for a commodity, or by its purchase of a large and apparently respectable dealer. The revelations recently made on this subject in some of the medical journals, are sufficient to show the public, that the only safeguard against fraud and deception remains with themselves. There are laws in this country to punish those who adulterate what they sell, but except with respect to a few exciseable articles, the authorities are supine, and the laws almost useless. The only remedy left to the public is to take no man's word, but to examine what they buy. They must abandon the struggle between quality and low prices, often falsely called cheapness, and at once cease dealing with those men who sell them adulterated or inferior articles for pure or good ones. The knowledge necessary for such an examination is very easily acquired, and its application is not merely simple, but is capable of yielding a fund of rational amusement and useful occupation, which is almost inexhaustible. Easy means of detecting the adulterations commonly met with in trade, will be found explained, under all the more important articles noticed in this work.

ÆGYPTIACUM. Syn. *Ægyption; Unguentum Ægyptiacum*,—Lat. An old name for various detergent and corrosive liniments, principally composed of verdigris, vinegar, and honey. See *Oxymels.*

ÆSCULINE. A white crystalline powder obtained from the bark of the horse-chestnut tree (æsculus hippocastinum). When dissolved in water it possesses the property of communicating a bluish opalescence to a large quantity of that fluid. It is said to consist principally of extractive matter and lime.

ÆTHOGEN. A compound of nitrogen with boron, remarkable for the intense luminosity which it exhibits in the oxidating flame of the blowpipe.

Prep. (Balmain.) Take of *powdered anhydrous boracic acid,* seven parts; *melon,* nine parts; place the mixture in a crucible lined with *charcoal,* and apply heat, then transfer the product into a well-stopped phial.

Prop. A light powder, resembling magnesia, infusible, and nearly insoluble in water. Its compounds with the metals are called *œthonides.*

ÆTHONIDES. These may be prepared by either exposing a mixture of the metal and *œthogen* to heat, or a mixture of the *cyanide of the metal* with *boracic acid.*

AFFINITY. Syn. *Elective Attraction,*

Chemical Attraction. The peculiar power by which new substances or compounds are generated by the chemical union of dissimilar bodies. The result of its operation is *chemical combination.*

The following tables of chemical affinity exhibit the order of precedence in attractive force of the various substances for each other, for the circumstances under which the experiments on which they were founded were made, and subject to the various conditions which modify elective attraction. An intimate acquaintance with the order in which decompositions take place among compounds, is of vast importance to the chemical manufacturer, and, in fact, forms the ground-work of operative chemistry. The tyro in this art is therefore recommended to pay especial attention to the subject.

I. *Table of Simple Affinity, drawn up from the researches of Geoffrey, Bergman, Vauquelin, Fourcroy, Berthollet, and others, and arranged in alphabetical order expressly for this work.*

Obs. The substance, the attractions of which are to be shown, is placed at the commencement of each paragraph, and the substances to which it has an attraction, follow in the order of the forces of that attraction.

Acetic Acid. Baryta; Potassa; Soda; Strontia; Lime; Magnesia; Ammonia; Metallic oxides; Glucina; Alumina; Zirconia.

Alcohol. Water; Ether; Volatile oils; Alkaline sulphurets.

Alumina. *Acids*—Sulphuric, Nitric, Hydrochloric, Oxalic, Arsenic, Fluoric, Tartaric, Succinic, Mucic, Citric, Phosphoric, Lactic, Benzoic, Acetic, Boracic, Sulphurous, Nitrous, Carbonic, Hydrocyanic.

Ammonia. *Acids*—Sulphuric, Nitric, Hydrochloric, Phosphoric, Fluoric, Oxalic, Tartaric, Arsenic, Succinic, Citric, Lactic, Benzoic, Sulphurous, Acetic, Mucic, Boracic, Nitrous, Carbonic, Hydrocyanic; Oil; Water; Sulphur.

Arsenic Acid. The same as Fluoric acid, omitting Silica.

Baryta. *Acids*—Sulphuric, Oxalic, Succinic, Fluoric, Phosphoric, Mucic, Nitric, Hydrochloric, Suberic, Citric, Tartaric, Arsenic, Lactic, Benzoic, Acetic, Boracic, Sulphurous, Nitrous, Carbonic, Hydrocyanic; Sulphur; Phosphorus; Water; Fixed oils.

Benzoic Acid. White oxide of arsenic; Potassa; Soda; Ammonia; Baryta; Lime; Magnesia; Alumina.

Boracic Acid. The same as Fluoric acid, omitting Silica, and adding Water and Alcohol.

Camphoric Acid. Lime; Potassa; Soda; Baryta; Ammonia; Alumina; Magnesia.

Carbon. Oxygen; Iron; Hydrogen.

Carbonic Acid. Baryta; Strontia; Lime; Potassa; Soda; Magnesia; Ammonia; Glucina; Zirconia; Metallic oxides.

Citric Acid. Same as Oxalic acid, excepting that Zirconia should be inserted after Alumina.

Fixed Oils. Lime; Baryta; Potassa; Soda; Magnesia; Oxide of Mercury; Metallic oxides; Alumina.

Fluoric Acid. Lime; Baryta; Strontia; Magnesia; Potassa; Soda; Ammonia; Glucina; Alumina; Zirconia; Silica.

Hydrochloric Acid. The same as Nitric acid, excepting that Ammonia should stand above Magnesia.

Hydrocyanic Acid. Baryta; Strontia; Potassa; Soda; Lime; Magnesia; Ammonia.

Hydrogen. Oxygen; Sulphur; Carbon; Phosphorus; Nitrogen.

Lactic Acid. The same as Acetic acid.

Lime. *Acids*—Oxalic, Sulphuric, Tartaric, Succinic, Phosphoric, Mucic, Nitric, Hydrochloric, Suberic, Fluoric, Arsenic, Lactic, Citric, Malic, Benzoic, Acetic, Boracic, Sulphurous, Nitrous, Carbonic, Hydrocyanic; Sulphur; Phosphorus; Water; Fixed oils.

Magnesia. *Acids*—Oxalic, Phosphoric, Sulphuric, Fluoric, Arsenic, Mucic, Succinic, Nitric, Hydrochloric, Tartaric, Citric, Malic, Lactic, Benzoic, Acetic, Boracic, Sulphurous, Nitrous, Carbonic, Hydrocyanic; Sulphur.

Nitric Acid. Baryta; Potassa; Soda; Strontia; Lime; Magnesia; Ammonia; Glucina; Alumina; Zirconia; Metallic oxides.

Nitrogen. Oxygen; Sulphur; Phosphorus; Hydrogen.

Oxalic Acid. Lime; Baryta; Strontia; Magnesia; Potassa; Soda; Ammonia; Alumina; Metallic oxides; Water; Alcohol.

Oxide of Antimony. *Acids*—Gallic,

Hydrochloric, Benzoic, Oxalic, Sulphuric, Nitric, Tartaric, Mucic, Phosphoric, Citric, Succinic, Fluoric, Arsenic, Lactic, Acetic, Boracic, Hydrocyanic; Fixed alkalies; Ammonia.

Oxide of Arsenic. *Acids*—Gallic, Hydrochloric, Oxalic, Sulphuric, Nitric, Tartaric, Phosphoric, Fluoric, Succinic, Citric, Acetic, Hydrocyanic; Fixed alkalies; Ammonia; Fixed oils; Water.

Oxide of Copper. *Acids*—Gallic, Oxalic, Tartaric, Hydrochloric, Sulphuric, Mucic, Nitric, Arsenic, Phosphoric, Succinic, Fluoric, Citric, Lactic, Acetic, Boracic, Hydrocyanic, Carbonic; Fixed alkalies; Ammonia; Fixed oils.

Oxide of Gold. *Acids*—Gallic, Hydrochloric, Nitric, Sulphuric, Arsenic, Fluoric, Tartaric, Phosphoric, Acetic, Hydrocyanic; Ammonia; Sulphuretted hydrogen.

Oxide of Iron. *Acids*—Gallic, Oxalic, Tartaric, Camphoric, Sulphuric, Mucic, Hydrochloric, Nitric, Phosphoric, Arsenic, Fluoric, Succinic, Citric, Lactic, Acetic, Boracic, Hydrocyanic, Carbonic.

Oxide of Lead. *Acids*—Gallic, Sulphuric, Mucic, Oxalic, Arsenic, Tartaric, Phosphoric, Hydrochloric, Sulphurous, Suberic, Nitric, Fluoric, Citric, Malic, Succinic, Lactic, Acetic, Benzoic, Boracic, Hydrocyanic, Carbonic; Fixed oils; Ammonia.

Oxide of Mercury. *Acids*—Gallic, Hydrochloric, Oxalic, Succinic, Arsenic, Phosphoric, Sulphuric, Mucic, Tartaric, Citric, Malic, Sulphurous, Nitric, Fluoric, Acetic, Benzoic, Boracic, Hydrocyanic, Carbonic.

Oxide of Platinum. *Acids*—Gallic, Hydrochloric, Nitric, Sulphuric, Arsenic, Fluoric, Tartaric, Phosphoric, Oxalic, Citric, Acetic, Succinic, Hydrocyanic, Carbonic; Ammonia.

Oxide of Silver. *Acids*—Gallic, Hydrochloric, Oxalic, Sulphuric, Mucic, Phosphoric, Sulphurous, Nitric, Arsenic, Fluoric, Tartaric, Citric, Lactic, Succinic, Acetic, Hydrocyanic, Carbonic; Ammonia.

Oxide of Tin. *Acids*—Gallic, Hydrochloric, Sulphuric, Oxalic, Tartaric, Arsenic, Phosphoric, Nitric, Succinic, Fluoric, Mucic, Citric, Lactic, Acetic, Boracic, Hydrocyanic; Ammonia.

Oxide of Zinc. *Acids*—Gallic, Oxalic, Sulphuric, Hydrochloric, Mucic, Nitric, Tartaric, Phosphoric, Citric, Succinic, Fluoric, Arsenic, Lactic, Acetic, Boracic, Hydrocyanic, Carbonic; Fixed alkalies; Ammonia.

Oxygen:—1. Carbon; Charcoal; Manganese; Zinc; Iron; Tin; Antimony; Hydrogen; Phosphorus; Sulphur; Arsenic; Nitrogen; Nickel; Cobalt; Copper; Bismuth; Mercury; Silver; Arsenious acid; Nitric oxide; Gold; Platinum; Carbonic oxide; Hydrochloric acid; White oxide of manganese; White oxide of lead.

2. (Vauquelin's table of the affinity of the metals or oxygen, according to the difficulty with which their oxides are decomposed by heat.)—Titanium; Manganese; Zinc; Iron; Tin; Uranium; Molybdenum; Tungsten; Cobalt; Antimony; Nickel; Arsenic, Chrome; Bismuth; Lead; Copper; Tellurium; Platinum; Mercury; Silver; Gold.

Phosphoric Acid. Baryta; Strontia; Lime; Potassa; Soda; Ammonia; Magnesia; Glucina; Alumina; Zirconia; Metallic oxides; Silica.

Phosphorous Acid. Lime; Baryta; Strontia; Potassa; Soda; Ammonia; Glucina; Alumina; Zirconia; Metallic oxides.

Phosphorus. The same as Sulphur.

Potassa. The same as Ammonia.

Silica. Fluoric acid; Potassa.

Soda. The same as Ammonia.

Strontia. *Acids*—Sulphuric, Phosphoric, Oxalic, Tartaric, Fluoric, Nitric, Hydrochloric, Succinic, Acetic, Arsenic, Boracic, Carbonic; Water.

Suberic Acid. Baryta; Potassa; Soda; Lime; Ammonia; Magnesia; Alumina.

Succinic Acid. Baryta; Lime; Potassa; Soda; Ammonia; Magnesia; Alumina; Metallic oxides.

Sulphur. Potassa; Soda; Iron; Copper; Tin; Lead; Silver; Bismuth; Antimony; Mercury; Arsenic; Molybdenum.

Sulphuretted Hydrogen. Baryta; Potassa; Soda; Lime; Ammonia; Magnesia; Zirconia.

Sulphuric Acid. Baryta; Strontia; Potassa; Soda; Lime; Magnesia; Ammonia; Glucina; Yttria; Alumina; Zirconia; Metallic oxides.

Sulphurous Acid. Baryta; Lime; Potassa; Soda; Strontia; Magnesia; Ammonia; Glucina; Alumina; Zirconia; Metallic oxides.

Tartaric Acid. Same as Oxalic acid.

Tungstic Acid. The same as Fluoric acid.

II. *Table of the Sequences of the Bases with the principal Acids, by* Dr. Young.

Obs. In all mixtures of the aqueous solutions of two salts, each acid remains united to the base which stands nearest to it in this table.

SULPHURIC ACID.									
Baryta	Baryta	Baryta	Baryta	Baryta	Baryta	Potassa	Baryta	Baryta	Lead
Strontia	Strontia	Potassa	Potassa	Potassa	Potassa	Soda	Strontia	Potassa	Mercury
Lime	Lime	Soda	Soda	Soda	Soda	Baryta	Lime	Soda	Iron
(Silver?)	Potassa	Ammonia	Strontia	Strontia	Strontia	Strontia	Potassa	Ammonia	Potassa
(Mercury?)	Soda	Strontia	Ammonia	Ammonia§	Ammonia‖	Ammonia¶	Soda	Strontia	Soda
Potassa	(Mercury?)	Magnesia‡	Magnesia	Magnesia§	Magnesia	Lime	Magnesia?	Magnesia	Magnesia
Soda	(Iron?)	Glucina	Glucina	Glucina	Lime	Magnesia	Ammonia	Glucina	Lead
Zinc	Magnesia	Alumina	Alumina	Alumina	Glucina	Glucina	Glucina	Alumina	Zinc
Iron	Ammonia†	Zirconia	Zirconia	Zirconia	Alumina	Alumina	Alumina	Zirconia	Copper
Copper	Glucina	Lime	Lime	Lime	Zirconia	Zirconia	Zirconia	Lime?	
Magnesia	Alumina †								
Ammonia*	Zirconia								
Glucina	(Copper?)								
Alumina									
Zirconia									
NITRIC	MURIATIC	PHOSPHORIC	FLUORIC	SULPHUROUS	BORACIC	CARBONIC	NITROUS	PHOSPHOROUS	ACETIC

* Ammonia stands above magnesia when cold.
† A triple salt is formed.
‡ Perhaps magnesia ought to stand lower.
§ A compound salt is formed, and when hot, magnesia stands above ammonia.
‖ Fourcroy says, that sulphate of strontia is decomposed by borate of ammonia.
¶ With heat, ammonia stands below lime and magnesia.

AFFUSION. The affusion of cold water has been successfully employed in the treatment of the early symptoms of low contagious fever, during the state of the greatest heat and exacerbation, even when the heat of the body reached 102° to 105° Fahr., and general restlessness increasing to delirium was present. Sponging the body may be adopted instead of affusion. The water may be medicated by the addition of a little vinegar, and employed tepid, if preferred. A shower bath is of a similar character, applicable during either health or disease. In certain stages of scarlatina and low typhus, and in inflammation of the brain, affusions have been found particularly serviceable. They should not be employed during either the cold or sweating stage of fever, nor in the hot stage when the heat does not much exceed the natural standard. The affusion should be continued until the patient feels cold and shivers, when the skin should be well dried, and the recumbent posture again resumed. A little warm wine-and-water may be administered to aid reaction and the consequent perspiration. Evening is the best time for the operation. See *Baths, &c.*

AFTER-PAINS. These distressing annoyances are, perhaps, best met by time and patience. They may be sometimes alleviated by small doses of morphia or opium.

AGATE. A semi-pellucid uncrystallized variety of quartz, remarkable for its hardness, variety of colour, and susceptibility of receiving a high polish. It is an aggregate of various siliceous minerals, of which chalcedony appears generally to be the base. Carnelian, jasper, amethyst, and other similar minerals, often enter into its composition. The colours are often delicately arranged in stripes, bands, or clouds. Those which take an angular form, as the *Scotch pebble*, are called *fortification agates.* The agate is the least valuable of the precious stones, and is chiefly made into rings, seals, beads, burnishers, &c., on account of its hardness.

AGRICULTURE. The origin and progress of agriculture, as well as the description of the mechanical operations of the agriculturist, do not properly come within the province of this work. Our remarks will therefore be confined chiefly to a few points which depend upon principles which may be accounted for by chemistry or its allied sciences.

The principles of agriculture are derived from a knowledge of the nature of plants and animals, of soils and manures, in their several relations with chemistry and physiology, and as influenced by climate, the seasons, and the weather. *Plants* are organised beings, which take up their food by means of roots, from the interior of the soil, and by means of their leaves from the atmosphere; *animals* are organized beings, which select their food from vegetables growing on the surface of the soil, or from other animals, their food being prepared before being absorbed into their system, by means of a stomach. The nature of these elementary principles being understood, even though imperfectly, improvements may be effected by art, which will greatly conduce to the increase of the agricultural produce obtained from any given surface of land. Among these principles, none are more important than those which relate to the *amelioration of the soil*, and maintaining it in a high state of fertility.

All soils are found to be productive in proportion to the organized matter which they contain. This is a law of nature, which, followed up by man, has led to the use of manures; as the fact everywhere observed, that no plant can live without water, has led to irrigation; and, as the observation, that the excess of water is injurious, has led to surface and under-draining. *Manures* are composed of either animal or vegetable matter; which may be either applied separately or together, and in a fresh state or in a state of decay. Their action is, however, much more effective after they have undergone the putrefactive fermentation. In employing manures, the great object of the cultivator is to apply *enough for the ensuing crop, and as little more as possible;* as all that is applied and not immediately used, is liable, to a certain extent, to have its particles carried off by evaporation (volatilization) into the atmosphere, or by rain into rivers or the sea. But even if this were not the case, to manure a soil which would not immediately yield a crop, would be an expenditure of capital without interest.

The improvement of the soil, considered as a mixture of different earths, mainly consists in rendering it more or less retentive of water, by the addition of clay in some cases, and of sand in others; and by the addition of such earthy, mineral, or saline matter, as may be present in too small quantities, or absent altogether. Experience shows, that those soils which are composed of *several* primitive earths are naturally more productive than those that consist of only *one* earth, other circumstances being the same; and that no soil will maintain its fertility for any length of time, that does not contain a very large proportion of calcareous earth (lime) in its composition. Hence, the addition of lime, and the admixture of soils with other soils of an opposite description.

The *rotation*, or *succession of crops*, may also be considered as connected with the fertility of soils, and the application of manures. To maintain a soil in a fertile state, it is not only necessary to supply it with manure, in proportion to the crops which have been carried from it, but to *vary* the crops which it is made to produce. It is found that plants belonging to the *same natural family, do not succeed so well after each other*, as when crops *of a different family* are made to intervene. Thus, the several grasses alternate better with root or herbage crops, than with one another; or, one of those grasses of which the *seed is ripened* will alternate better with another in which the *herbage* only constitutes the crop, than with one of the same kind as itself. Something analogous also takes place with regard to the pasturage of animals. Cattle flourish better in a field that has been grazed by horses, than *horses* after *horses*, or *cattle* after *cattle.* (Loudon.) The succession of crops becomes necessary, from the fact that certain mineral or saline matters enter into the composition of one class of plants, which are not required by another; at the same time that the other matters present in the soil accumulate ready to be appropriated by those plants into the constitution of which they enter. The necessity for the rotation of crops can only be obviated by supplying such plants with a proper quantity of the substances which enter into their composition, in the shape of manure. This practice requires a thorough knowledge of the chemical constitution of both the plants and soil; besides which, the expense of so doing so greatly exceeds that of the ordinary method of manuring with the proper rotation of crops, as to preclude its introduction on the large scale. Crops should therefore always succeed each other in such a way that the soil may not be exhausted of any one particular kind of nutriment.

AGUE. A species of fever which comes on only at stated intervals, (hence called *intermittent fever,*) leaving the patient, between the periods of attack, free from febrile symptoms, but generally in a state of languor and inaptitude, or disinclination to physical exertion. The attacks of this disease usually return with great regularity, and have, in consequence, been distinguished by names having reference to the periods of their visits; as—*Quotidian,* returning every second day;—*Tertian,* every third day;—*Quartan*, every fourth day; and so on, until the interval extends to nine or ten days.

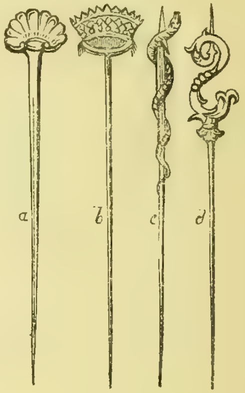
Symp.—1. The *cold stage*, marked by debility, paleness, coldness, drowsiness, and general rigors throughout the body, impaired respiration, nausea, vomiting, &c.—2. The *hot stage*, distinguished by the usual marks of fever, and, in some cases, delirium, &c.—3. The *sweating stage*, marked by a copious perspiration, and a gradual return of most of the functions of the body to their ordinary state. In many cases, the symptoms and the succession and duration of the stages vary.

Treat., *&c.*—1. (*Palliative.*) An emetic or a full dose of opium or laudanum has been recommended at the commencement of the fit, followed by a warm foot, hip, or full bath. Stimulants, as ether, spirits, &c., are also used, but, when they fail to relieve, they tend to aggravate the distemper.—2. (*Curative.*) This consists in the administration of febrifuge medicines during the intermission of the paroxysms. The principal of these are *bark and its preparations* and *liquor of arsenic.* Two or three doses of purgative medicine may be given, after which 2 to 5 grs. of the disulphate of quinine (in solution) may be taken three or four times daily; or, when this cannot be obtained, 1 to 2 dr. of powdered cinchona bark. When the stomach rejects the powder, the infusion, decoction, or extract of bark may be employed. Quinine, properly administered, generally cures ague. The solution of arsenite of potassa (liquor arsenicalis, Ph. L.) is also a valuable medicine in ague, but its use requires care and attention. Under the name of "tasteless ague drop," it has cured thousands. *Dose*, at first, 5 drops twice a day, gradually raised to 20 drops. This is the common ague medicine in the fen counties of England. Warm clothing and a light nutritious diet should be adopted during the curative course; and if the patient reside in a swampy or marshy district, he should remove as quickly as possible to one of a drier and opposite description.

AGUE DROP. Solution of arsenite of potassa.

AGUSTINE. A name given by Tromsdorff to a supposed new earth found by him in the Saxon beryl. It is merely phosphate of lime.

AIGUILLETTE. A term applied to several small dishes, from the articles of which they consist being mounted on silver needles or skewers with ornamental handles or tops. They form one of the varieties of the hors-d'œuvres of Soyer, or dishes to be handed round the table.



Attelettes from Soyer.

AIGUILLETTES (de Ris de Veau). Syn. *A. of the Sweetbread of Veal. Prep.* (Soyer.) Take *throat sweetbreads*, three in number; boil in *water* ten minutes, pour off the liquor, add *one onion*, *one carrot*, *one turnip*, *two bay-leaves*, and a *pint* of *white broth;* simmer twenty minutes, cut them into round pieces about the size of a shilling, and season with *salt* and *pepper;* next put them into a stew-pan, with butter, 1 *oz.*; dress them quite white; then dip each piece with a fork into a mixture of *white sauce*, 10 tablespoonfuls; *light stock*, eight ditto; *yelks* of *two eggs;* and the juice of *half a lemon;* previously brought to a proper consistence without quite boiling. When cold, run the skewers through the pieces, putting two or three on each skewer; dip them into *four eggs*, well beaten, then into bread crumbs, and fry in hot lard. Serve on a napkin.—*Aiguillettes aux Huitres*, (oysters);—*Aiguillettes de Homard*, (lobsters);—*Aiguillettes de Filets de Sole*, (soles);—*Aiguillettes de Langue de Bœuf*, (ox-tongue);—*Aiguillettes de Volaille à la Jolie Fille*, (fowl); are prepared in a similar manner to those before described, merely varying the sauces, &c., to suit the article and palate.

AIR. The fluid we breathe. This term was formerly applied to any aeriform body or gas, but is now usually confined to the gaseous matter forming our atmosphere. This compound consists of a mixture of *nitrogen* and *oxygen*, together with a small quantity of *aqueous vapour* and *carbonic acid.* It may be described as an inodorous, invisible, insipid, colourless, elastic fluid or gas, possessing gravity, and easily moved, rarefied, and condensed. See *Atmosphere, Ventilation, &c.*

ALABASTER. There are several varieties of alabaster, known in the arts, all of which may be ranged under two heads:

1. *Calcareous* or *Oriental alabaster*, is a sub-variety of carbonate of lime, formed by the deposition of calcareous particles in the caverns of limestone rocks. It has a foliated, fibrous, or granular structure, a pure, soft, rich, semi-translucent whiteness, generally agreeably variegated with undulating zones or stripes of various shades of yellow, red, or brown. This variety is that most esteemed by sculptors, and for the manufacture of alabaster ornaments.

2. *Gypseous* or *common alabaster*, is a natural hydrous sulphate of lime, containing a little carbonate of lime. That from the quarries of the Paris basin contains 12% of the latter substance. When calcined or roasted at a heat of about 400 Fahr., (for which purpose that of a baker's oven will do,) it loses its combined water, and when powdered, forms the substance known under the name of *Plaster of Paris.* In this state, when mixed with water to the consistence of cream, and poured into moulds, it rapidly hardens, receiving a sharp and faithful impression of even the finest lines with which it comes in contact. It is thus employed by the manufacturers of stucco ornaments, and affords to the poor Italian artist the means of producing copies and imitations of the works of the great masters, at a rate sufficiently low to place them within the reach of almost every class of society. The more compact, fine-grained specimens of this variety of alabaster, are, like the preceding one, sculptured into almost numberless articles of ornament and utility, such as vases, clock-stands, statuettes, &c. The inferior kinds are manufactured into the plaster of Paris of the shops.

Alabaster is bronzed by simply covering the surface (previously prepared with one or two coats of *size*) with a *bronze-green-coloured paint;* and when this is nearly dry, dabbing on the prominent parts, with a wad of soft cotton, a little *bronze powder*, such as is sold by artist's colourmen. On the taste exercised in this part of the operation depends the beauty of the work. A good paint for the purpose is made of *verdigris* and *ochre*, tempered to the desired tint with *Prussian blue.* The addition of a little *bronze-powder* or *Dutch leaf*, to this paint, improves it.

Alabaster is cleaned with a brush and warm *soap-and-water;* afterwards well rinsing it in *clean water.* If necessary, the surface must be re-polished. *Grease spots* may be removed with a little clean *oil of turpentine.*

Alabaster is engraved or *etched* by covering every part of the surface of the subject or cast, except that to be etched, with a solution of *white wax* in *oil of turpentine* (1 to 4,) thickened with a little finely powdered *white lead*, and subsequent immersion in *water* for 20 to 50 hours, according to the effect desired. The varnish is washed off with *oil of turpentine*, and the etched parts carefully brushed over with *powdered gypsum.* The effect is produced by the solvent action of water on gypsum. This does not succeed with calcareous alabaster.

Alabaster is hardened,—1. By exposing the unpolished articles for 12 to 24 hours, to *a heat about equal to that of a baker's oven*, and when they are withdrawn and considerably cooled, *immersing* them for the space of 2 to 5 minutes in *pure river water.* The operation is sometimes repeated a second time, and 3 or 4 days are allowed to elapse before polishing them.

2. As the last, but employing *a weak solution of alum*, (alum-water,) instead of river water.

3. Dip the cast or model, previously warmed, and suspended by a fine silken cord or wire, into the *purest white wax*, melted in a suitable vessel. The operation should be repeated until the liquid wax begins to rest unabsorbed on the surface of the plaster, when the article must be placed aside (suspended) until the next day, and then polished with a brush.—*Obs.* The itinerant image vendor of London imitates this process by brushing over the surface of his wares, previously warmed, melted tallow, suet, or stearine. These substances, however, not only injure the colour of the plaster, but render it more attractive of dust and dirt.

4. Suspend the article, as last, in a wooden trough or any suitable vessel of glass or earthenware; cover it with a *strong* and *perfectly clear solution of alum*, and let it remain until a sufficient quantity of the salt has crystallized on the surface. It should be afterwards polished with a wet cloth.

5. Mix up the plaster of Paris with *weak alum-water*, instead of common water; but otherwise proceed in the usual way.

6. Mix up the plaster with *a weak solution of gum Arabic*, (1½ or 2 *oz.* to the pint

of water,) or, for rough purposes, with a *weak solution of size.*

Obs. Beautiful imitations of marble may be produced by each of the above processes; but some care and address is necessary to ensure success. They refer to gypseous alabaster only.

Alabaster is joined by means of a little *white of egg,* thickened with *finely powdered quicklime,* or by a paste of newly-baked and *finely powdered plaster of Paris,* mixed up with the least possible quantity of water.

Alabaster is polished, first with *pumice stone,* and then with a paste or pap made of *whiting, soap,* and *milk* or *water;* and lastly with *dry flannel.* A better method is said to be to take the article in the rough state from the hands of the sculptor or turner, and to rub it with *dried shave-grass* (equisetum), and afterwards, with *finely powdered* and *sifted slaked lime* formed into a paste with *water.* The resulting rough polish is then brought up and finished off by friction with finely-powdered *talc,* or *French chalk,* until a satiny lustre is produced.

Alabaster is stained or *coloured* by mixing with the water used in working up the plaster any of the *ordinary pigments* or coloured solutions that are not decomposed by contact with sulphate or carbonate of lime. A little *terra di Sienna,* in very fine powder, or ground with water, added to the water as above, imparts a very pleasing colour to busts, statues, medallions, &c. In the rough way, for architectural purposes, &c., the colours or stains are commonly added in the required quantity, to a solution of clear size, which is then made into a paste with plaster. In this manner coloured stuccoes of great hardness and durability are produced.

Alabaster is wrought, turned, and *fashioned,* in a similar manner to the softer varieties of marble.

ALANINE. A peculiar substance, possessing feeble basic properties, obtained by Strecker from aldehyde.

Prep. An aqueous solution of *aldehyd-ammonia* is treated with *hydrocyanic* and *hydrochloric acid;* a mixture of *alcohol* and *ether* is then added, and the precipitate (chloride of ammonium) removed by filtration; the filtrate is next agitated with *protoxide of lead,* and subsequently separated from the lead by passing a stream of *sulphuretted hydrogen* through it. The decanted liquid yields feathery crystals of *alanine* on evaporation.

Prop., &c. Crystals, rhombic prisms of a pearl-like lustre; soluble in cold water; scarcely so in alcohol; insoluble in ether; solution, neutral, and tastes saccharine. Under the influence of nitrous acid it is converted into lactic acid precisely identical with that obtained from milk-sugar.

ALANTIN. Syn. *Alantina.* A starchy substance identical with inulin, found in the roots of elecampane and garden angelica.

ALBATA. A white metal, formed by alloying copper with nickel and zinc, to which sometimes a little lead and iron are added. See *Alloys.*

ALBUMEN. A peculiar nitrogenous substance which enters largely into the composition of animal bodies. It abounds in the blood, muscles, bones, coagulable lymph, vitreous and crystalline humour of the eye, fluid of dropsy, &c. &c. The white of egg consists of nearly pure albumen dissolved in water.

Prep. 1. The *white of egg* and the *serum of the blood,* when strained through muslin, furnish albumen, in solution, in a sufficiently pure state for all the ordinary purposes of the arts.

2. Agitate the strained *white of egg* with 10 or 12 times its bulk of *alcohol,* collect the precipitated flocculi on a muslin filter, and suffer it to dry at a temperature not exceeding 120° Fahr.

3. Add a little *water* to *white of egg,* mix, filter, exactly neutralize with *acetic acid,* and then largely dilute with pure *cold water;* the precipitate which falls may be collected on a filter and washed. The strained serum of blood may be used instead of white of egg, in both the above forms. The last two are perfectly pure.

Prop., &c. Perfectly pure solid albumen is scarcely soluble in water, but dissolves readily in water containing an exceedingly small quantity of caustic soda or potassa; it is nearly colourless, inodorous, and tasteless. When dried by a gentle heat it shrinks into a translucent, horny mass, and when exposed to a sufficient temperature, yields the usual ammoniacal odour and products of animal matter. Its solution (white of egg) is solidified or coagulated by a heat of from 145° to 165° Fahr., forming a white, opaque mass; when very dilute, on boiling (only) it separates in fine light flocks. When thus coagulated, it is insoluble in water at a less temperature than 302° Fahr., (Wohler and Vogel,) unless alkalized. Ordinary solutions of albumen give precipitates with sulphuric, hydrochloric, and nitric acid, with tannin and astringent solutions, and with most of the metallic salts, but are not affected by either acetic or tribasic (common) phosphoric acid. Alcohol, in quantity, also precipitates albumen by seizing on the water which holds it in solution.

Tests.—1. A solution of bichloride of mercury dropped into a fluid containing albumen occasions a white precipitate.—2. Subacetate of lead acts in the same way. Either of the last two will render turbid a solution containing only the 1-2000th part of fresh white of egg, or the 1-10,000th part of dry albumen.—3. Tannin and tincture of galls give a yellow, pitchy precipitate.

ALBUMEN (Flake). Syn. *Albumen in powder, Solid Albumen, Soluble do., Planter's do.* *Prep.* Expose the strained *white of egg* or the *serum of bullock's blood* in a thin stratum, to a current of dry air, until it concretes into a solid transparent substance, resembling horn. In this state it may be kept any length of time, or it may be further dried until brittle, and then powdered.

Use. It is extensively used as a clarifier in the sugar plantations of the West Indies, and elsewhere. It is prepared for use by stirring it with cold water until it is dissolved, when it is whisked to a froth in the usual way, and agitated with the liquid to be clarified.

ALCARAZZA. A species of porous earthenware made in Spain for cooling water and other liquids. Similar articles are made in England under the names of *water coolers, wine coolers, butter coolers, &c.*

Prep. 1. Take *sandy-marl,* 2 parts; *brine,* q. s.; make a dough, and then knead in *common salt,* in fine powder, 1 part; bake slowly, and lightly.

2. *Good clay,* 2 parts; *fine silicious sand,* 3 parts; *brine,* q. s.; *common salt,* 1 to 2 parts; only half bake, as before.

3. *Powdered clay,* 2 parts; *powdered charcoal,* 3 parts; (by weight;) form into a dough with water. The kilning must be so arranged that the heat is applied gradually, and the vessels exposed to a current of hot air; which must be continued until all the charcoal is burnt out.

ALCOHOL. A peculiar liquid generated by the fermentation of aqueous solutions of sugar. It is the characteristic principle of wines, beer, spirits, and other like intoxicating liquors. The spirits of commerce contain about half their bulk of alcohol. Dilute alcohol may be procured by the ordinary process of distillation, from *all* fermented liquors. When drawn from wine (as in France), it constitutes *brandy;* when from the juice of the sugar-cane, it is called *rum;* and when from malt, grain, or molasses (as in England), it is called *malt, grain,* or *molasses spirit.* In this state, it contains, besides water, variable quantities of essential oils, ethers, acetic acid, and other flavouring matters, which, by one or more redistillations with charcoal, lime, or other like substances, it for the most part loses, and then becomes commercial spirit of wine. By further rectification from chloride of calcium, lime, carbonate of potassa, or some other substance, which has a strong affinity for water, this last is retained, and the spirit passes over *nearly* pure. It is now called alcohol. By repeating the process, and using the proper precautions, it may be obtained entirely free from water.

Prep. 1. (Liebig.) Take *alcohol,* or *rectified spirit of about* 90%, (Sp. gr. 0·835 to 0·825,) any quantity; saturate with *dry chloride of calcium,* in powder, and after repose for a few hours, distil over the alcohol by a gentle heat in a water bath, until the product *nearly* equals the quantity of dry alcohol in the sample.

2. (Graham.) Place *alcohol of* 90%, under the *exhausted receiver* of an *air-pump,* surrounded with *quick-lime;* after the lapse of 3 or 4 days, if the vacuum be well kept up, the spirit will have entirely lost its water.

3. (Ph. E.) Take *rectified spirit,* 1 pint; *quick-lime,* (crushed small,) 18 oz.; mix, expose to a gentle heat in a closed glass mattrass, till the lime begins to slake; then withdraw the heat, and keep the upper part of the vessel cool with damp cloths until the slaking is finished; lastly, attach a proper refrigeratory, and with a gentle and gradually increased heat draw off 17 fl. oz. The sp. gr. of the product should be 0·796, in which case it would be nearly free from water.

4. (Ph. D.) Take *stronger spirit,* (Sp. gr. 0·818) 1 pint; pulverized *fresh burnt lime,* 10*oz.;* proceed as last, using a "chloride of zinc bath and a Liebig's condenser." When "the liquid which first comes over, together with that obtained during the slaking measures *two ounces,*" it must be rejected, the receiver changed, and the distillation continued until a product of *nearly sixteen ounces* is procured," of the "sp. gr. 0·795."

5. (Liebig.) By submitting the spirit used in the preparation of caustic potassa to distillation as above.

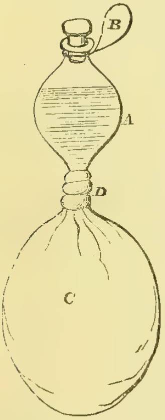
6. (Fresenius.) By the distillation of spirit of 90%, from fused *chloride of calcium,* as above; or by digestion with *anhydrous sulphate of copper,* (in powder,) agitation, decantation, and careful distillation. The products of the above processes are pure alcohols, either wholly or nearly free from water.

7. (Ph. L. 1836.) Take *rectified spirit*, (sp. gr. 0·838), 1 gallon; *chloride of calcium*, 1 ℔; proceed as above and distil 7 pints and 5 fl. oz. Sp. gr. of product 0·815; it contains about 7% of water.

8. (Ph. D. 1826.) *Rectified spirit*, 1 gallon; *pearl ashes*, dried and still hot, 3½ ℔; *chloride of calcium*, (dried,) 1 ℔; mix the ashes and spirit, digest in a covered vessel with frequent agitation for seven days; decant the clear portion, add the chloride of calcium, agitate to effect solution, and distil until the mixture in the retort begins to thicken. Sp. gr. of product, 0·810; it contains about 5% of water.

9. (*Without distillation.*) Take *rectified spirit*, and add thereto, in a closed vessel, with continual agitation, *fresh dried and slightly warm pearl-ashes* or *carbonate of potassa*, until the powder sinks to the bottom undissolved; add some, still further, in considerable excess; repeat the agitation at short intervals for some time; lastly, allow the mixture to repose for a few hours, and decant the clear upper portion. The product contains a little potassa, which can only be removed by distillation.

10. (Soëmmering.) Take the *bladder of an ox or calf*, soak it in water, inflate it, free it from the attached fat and vessels on both sides; dry and smear over the outer surface *twice*, and the inner surface *four* times, with a *solution of isinglass*. Then nearly fill it with the spirit to be concentrated, securely fasten it and suspend it in a warm situation, at a temperature of about 122° Fahr. In six to twelve hours, if the heat be properly maintained, the spirit will be concentrated, and in a little time longer will be renderd *nearly* free from water (anhydrous,) or of the strength of 97 or 98 per cent. The product is termed *"varnish maker's alcohol."* A *common* bladder, thoroughly cleansed from fat, and washed and dried, may be used *without* any *further preparation*. The bladder should be kept very nearly full, or else a portion of the spirit will escape through the empty part. To prevent this accident, a bottle with a double neck, of the shape represented in the engraving, may be employed. Before hanging the apparatus up, it is better to enclose it in a coarse potato netting, to prevent any accident arising from the strain on the neck of the bladder.



A, A bottle with two necks, the upper furnished with a ground-glass stopper.

B, Loop of cord to hang the apparatus up by.

C, Bladder containing spirit, filled by means of the bottle *A*.

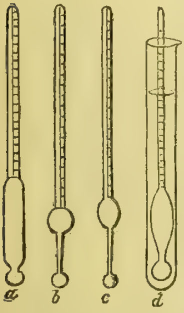
D, Neck of bladder accurately secured to the under neck of the bottle *A*.

Prop. Light, transparent, colourless, volatile, inflammable; miscible, in all proportions with water, with the evolution of heat, and condensation of the mixture, but some hours elapse before the union is complete; dissolves resins, gum resins, essential oils, camphor, bitumen, soaps, sugar, carbonic and boracic acid, iodine and the iodides, phosphorus, lime, ammonia,, soda, potassa, the alkaloids, wax, spermaceti, all the deliquescent salts, (except carbonate of potassa,) and various other substances. It curdles milk; coagulates albumen, and separates both starch and gum from their mucilages. It boils at 172°, and in vacuo, at 56° Fahr. Sp. gr. 0·794 at 60° Fahr. (0·7939,—Tralles.) It is uncongealable by cold. Its evaporation, like that of ether, produces intense cold. It acts as a powerful antiseptic on organic substances immersed in it. With the acids, it forms ether. By undergoing the acetic fermentation it is converted into vinegar. It is eminently poisonous and intoxicating. In small doses it occasions excitement and intoxication; in larger ones, delirium, somnolency, coma, apoplexy, and death. All strong spirits act in the same way, the effect being proportional to the state of concentration, and the quantity taken.

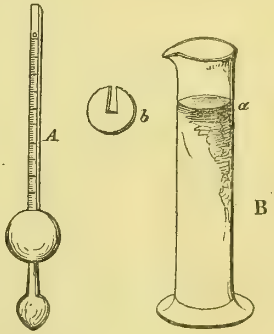
Pur. The presence of water is best ascertained by taking the specific gravity of the liquid, (See *Alcoholmetry*);—the absence of other foreign matter by the following tests—1. Colourless *oil of vitriol* added to spirit, produces a reddish tinge, if either essential oil, or organic matter be present. (Liebig.)—2. A *solution of nitrate of silver* does not alter the colour or transparency of pure alcohol; if it reddens it, the sample contains either oil or organic matter. (Vogel.)—3. It should be neutral to test paper.—4. It should be "colourless; evaporate entirely by heat; combine with water and with ether, retaining its transparency; taste and smell vinous." (Ph. L. 1836.) The above tests are applicable to alcohols of all strengths.—5. One per cent. of wood spirit (wood naphtha) may be detected in spirit of wine by testing it with caustic potassa, which will speedily give it a yellow or brown colour, but imparts no tint to pure alcohol. (Ure.)

Concluding Remarks. The selection of any one of the processes given above for the preparation of alcohol, must greatly depend on the convenience or position of the operator. Gay-Lussac has recommended the use of *caustic baryta* instead of *lime*, and others have employed *dry alumina*, as an absorbent of the water prior to distillation. Common proof spirit may be concentrated until its sp. gr. falls to about 0·825, by simple distillation in a water bath; at which sp. gr. it contains only about 11% of water, and is then about as volatile as pure alcohol. By surrounding the capital of the still or apparatus by a water bath kept at the proper temperature, the alcoholic strength or content of the product may be regulated to the greatest nicety. See *Alcoholmetry*, *Brandy*, *Distillation*, *Fermentation*, *&c.*

ALCOHOLMETRY. Syn. *Spirit Testing*, *Alcoholometry*, &c. The determination of the quantity of pure alcohol, or of a spirit of a certain strength, taken as a standard, present in any given sample of spirituous or fermented liquors. The instruments used for this purpose are called *alcoholmeters*. Some, as those of Baumé, Cartier, &c., are simply hydrometers, by which the specific gravity of the sample is ascertained; others of a like construction, as those of Richter (*a*), Tralles (*b*), and Gay-Lussac (*c*), have their stems so graduated as at once to indicate the proportion of alcohol present, either by weight or volume, at some standard temperature (*see* engr.); whilst a third class, as those of the Abbé Brossard-Vidal, Field, &c., are essentially thermometers, with scales which indicate the boiling points of spirits of different strengths, instead of the common thermometric degrees. A very convenient hydrometer for common purposes (*d*) has been lately produced by some of the instrument makers. It is of the usual form, but its stem on one side exhibits the per centage by *volume*, and on the other, the per centage by *weight*. Thus, both results may be obtained at one trial of the sample.



Methods of Alcoholmetry.—1. (Revenue System.) The annexed engraving represents Sike's hydrometer, as made by Mr. Bate, under the direction of the Commissioners of Inland Revenue and Customs. It consists of a stem about 4 inches long, divided into 10 parts, each of which contains 10 subdivisions; and it is furnished with 9 weights of different sizes, numbered respectively 10, 20, 30, &c., to 90, by which it acquires a range over 900 divisions. The instrument is so formed as to give the sp. gr. with almost perfect accuracy, at 62° Fahr. It is fitted up in a neat mahogany case, accompanied with a thermometer, and a book of tables containing corrections for temperature, &c. The mode of using this hydrometer is as follows:



A glass tube of the form of fig. (B) is filled to the mark (*a*) with the sample for examination; the thermometer is then placed in the liquor and stirred about for 2 or 3 minutes, (observing not to breathe upon the glass nor hold it in the hand,) when it is withdrawn and the temperature noted. The hydrometer is next immersed in a similar manner, and gently pressed down in the liquor to the (0) on the stem with the finger, having been previously loaded with any one of the nine weights that will make it float with the surface of the spirit at some point on the graduated part of the scale. The indication at the point cut by the surface of the liquor, added to the weight with which the float is loaded, gives a number which must be sought in the book of tables. In this book, at the page headed by the *Temperature as observed by the Thermometer*, and against the part of the column appropriated to the *given indication* (weight,) will be found the strength per cent., in whole numbers and decimal parts. In reading off the indication, to ensure accuracy, it is necessary to allow for the convexity of the liquor at the part where it immediately rests against the stem.

The above, as well as all other methods of alcoholmetry depending on the sp. gr., refer to *unsweetened spirits*. The strength of *sweetened spirits* cannot be determined by the common hydrometer or the specific gravity.

2. *Sike's* hydrometer, as already stated, gives the specific gravity with almost perfect accuracy at 62° Fahr.;—*Baumé's* and *Cartier's* (as made in England) do the same at 60°; —*Richter's* gives the per centage of alcohol by *weight*, and *Tralle's*, by *volume*, also at the temperature of 60°. *Gay-Lussac's alcoömètre* for the most part resembles that of Tralle, except in being adjusted for the temperature of 59° Fahr., (15° Cent.) When, therefore, the spirit under examination is of any other temperature than the normal one of the instrument, certain corrections are necessary to render the results of any value. Perfect accuracy requires that tables for every variation of the thermometer, founded on actual experiments, should accompany each instrument. Such tables are furnished by the maker of Sike's hydrometer, but from their great length cannot be inserted here. For ordinary purposes, in the absence of tables or nicer calculations, it may be useful to know, that —5° Fahr. are equal to 1·00$^0_0$ of Alcohol, or 1·794$^0_0$ of proof spirit, by *volume;* and 0·794$^0_0$ of alcohol, or 1·620$^0_0$ of proof spirit, by *weight*. Thus, by making the proper *addition* to *the apparent strength per cent.*, when the *observed temperature* is *below* the *normal temperature of the instrument*, or a corresponding *subtraction*, when it is *above* it, the *strength* of the sample may be determined (nearly.)

3. Weigh the sample to be tried in a phial capable of holding exactly 500 grains of distilled water. The observed weight, doubled, will give the specific gravity at the given temperature. If a *thousand-grains* bottle be used, the result will be obtained without calculation. The specific gravity may next be sought in one or other of the following tables, and the necessary corrections made for temperature.

TABLE I, *exhibiting the per centage of Alcohol by* VOLUME, *corresponding to the given Specific Gravities*. By TRALLES.

Alcohol in 100 measures of Spirit.	Sp. Gr. at 60° Fahr.	Difference of Sp. Gr.	Alcohol in 100 measures of Spirit.	Sp. Gr. at 60° Fahr.	Difference of Sp. Gr.
Pure water	·9991	00	51	·9315	20
1	·9976	15	52	·9295	20
2	·9961	15	53	·9275	20
3	·9947	14	54	·9254	21
4	·9933	14	55	·9234	20
5	·9919	14	56	·9213	21
6	·9906	13	57	·9192	21
7	·9893	13	58	·9170	22
8	·9881	12	59	·9148	22
9	·9869	12	60	·9126	22
10	·9857	12	61	·9104	22
11	·9845	12	62	·9082	22
12	·9834	11	63	·9059	23
13	·9823	11	64	·9036	23
14	·9812	11	65	·9013	23
15	·9802	10	66	·8989	24
16	·9791	11	67	·8965	24
17	·9781	10	68	·8941	24
18	·9771	10	69	·8917	24
19	·9761	10	70	·8892	25
20	·9751	10	71	·8867	25
21	·9741	10	72	·8842	25
22	·9731	10	73	·8817	25
23	·9720	11	74	·8791	26
24	·9710	10	75	·8765	26
25	·9700	10	76	·8739	26
26	·9689	11	77	·8712	27
27	·9679	10	78	·8685	27
28	·9668	11	79	·8658	27
29	·9657	11	80	.8631	27
30	·9646	11	81	·8603	28
31	·9634	12	82	·8575	28
32	·9622	12	83	·8547	28
33	·9609	13	84	·8518	29
34	·9596	13	85	·8488	30
35	·9583	13	86	·8458	30
36	·9570	13	87	·8428	30
37	·9556	14	88	·8397	31
38	·9541	15	89	·8365	32
39	·9526	15	90	·8332	33
40	·9510	16	91	·8299	33
41	·9494	16	92	·8265	34
42	·9478	16	93	·8230	35
43	·9461	17	94	·8194	36
44	·9444	17	95	·8157	37
45	·9427	17	96	·8118	39
46	·9409	18	97	·8077	41
47	·9391	18	98	·8034	43
48	·9373	18	99	·7988	46
49	·9354	19	Pure Alcohol	·7939	49
50	·9335	19			

*** *If the precise specific gravity* sought cannot be found in the table, the *difference* between it and the next greater specific gravity must be taken for the numerator of a fraction, having for its denominator the number found in the *third* column against the next greater sp. gr. This fraction, added to the per centage of alcohol in the first column of the table against the said greater sp. gr., will give the true per centage sought. Thus: "if the sp. gr. of a spirit be ·9605, what is its alcoholic content?" ·9605 is not in the table, and the next greater number is 9609; the former must therefore be deducted from the latter, and the difference (4) put as the numerator of the fraction, having for its denominator the number (13) in the column of differences against ·9609. The fraction $\frac{4}{13}$ so found, added to the per centage against ·9609 in the first column, gives $33\frac{4}{13}$ as the true per centage of alcohol in the given sample.

Table II, *showing the Alcoholic Content per cent., by* weight, *of spirits of different Specific Gravities.* By Fownes, *with an additional column by* Mr. Cooley.

Per cent. by weight of Real Alcohol.	Sp. Gr. at 60° Fahr.	Difference of Sp. Gr.	Per cent. by weight of Real Alcohol.	Sp. Gr. at 60° Fahr.	Difference of Sp. Gr.
0·5	·9991	00	27·	·9623	15
1·	·9981	10	28·	·9609	14
2·	·9965	16	29·	·9593	16
3·	·9947	18	30·	·9578	15
4·	·9930	17	31·	·9560	18
5·	·9914	16	32·	·9544	16
6·	·9898	16	33·	·9528	16
7·	·9884	14	34·	·9511	17
8·	·9869	15	35·	·9490	21
9·	·9855	14	36·	·9470	20
10·	·9841	14	37·	·9452	18
11·	·9828	13	38·	·9434	18
12·	·9815	13	39·	·9416	18
13·	·9802	13	40·	·9396	20
14·	·9789	13	41·	·9376	20
15·	·9778	11	42·	·9356	20
16·	·9766	12	43·	·9335	21
17·	·9753	13	44·	·9314	21
18·	·9741	12	45·	·9292	22
19·	·9728	13	46·	·9270	22
20·	·9716	12	47·	·9249	21
21·	·9704	12	48·	·9228	21
22·	·9691	13	49·	·9206	22
23·	·9678	13	50·	·9184	22
24·	·9665	13	51·	·9160	24
25·	·9652	13	52·	·9135	25
26·	·9638	14	53·	·9113	22
54·	·9090	23	78·	·8533	24
55·	·9069	21	79·	·8508	25
56·	·9047	22	80·	·8483	25
57·	·9025	22	81·	·8459	24
58·	·9001	24	82·	·8434	25
59·	·8979	22	83·	·8408	26
60·	·8956	23	84·	·8382	26
61·	·8932	24	85·	·8357	25
62·	·8908	24	86·	·8331	26
63·	·8886	22	87·	·8305	26
64·	·8863	23	88·	·8279	26
65·	·8840	23	89·	·8254	25
66·	·8816	24	90·	·8228	26
67·	·8793	23	91·	·8199	29
68·	·8769	24	92·	·8172	27
69·	·8745	24	93·	·8145	27
70·	·8721	24	94·	·8118	27
71·	·8696	25	95·	·8089	29
72·	·8672	24	96·	·8061	28
73·	·8649	23	97·	·8031	30
74·	·8625	24	98·	·8001	30
75·	·8603	22	99·	·7969	32
76·	·8581	22	Pure Alcohol	·7938	31
77·	·8557	24			

*** The remarks appended to Table I, as far as the specific gravities are concerned, also apply to this table.

4. *From the temperature of the vapour,* ascertained by thrusting the bulb of a thermometer through a cork or piece of vulcanized India rubber into the head of the still or other vessel containing it, and noting its temperature, which must then be sought in the following table. This method is admirably adapted to the purposes of the distiller and rectifier, and it is to be regretted that we are not in possession of a more extensive and comprehensive table.

Table III, *showing the Alcoholic Content of Boiling Spirits, from the temperature of their Vapour, observed by a thermometer.* By Gröning.

Temperature of Vapour. Fahrenheit.	Alcoholic content of Vapour by volume per cent.	Alcoholic content of boiling liquid per cent.
170·0	93	92
171·8	92	90
172·0	91	85
172·8	91½	80
174·0	90	70
174·6	89	70
176·0	87	65
178·3	85	50
180·8	82	40

Temperature of Vapour Fahrenheit.	Alcoholic content of Vapour by Volume per cent.	Alcoholic content of boiling liquid per cent.
183·0	80	35
185·0	78	30
187·4	76	25
189·8	71	20
192·0	68	18
194·0	66	15
196·4	61	12
198 6	55	10
201·0	50	7
203·0	42	5
205·4	36	3
207·7	28	2
210·0	13	1
212·0	0	0

5. (*From the boiling point.*) For this purpose a simple thermometer, with a large bulb, and a very narrow bore from about 180° to 212° Fahr., may be successfully employed; but instruments for this especial object have been prepared by Long and others. The temperature at the commencement of full ebullition being ascertained, may be sought in one of the following tables, against which the alcoholic content of the liquor (nearly) will be found.

TABLE V, *exhibiting the boiling points of Mixtures of Alcohol and Water of the given strengths.* By GRÖNING.

Alcohol per cent. by volume.	Boiling point. Fahr.	Alcohol per cent. by volume.	Boiling point. Fahr.
5	205·34	55	179·96
10	199·22	60	179·42
15	195·80	65	178·70
20	192·38	70	177·62
25	189·50	75	176·54
30	187·16	80	175·46
35	185·00	85	174·92
40	183·38	90	174·20
45	182·12	95	173·14
50	181·58	100	172·00

TABLE VI, *showing the boiling points of "under proof" spirit.* By Dr. URE.

Specific Gravity.	Per centage strength.	Boiling points Fahr.
·9200	Proof.	178·60
·9318	10· U.P.	179·75
·9420	20· ”	180·04
·9516	30· ”	182·00
·9600	40· ”	183·40
·9665	50· ”	185·60
·9729	60· ”	189·00
·9786	70· ”	191·80
·9850	80· ”	196·40
·9920	90· ”	202·00

6. (Brande.) Half fill a graduated tube with the liquor to be tried, and add thereto about 12% or 15% of a strong solution of *diacetate of lead*, then agitate the mixture until the colour is nearly removed. Next add dry *carbonate of potassa*, in powder, until it falls down undissolved, even after the continued shaking of the liquid. On allowing the tube to repose for a short time, the alcohol will be seen floating on the top of the aqueous portion in a well-marked stratum, and its quantity may be read off by means of the graduations on the tube. Gay-Lussac has proposed a simpler mode of applying this test. He agitates a little *powdered litharge* with the sample, until it is decoloured and limpid, and then saturates it with the *carbonate of potassa*, as before. The alcohol, thus separated, has a sp. gr. of about 0·8117, and contains 3 or 4% of water. This process answers well with spirits, cordials, wines, &c., but requires some address to make it succeed with the weaker liquors, as ale, beer, and porter.

7. (M. Gay-Lussac.) Take of the *liquor to be tried*, measured in a graduated glass tube, 300 *parts.* Place the liquor in a still or retort, and carefully draw over *one hundred parts*, or *one third*, using a graduated tube as the recipient, and stopping the operation when the distilled liquor reaches the hundredth degree. Then ascertain the alcoholic strength of the distilled liquor by any of the usual methods, and divide the result by three, when the per centage of alcohol in the original liquor will be obtained. If, from want of attention, more than one hundred parts should be distilled over, the number which expresses the relation of the volume of the distilled product to the original bulk of the liquor tested must be employed as the divisor. Thus, if 106 parts of liquor has distilled over (instead 800,) containing 33 per cent. of alcohol, the 300 must be divided by 106, which gives 2·83, and the 33% by 2·83, which gives 11·66. The last number expresses the per centage of alcohol in the liquor submitted to examination. The strength at "proof" may be calculated in a similar way.

Concluding Remarks. The *Duties on Spirits* in England are charged on the number of *proof gallons* they contain, which is ascertained by first "*gauging*" or "*ullaging*" the liquor, and then "trying its strength" by Sike's hydrometer, in the way already described, when the per centage content of proof found, multiplied by the "gauge" or "ullage" gallons, gives the net amount of proof spirit in the quantity surveyed.

The *proof strength* is an arbitrary standard, adopted for the purpose of facilitating calculations, for which it is well suited, although pure alcohol would, for this purpose, be more simple and convenient. The sp. gr. of proof spirit is 0·920 at 60° Fahr., and it contains, in 100 parts, by *weight*, 49% of alcohol of 0·794, and 51% of water; and by *volume*, 56·66% of alcohol, and 43·34% of water. At 51° Fahr., the sp. gr. of proof spirit is 0·923, and 13 volumes weigh exactly equal to 12 volumes of distilled water. On this standard strength, all the calculations and language of trade are based. Thus, when a given sample of spirit is said to be 10% *over-proof*, or "*o. p.*," as it is technically called, it means, that 100 gallons of such spirit contain exactly as much alcohol as 110 gallons of proof. In *over-proof* spirit, the per centage *o. p.* represents the *quantity of water* which the given spirit will take to reduce it to *proof*. By adding this per centage over-proof to 100, we obtain a number, which, multiplied by any number of gallons, and divided by 100, gives the exact number of proof gallons which is contained in any quantity of the spirit referred to. To determine the quantity of water required to reduce this spirit to the proof strength, the number of gallons of the spirit at the given strength must be deducted from its content in proof gallons. The difference is the quantity of water that must be used for the purpose.

In like manner *when* a spirit is said to be u. p., or *under-proof*, the per centage u. p. deducted from 100, furnishes a factor, which multiplied by any number of gallons, and divided by 100, gives the exact number of proof gallons contained in such a quantity of the given strength. In a similar way we may ascertain *how much water it will take to reduce one strength to another*, of any weaker degree. We have only to reckon how many gallons of u. p. spirit would contain an equal quantity of the proof strength. This we find by the simple rule of proportion. Then by deducting the number of gallons of o. p. from the number of gallons just obtained, the quantity of water which must be added for the desired purpose is immediately seen. By a little practice such calculations become easy.

Formerly, spirit was said to be 1 *to* 3, 1 *to* 4, &c., *over-proof*, by which it was meant that 1 gallon of water added to 3 or 4 gallons of such spirit would reduce it to proof. On the other hand, 1 *in* 3 or 1 *in* 4 *under-proof* meant that the 3 or 4 gallons, as the case may be, contained 1 gallon of water and the remaining quantity of proof spirit. This method of calculation has now given way, in this country, to the centigrade system followed by the Excise and Customs.

The *stocks of "dealers"* (those not permitted to sell less than 2 gallons) are always taken by the proof; but the spirits sold by retailers are only tested on being admitted into stock, and then afterwards taken according to their gross quantity, (ullage or gauge). The officers can, however, try the strength of any sample they choose, at any time, even in the stock of a *retailer*, when, if it be altered from the strength at which it was "*permitted*" into stock more than 3% (unless due notice of such reduction has been given), or if it be otherwise of an illegal strength, it becomes *seizable*. *A surplus*, however small, of more than 2 gallons over the quantity that should remain in hand of any one "*quality*" (kind) of spirit, after deducting the amount sent out by permits from the stock, as settled at the previous survey, is also seizable.

The *strength of spirits* are regulated *by the revenue laws of Great Britain.* When higher than 43 o. p., or sp. gr. 0·8597, the liquor is designated *spirit of wine*, and marked *S. W.* by the officers. Unflavoured spirit below this strength is termed *plain spirits. Distillers of British spirits* are not allowed to send out spirit at other strengths than 25 or 11 per cent. o. p. and 10 u. p. *British compounds*, (gin, British brandy, &c.) are not allowed to be kept in stock or sent out *stronger* than 17 u. p.; but gin, as usually sold by the wholesale dealer, is 22 to 24 u. p.; and when sweetened, as in cordial gin, is frequently 35 u. p., or even weaker. *Unsweetened foreign* and *colonial spirits* must not be kept or sent out *weaker* than 17 u. p.

Several other methods of alcoholmetry have been adopted at various times besides those above noticed. Thus the strength of spirit was at one time estimated by what was called the "*proof*." A little of the spirit was poured upon a small quantity of gunpowder, in a spoon or saucer, and inflamed; *if explosion followed the combustion of the spirit*, the sample was said to be *above* or *over proof;* but if *the contrary*, it was declared *below* or *under proof*. Hence arose the words "proof" and "proof spirit," which have since been applied to spirit of a particular strength by Act of Parliament. *Another method*, is the "*preuve d'Holland*" of the French, or the "*bead*," still frequently employed by persons unacquainted with the use of the hydrometer. It consists in shaking the spirit in a phial, and observing the *size*, *number*, and *duration* of the bubbles, or "beads" as they are called. The *larger* and *more numerous* these are, and the *more rapidly* they *break* and *disappear*, the *stronger* is deemed the spirit. Owing to the untrustworthy character of both these plans they have now long fell into disuse. *Lovi's beads* are often employed to ascertain the strength of spirit. *The sudden increase of temperature* produced by mixing a known weight of spirit with a known weight of pure water being observed by a thermometer, has also been proposed for the same purpose, but neither this nor the previous method is capable of *great accuracy*. The insufficiency of other methods of alcoholmetry throws us back on the *Revenue System*, or the *specific gravity*, for *unsweetened spirits*, and on the *thermo-alcoholmeter*, *potash-test*, or *distillation*, for *cordials*, *wines*, *beer*, and *other liquors*, containing extractive matter or sugar. See *Alcohol*, *Specific Gravity*, *&c.*

ALCORNINE. A crystalline substance obtained from the alcornoque or alcornoco bark of South America. The bark from which it is obtained is astringent and bitter, and has been recommended in phthisis, but appears to possess little medicinal virtue. The bark of the young branches of the cork tree (Quercus suber,) used for tanning, has also been called alcornoco bark, but possesses none of the characters of the former article.

ALDEHYDE. Syn. *Hydrate of Oxide of Acetyle*. A pungent volatile liquid, obtained from alcohol.

Prep. (Liebig.) Take *aldehyd-ammonia*, and *distilled water*, of each 8 parts; dissolve; add *sulphuric acid*, 7 parts, diluted with about its own weight of water; and distil by a gentle heat in a water bath into a well-cooled receiver. Rectify the product, twice, from *its own weight of dried chloride of calcium*, at a temperature not exceeding 86° or 87° Fahr. The last product is anhydrous aldehyde.

Prop. &c. Limpid, colourless, ethereal, neutral, inflammable; mixes in all proportions with alcohol, ether, and water; boils at 72° Fahr.; sp. gr. 0·790; by exposure to the air, it is gradually converted into acetic acid; gently heated with protoxide of silver or its solutions, the oxide is reduced and deposited on the inner surface of the vessel, as a brilliant and uniform film of pure silver, whilst *aldehydate of silver* remains in solution; treated with hydrocyanic acid it yields *alanine.*

ALDEHYD-AMMONIA. *Prep.* (Liebig.) Take *sulphuric acid* and *peroxide of manganese*, in fine powder, of each 6 parts; *water* 4 parts; *alcohol* of 80$^{o}_{0}$, 4 parts. Dilute the acid with the water, add carefully the alcohol, and next the manganese; agitate and distil with a gentle heat, from a spacious retort into a receiver surrounded with ice and connected with the former perfectly air-tight. When six parts have distilled, re-distil this portion from its own weight of dried chloride of calcium, until three parts have come over, and again rectify in the same manner, until 1½ part of liquid is obtained. Mix this with an equal bulk of ether, and saturate the mixture with dry ammoniacal gas; brilliant colourless prismatic crystals of great beauty will then form, which after washing with ether and drying, are pure aldehyd-ammonia.

Prop. &c. Smells like a mixture of turpentine and ammonia. Melts at 165° to 170°; volatilizes, unchanged, at 212° Fahr.; decomposed by exposure to the air; soluble in most menstrua except ether; acids decompose it. With sulphuretted hydrogen it forms *thialdine.*

ALDEHYDIC ACID. Syn. *Acetylous acid*, *Acetulous Acid; Lampic Acid?* An acid discovered by Liebig, and supposed by him to be identical with the lampic acid of Davy and Faraday; or at least its essential part.

Prep., *&c.* Digest *oxide of silver* in *aldehyde*, decant and pass *sulphuretted hydrogen* through the liquid to threw down the silver. The product is a weak acid forming salts with the bases, called *aldehydates*. These salts suffer decomposition during the evaporation of their solutions, and hence, cannot be obtained in the dry state.

ALE. Syn. *Ala*, *Alla*, *Cerevisia*, *Cerevisia Alba*, *Cerevisia Lupulata*, *Liquor Cereris*, *Vinum Hordeaceum*, *Vinum Anglicanum*,—Lat. var. A pale-coloured beer, prepared from lightly dried malt, by the ordinary process of brewing.

In brewing the finer kinds of ale, "pale" or "lightly dried" malt, and pale East Kent hops, of the current season's growth, are always preferred; and when it is desired to produce a liquor possessing little colour, great attention is paid to this selection. With the same object in view, the boiling is conducted with more than the usual precautions, and the fermentation is carried on at a somewhat lower temperature than that commonly allowed for several other varieties of beer. For ale intended for immediate use, the malt may be *all*, or mostly "pale;" but if the liquor be brewed for keeping, and in warm weather, one fifth, or one fourth of amber malt may be advantageously employed. From 5*lb.* to 6*lb.* of *hops* is the quantity commonly used to *a quarter of malt*, for "ordinary ales;" and 8*lb.* to 10*lb.* for "keeping ales." The proportions must, however, greatly depend on the intended quality and description of the brewing, and the period that will be allowed for its maturation.

The stronger varieties of ale contain from 7 to 8 per cent. of absolute alcohol; ordinary strong ale, 5 to 6 per cent.; mild ale, 3 to 4 per cent.; and table ale, 1 to 1½ per cent.; together with some undecomposed saccharine, gummy, and extractive matter, the bitter and narcotic principles of the hop, some acetic acid formed by the oxygenation of the alcohol, and very small and variable quantities of mineral and saline matter. See *Brewing, Malt Liquors, &c.*

ALES, (Medicated.) Syn. *Cerevisiæ Medicatæ,*—Lat. Ale prepared by macerating medicinal substances in it, either at the ordinary temperature of the atmosphere, or when heated; infusions and decoctions, in which ale or beer is employed as the menstruum. The old dispensatories enumerate several medicated ales. Preparations of this kind are now seldom ordered by the faculty, and their use is chiefly confined to the practice of empirics, and to domestic medicine. Bark, rue, savin, anti-scorbutic plants, aromatic bitters, and stomachics, are the substances most commonly administered in this way. Ale in which wormwood, gentian, orange-peel, and the like, have been steeped, taken warm, early in the morning, is much esteemed as a restorative tonic by drunkards and dyspeptics. See *Beer* and *Purl.*

ALEBERRY. A beverage made by boiling ale with some *spice*, *sugar*, and *bread-sops;* the last, commonly toasted. A domestic remedy for a cold.

ALEGAR. Sour ale; ale or beer vinegar. The latter is commonly prepared from *ale* that has become *too old* or *tart for sale* as such; and from *waste liquor*, by allowing them to remain in an *unbunged* cask or other loosely covered vessel, in a warm situation, until sufficiently mature. *Vine-cuttings*, *unripe* or *damaged grapes*, *cheap raisins*, and *vinegar bottoms*, are often added to hasten acetification, and to improve the flavour.

ALEGILL. Ale or beer, in which the *leaves* of *ground ivy* have been infused. Pectoral and stomachic.

ALGAROBA. Syn. *Algaroba Beans.* The *pods* of the ceratonia siliqua,—*Linn.* They are used for food, and to improve the voice; they contain a sweetish, nutritious powder, and are supposed to have been the locust on which St. John fed in the wilderness; their decoction has been used as a pectoral in asthma and coughs. The astringent pods of the *Prosopis pallida*, as well as those of the *Inga Marthæ*, both South American trees, are also called *Algaroba* or *Algarovilla.* The pods of the Chilian tree, *Prosopis Siliquastrum*, are known as *Chili Algaroba.* The last three are used in tanning, for which purpose they have been strongly recommended; indeed Chili Algaroba is said to possess "four times the power of good oak bark." (Ure.)

ALIZARINE. A peculiar colouring principle obtained by Robiquet from madder. See *Madder Red.*

ALKAHEST (of Glauber.) A crude *oil of tartar*, obtained by detonating *nitre* on hot coals, and then exposing the deflagrated matter in a damp place, until it runs into an oily-looking liquid.

ALKAHEST RESPURII. Prepared by detonating a mixture of *nitre* and *zinc filings*, powdering the resulting scoriæ, agitating it with water, and filtering. The filtered liquid contained the alkahest.

ALKAHEST ZWELFERI. Acetic acid obtained by the dry distillation of verdigris.

ALKALI. In *familiar language*, any substance freely soluble in water, possessing causticity, an acrid, urinous taste, and antacid qualities;—in *chemistry*, an electro-positive compound, capable of neutralizing the acids and combining with them in definite proportions, forming salts, and which, both alone and carbonated, is freely soluble in water, and in either of these conditions, when fluid or in solution, changes vegetable blues *green*, and vegetable yellows *brown.* The principal alkalies are *potassa, soda*, and *ammonia.* The *first* has been called the *vegetable*, the *second* the *mineral*, and the *third* the *volatile alkali;* but this distinction is now obsolete. *Potassa* and *soda* have also been called the *fixed alkalies*, from their permanence in the fire; and *ammonia* was formerly termed *alkaline air*, because when perfectly pure it exists only in the state of gas. *Lithia* is another alkali, but it is of rare occurrence, and differs from those before noticed, in the difficult solubility of its carbonate, and in possessing some of the other properties of alkalinity in an inferior degree. The basic compounds frequently termed *Organic* or *Vegeto-alkalies*, and which more or less resemble the true alkalies in their behaviour with the acids, may be conveniently and correctly considered as a distinct class of bodies, and treated of under the more appropriate name of *alkaloid*. *Baryta, lime, magnesia*, and *strontia*, from their causticity, action on vegetable colours, and some other qualities, have also been called *alkalies*, but they are distinguished from those bodies by their sparing solubility in water, and by the total insolubility of their carbonates in that menstruum. Later chemists have classed these substances under the title of *alkaline earths.*

Prop., &c. Potassa, soda, and ammonia, are known by the following characteristics:—1. An acrid, urinous taste;—2. A great degree of causticity, and acting as energetic solvents of animal matter;—3. Changing litmus and several other vegetable blues to *green*, and turmeric paper, and other vegetable yellows, *brown*;—4. Forming soaps with the fixed oils and fats;—5. Forming salts with the acids;—6. Free solubility in water and alcohol;—7. Solubility of their carbonates in aqueous menstrua;—8. Action of their carbonates on vegetable colours;—9. Their solutions imparting a soapy greasy sensation to the cuticle;—10. Evolving a peculiar soapy odour when in contact with organic matter;—11. Permanency in the fire (excepting ammonia, which is volatile); —12. Solubility and other properties not impaired by calcination, (excepting ammonia.)

Uses, &c. The *concentrated* alkalies are employed as escharotics; *diluted*, as antacids or absorbents, in stomach complaints, and in poisoning by the acids; as detergents, lithontriptics, diuretics, resolvents, liquefacients, and alteratives; in acute, inflammatory diseases, rheumatism, gout, dropsy, and glandular and visceral enlargements. They are also used as cosmetics. *In the Arts* their applications are numerous;—soap is a compound of alkaline and fatty matter, and common salt is formed of soda and hydrochloric acid. Their salts are applied to almost numberless purposes in *pharmacy, chemistry, bleaching, dyeing*, and the other arts of life and civilization.

Like the acids, the pure, or caustic alkalies, and their solutions, should be kept in stoppered glass bottles, well secured from the air, as they otherwise rapidly absorb carbonic acid, and become carbonates. Their carbonates also require exclusion, to prevent efflorescence (soda,) or deliquescence (potassa.) Ammonia water should be kept in a well-stoppered bottle and in a cool situation.

ALKALIMETRY. The estimation of the strength of the commercial alkalies.

Alkalimetrical processes for the most part depend on the determination of the *quantity of acid of a known strength required to neutralize a known weight of alkali*; or of the *quantity of dry carbonic acid which any given weight of alkali is capable of yielding, under the influence of a stronger acid.* From either of these results the exact amount of alkali present in any sample is easily calculated. These processes are indeed precisely similar to those described under *Acidimetry;* but here the unknown quantity sought is the *alkali* instead of the *acid.* The test liquid commonly used in the *first* method referred to, is *sulphuric acid*, previously reduced to a proper state of dilution with pure water. In the *second* method, *concentrated sulphuric acid* is employed. The glasses from which the test liquor is poured, and by which they are measured (*alkalimeters*), are similar to those already figured and described under *Acetimetry* and *Acidimetry.*

Process. 1. The number of grains required for the trial, being weighed, are next placed in a *phial* or *small glass tube*, and agitated with about *half an ounce of hot water.* After a short time allowed for repose, the clear liquid is poured off into a beaker glass or other vessel in which the trial is to be made. This process is repeated with a *second* and *third* quantity of water, or until nothing soluble remains, shown by the last washings *not* affecting the colour of turmeric paper. The greatest care must here be taken not to waste the smallest portion of the liquid, which would render the results inaccurate. The *alkaline ley* in the beaker glass is next *exactly* neutralized by cautiously adding to it the *test acid*, from an alkalimeter. When this is properly done, the solution, after being heated a few minutes, will neither *redden* litmus paper, nor turn turmeric paper *brown;* or what is the same, until the litmus paper, only slightly reddened by the *cold* solution, recovers its blue colour by exposure or warmth. The quantity of the test acid consumed to produce this condition is now read off from the graduated scale of the alkalimeter, or ascertained by re-weighing it. The loss of weight or volume consumed, gives either the *absolute* or the *per centage quantity* of alkali in the sample examined, according to the constitution of the test acid employed.

Test Acids.—a. (Ure). This acid has the sp. gr. of 1·032, at 60° Fahr.; 100 alkalimetrical divisions, or 1000 water-grains measure, contain exactly 40 grs., or 1 eq. of dry sulphuric acid, and consequently correspond to 1 eq. of every other base, as shown in the table below.

TABLE I.—*Equivalent Weights of the principal Alkalies, and their Carbonates, &c.*

40 grs. of Sulphuric Acid (dry).
49 ,, ,, (liquid, sp. 1·845).

Grains.	are equivalent to
31	Pure or caustic soda.
53	Carbonate of soda (dry).
143	,, ,, (crystallized).
82	Sesquicarbonate of soda (Ph. L. 1836).
85	,, ,, (commercial).
84	Bicarbonate of soda (crystallized).
47	Pure or caustic potash.
69	Carbonate of potassa (dry).
82½	,, ,, (granulated).
87	,, ,, (crystallized).
100	Bicarbonate of potassa (crystallized).
17	Pure or gaseous ammonia.
43½	Carbonate of ammonia (neutral.)
59	Sesquicarbonate of ammonia (Ph. L.)
79	Bicarbonate of ammonia (crystallized).

Obs. It will at once be seen that every alkalimeter division of the above acid represents the $\frac{1}{100}$th part, or *one per cent.* of the *equivalent weight of the given alkali* present in the sample tested, when 100 grains have been taken. Thus, 90 alkalimeters divisions of test acid having been used in the assay of a crude sample of potash, (the eq. of potash being 47), this would be—

100 : 47 :: 90 : 42·3

or just 42⅓ per cent. If only 50, 25, or 20 grs. have been tested, the result so obtained must, of course, be doubled, quadrupled, &c., as the case may be. By means of the simple rule of proportion the per centage quantity of alkali may be found, whether 100 or any other number of grains have been submitted to trial. For—The *weight of the sample tested*, (in grains,) bears the same relation to the *equivalent weight of the alkali under examination*, that the *number of alkalimeter divisions consumed* do to the *per centage of alkali sought*. Thus:—A sample of 33 grains of pearlash having taken 35 alkalimeter divisions (350 parts or grains measures) of test acid for its neutralization, what was its per centage content of pure alkali? Here—

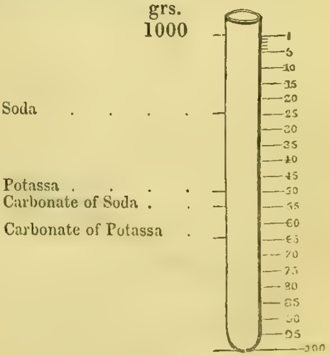
33 : 47 :: 35 : 49·85.

It consequently contained nearly 50 per cent. of real potash.

b. (Cooley). This acid is slightly tinged with litmus, and has a sp. gr. of about 1·071; 100 alkalimeter divisions, or 1000 water-grains measure, exactly saturate 100 grs. of pure potassa, or 113 grs. of dry carbonate of soda. The number of measures consumed, read off by *mere inspection* from the scale of the alkalimeter, give the exact *per centage of alkali* in the sample examined, for *potash;* and by taking $\frac{2}{3}$rds of this number, or more correctly, by multiplying it by ·66, that for *soda* also. By employing ·362 as the multiplier, it gives the like result for *ammonia.* By making up this acid to *weigh* instead of *measure* 1000 grains, every 10 grains weight consumed will represent 1 gr., or *one per cent.* of real potash, and with ordinary care will give results perfectly accurate, to less than the $\frac{1}{10}$th of a gr. per cent., when 50 or 100 grs. are tested.

c. (Hennel). Here two *test acids* are used—one for potash and the other for soda.—*Test acid for Soda.* Sp. gr. 1·1086; 313 grs. contain exactly 40 grains of anhydrous sulphuric acid; 1000 grs. weight saturate exactly 100 grs. of pure potash.—*Test acid for potash.* Sp. gr. 1·070 to 1·071; 471½ grs. contain 40 grs. of dry sulphuric acid; 1000 grs. weight neutralize exactly 100 grs. of pure potassa.

d. (Faraday). Sp. gr. of acid 1·1268 at 60° Fahr. 100 grs. of pure anhydrous carbonate of soda, must be exactly saturated by the quantity of test acid corresponding to the mark opposite the name of that article on the scale of the alkalimeter. It is used with the glass tube, commonly known as *Faraday's alkalimeter*, this is graduated in the usual manner; but opposite the numbers 23·44, 48·96, 54·63, and 65, are cut the words *soda*, *potassa*, *carbonate of soda*, and *carbonate of potassa*, to indicate the quantity of the test acid to be employed for each of these substances. (See *engr*). It is used by pouring the test liquid into it until it reaches the line marked against the alkali or its carbonate under examination. Water is then poured in to



the line marked 0, or 1000 grs. on the scale, and the whole is well mixed by placing the thumb on the orifice of the tube and shaking it well. The measure of the resulting dilute acid must then be very carefully observed, and more water added, if required, to make up the proper quantity as before; agitation being again employed to produce perfect mixture, and the greatest care taken not to waste any of the liquid during the operation. The test acid thus prepared, is then added with the usual precautions to the sample until exact neutralization is effected.

2. (Fresenius and Will). This is performed in a similar manner and in a similar apparatus to that described under *Acidimetry*, (No. 2.)—The smaller flask (*B*) is about half filled with concentrated sulphuric acid, and the sample of alkali, in solution, (*under the form of carbonate*,) being placed in the larger flask (*A*), water is added until it is about one-third full. The tubes are then fitted into the apparatus quite air-tight; the end of the tube (*b*) is fastened with a piece of wax, and the whole is carefully weighed. The apparatus is now removed from the scales, the lips applied to the end of the tube (*h*), and a few bubbles of air sucked out of the flask (*B*), the consequence of which is, that on removing the mouth, the acid in (*B*) ascends to a certain height in the tube (*c*). If in a short time this little column of liquid maintains its height in the tube, it is a proof that the apparatus is air-tight, and as it should be. Suction is now again cautiously applied to the tube (*h*), and a little of the acid in (*B*) made to flow over into the flask (*A*), the quantity being proportionate to the vacuum produced by suction, and capable of being regulated at will. No sooner does the acid come into contact with the carbonate in the flask (*A*), than the evolution of carbonic acid commences, and from the construction of the apparatus having to pass through the concentrated sulphuric acid, it is rendered quite dry before it can escape by the tube (*d*) into the atmosphere. Whenever the effervescence flags, a little more acid is sucked over, until the whole of the carbonate is decomposed, after which an additional quantity is made to pass into (*A*), so as to raise the temperature considerably, for the purpose of expelling all the gas absorbed by the fluid during the operation. As soon as this is effected, the wax is removed from the aperture (*b*), and suction applied to (*h*), until all the carbonic acid in the apparatus is replaced by atmospheric air. The whole is now allowed to cool, and is again weighed.

TABLE II.—*Multipliers and Standard Weights for the Principal Alkalies and their Carbonates.* By Mr. COOLEY.

Names, &c.	Factors or Multipliers.	Quantities (in grains,) to be taken, so that the per centage value of the sample tested shall be shown in the terms of any of the denominations given, by the weight of the evolved Carbonic Acid reckoned—				
		In tenths of a grain.		*In quarter-grains.*	*In half-grains.*	*In grains.*
		Whole numbers and decimals.	Nearest common numbers.			
SODA	1·41	14·1	$14\frac{1}{8}$	$35\frac{1}{4}$	$70\frac{1}{2}$	141
Carbonate of Soda (*dry*) . .	2·41	24·1	$24\frac{1}{8}$	$60\frac{1}{4}$	$120\frac{1}{2}$	241
„ „ (*crystallized*) .	6·50	65·0	65	$162\frac{1}{2}$	325	650
Sesquicarbonate of Soda (*Ph.L.*, 1836)	3·73	37·3	$37\frac{1}{4}$	$93\frac{1}{4}$	$186\frac{1}{2}$	373
„ „ (*Commercial*)	3·86	38·6	$38\frac{1}{2}$	$96\frac{1}{2}$	193	386
Bicarbonate of Soda (*crystallized*) .	3·82	38·2	$38\frac{1}{4}$	$95\frac{1}{2}$	191	382
POTASSA , ...	2·14	21·4	$21\frac{1}{2}$	$53\frac{1}{2}$	107	214
Carbonate of Potassa (*dry*) . .	3·14	31·4	$31\frac{1}{2}$	$78\frac{1}{2}$	157	314
„ „ (*granulated*) .	3·75	37·5	$37\frac{1}{2}$	$93\frac{3}{4}$	$187\frac{1}{2}$	375
„ „ (*crystallized*)	3·96	39·6	$39\frac{5}{8}$	99	198	396
Bicarbonate of Potassa (*crystallized*)	4·55	45·5	$45\frac{1}{2}$	$113\frac{3}{4}$	$227\frac{1}{2}$	455
AMMONIA	·773	7·73	$7\frac{3}{4}$	$19\frac{11}{32}$	$38\frac{5}{8}$	77·3
Carbonate of Ammonia (*neutral*) .	1·98	19·8	$19\frac{3}{4}$	$44\frac{1}{2}$	99	198
Sesquicarbonate of Ammonia .	2 68	26·8	$26\frac{7}{8}$	$67\frac{1}{8}$	$134\frac{1}{4}$	268
Bicarbonate of Ammonia . .	3·59	35·9	$35\frac{7}{8}$	$89\frac{3}{4}$	$179\frac{1}{2}$	359

The *loss of weight* gives the exact amount of *dry carbonic acid* which was contained in the specimen, from which the weight of pure alkali is readily estimated.—Every 22 *grs. of dry carbonic acid gas* evolved, represent exactly 31 grs. of pure soda, and 47 grs. of pure potash, these numbers being the equivalents of these substances, (see p. 41,) from which the *per centage* strength may be found by the rule of proportion before explained.

By taking such a weight of the specimen for the assay, as shall contain exactly 10 grs. of carbonic acid gas, or any multiple thereof, the *per centage* "richness," in alkali, may be found, (without calculation,) by the weight of that gas lost during the process. The standard weights recommended by Fresenius and Will, are—*carbonate of soda*, 4·83 grammes; *carbonate of potash*, 6·29 grammes. As these numbers and the computations on which they are founded are not familiar to the English operative, others based on our own system of notation may be advantageously substituted. Indeed, the principle may be so far extended, that by taking certain standard weights for the assay, the quantity of carbonic acid evolved may be made to furnish the per centage strength or value of the specimen in the terms of either the *pure* or *carbonated alkalies*, whether in their *dry* or *hydrated* state. The numbers in the *second column* of the preceding table, represent the quantity in grains and decimal parts, of each of the substances named in the *first column*, equivalent to *one* grain of dry carbonic acid. These numbers may be employed as factors for converting any numbers representing grains of that acid into the equivalents of these substances; and further, they furnish us with the data for determining the exact number of grains which must be tested, so that the loss of weight in carbonic acid shall at once give us the per centage richness of the sample in the terms of the denomination for which it is taken. These weights are given in the other columns of the table.

In the above ingenious method of alkalimetry it is absolutely necessary, that the whole of the alkali in the specimen tested, should be in the state of neutral carbonate. If it contains any *caustic alkali*, (as many of those of commerce do,) Messrs. Fresenius and Will direct it, previously to being tested, to be triturated with its *own weight of pure quartzoze sand*, and *the fourth of its weight of carbonate of ammonia;* and the resulting mixture to be placed in a small iron capsule, moistened with water, and exposed to a gentle heat until it becomes quite dry, and all the ammonia is expelled. If the sample contains either bicarbonate or sesquicarbonate of soda or potassa, it must be heated to dull redness before being placed in the apparatus and tested. If it contains sulphurets, sulphites, or hypo-sulphites, they direct the same method to be followed, except that liquor of ammonia instead of water is to be employed for moistening the powder. In the case of *soda,* the quantity of *carbonate of ammonia* should be equal to at least *half the quantity* operated on.

Concluding Remarks. The methods of alkalimetry, depending on the saturating power of the specimen, are those chiefly used in the United Kingdom. The choice of the test acid, and the other minor details of the process, must depend entirely on the operator. The test liquor No. 1, is that originally proposed by Dr. Ure, and answers the purpose admirably, but requires a trifling calculation to give per centage results; the acid No. 2, we have used for years; when carefully added from a graduated alkalimeter containing 1000 water-grain measures, the per centage of alkali present in the specimen may easily be determined to the $\frac{1}{10}$th of 1 per cent.; but by employing it by weight, and using a very delicate balance, the quantity of alkali may be found to the $\frac{1}{50}$th of a grain; and if it were possible in the manufactory or the workshop to effect *absolutely perfect neutralization*, it might be determined in this way, even to the $\frac{1}{100}$th of a grain per cent., a precision unattainable by any other method adapted to common use;—the method No. 3, gives equally accurate results, but here two test liquids are ordered; —it has been long successfully employed at Apothecaries' Hall, at the Polytechnic Institution, (by Mr. L. Thompson,) in the laboratory of Messrs. Hawes, and in numerous other places where great nicety is required; —No. 4, is well suited to rough purposes, and is easily applied by any person with a steady hand who can read and write; it is in common use in many laboratories. Of the new German method of alkalimetry, it may be remarked, that it obviates one of the chief objections to the common plan, in its accuracy not being dependent on effecting the exact neutralization of the alkali, or on the test acid being of precisely the proper strength. It, however, requires considerable neatness in manipulation, and that the weights be taken with the greatest accuracy, and in a balance possessing great delicacy when loaded with the apparatus.

In the *common methods* of alkalimetry

the alkali in the specimen examined may be in either the caustic or carbonated state, or consist of any mixture of caustic alkali, or carbonates; but it is absolutely necessary for accurate results, that it should be free from sulphurets, sulphites, and hyposulphites, as the sulphuric acid acts upon these substances as well as on the carbonates. The presence of muriates does not interfere with the accuracy of the results unless heat is employed.—The soda ash of commerce generally contains all these substances besides insoluble matter. Crude samples of pot and pearl ashes also generally contain some sulphurets. Various plans have been proposed to avoid this source of error. Gay-Lussac and Welter direct samples containing the above substances, to be calcined in a platinum crucible with about 5% or 6% of *chlorate of potash* before testing them. In this way, the salts referred to, are transformed into sulphates on which the test acid exerts no action. This method is, however, objectionable when *hyposulphites* are present; as *each* equivalent of hyposulphite becomes converted into *two* equiv. of sulphate, at the expense of the alkali or its carbonate in the specimen so treated, which renders the assay inaccurate. The treatment recommended by Fresenius and Will avoids this new source of error. The difference between an assay of a sample of the *unprepared* alkali, and of another which has been treated as above, will indicate the quantity of impurities contained in them under the forms just referred to.

Other matters deserving the most serious attention, are—hitting the exact point of neutralization, and preparing the test acids of the proper strength. The method of effecting the former correctly, has been already noticed, in speaking of the estimation of the strength of acids and vinegar. The test acid may be very simply prepared, by gradually diluting concentrated sulphuric acid with water until it is reduced to the proper strength, the dilution being made in a glass vessel containing a hydrostatic bead exactly corresponding to the desired specific gravity of the diluted acid. When the proper point is reached, the bead rises from the bottom of the vessel and floats about indifferently in the middle of the liquid at the temperature of 60 Fahr. The sp. gr. may then be carefully ascertained by means of a hydrometer or the specific gravity bottle. Allowance must here be made for the increase of temperature arising from the mixture of the water and acid; and the final adjustment delayed until the fluid returns to its normal temperature. An acid of any given strength or saturating power may also be prepared in the following manner:—49 parts of commercial oil of vitriol, (sp. gr. 1·825,) contain 40 parts or 1 eq. of real sulphuric acid; if therefore we want to prepare a dilute acid containing in every thousand grains weight or measure, exactly 1 eq. of sulphuric acid, we have only to make 49 grs. of such acid up to 1000 grains weight or measure, with pure water. After it has recovered the proper temperature its sp. gr. must be again tried, and if necessary, re-adjusted. As, however, it very often happens that the oil of vitriol employed is not so strong as that above referred to, its strength may be first tested with dry carbonate of soda; every 53 grs. of which are exactly equal to 40 grs. of dry sulphuric acid. Suppose, we find our oil of vitriol to contain only 72 per cent. of real acid, then—

100 : 72 : : 40 : : 55·55

or, instead of only 40 grs., fully 55½ grs. will be required, which are to be made up with water as before. Finally the diluted acid is carefully re-tested with pure dried carbonate of soda, and if found correct, is put into a well-stoppered bottle, labelled, and preserved for use. Too much care cannot be taken to ensure the test liquid being of the proper strength, of which the specific gravity alone is an insufficient proof. In practice, so small a quantity only of test acid as that referred to above, is of course never made; but as any larger quantities are merely multiples of the smaller one, the necessary proportions to be employed are easily calculated. The common plan is to prepare one or more gallons or quantities of 10 *lb.* each, and to preserve the liquid in stoppered green-glass "Winchester quart bottles," so that it may be always ready for use.

In conclusion, we may remark, that it was formerly the practice to reckon the strength of alkalies with reference to a standard termed 100 alkalimetric degrees, in a similar way to that noticed as employed for acids, at p. 20. This had reference to the per centage of their weight in sulphuric acid, which was necessary for their saturation. On this system a specimen of pearl-ashes which neutralizes 56-100ths of its weight of sulphuric acid, is said to be of 56 alkalimetrical degrees. This was Descroizilles' system of notation. See *Acidimetry, &c.*

ALKALOIDS. Syn. *Vegeto-Alkalies, Organic Alkalies, Organic Bases.* Substances of vegetable origin analogous to the alkaline bases, in which the medicinal activity of the plants in which they are found appears to reside.

Prep. The following general methods of procuring the alkaloids will be found applicable for such as full directions are not given for under their respective heads:—

1. (*When the base is insoluble in water, non-volatile, and existing in the plant in an insoluble form.*) Boil or macerate the bruised plant in water acidulated with muriatic or acetic acid, filter, neutralize the acid with an alkali (ammonia, potassa, lime, or magnesia), and collect the precipitate; purify by re-solution in dilute acid, digestion with a little animal charcoal, and subsequent crystallization, or precipitation with an alkali; or the first precipitate may be purified by dissolving it once or oftener in boiling alcohol, which will yield the pure alkaloid either on cooling or by evaporation.

2. (*When the base is insoluble in water, and non-volatile, but existing in the plant in a soluble state.*) Boil or macerate in hot water as before; and filter, precipitate, &c. as last.

3. (*When the base is soluble in water and non-volatile.*) Make an infusion with a very dilute acid (muriatic or acetic); concentrate by a gentle heat; treat the liquor with potassa and ether (conjointly); decant and evaporate. For those alkaloids which are insoluble in ether, (as morphia and cinchonia), the previous process may be adopted.

4. (*When the base is both soluble in water and volatile*). The vegetable or its extract may be mixed with potassa and distilled; the product, neutralized with oxalic or sulphuric acid, carefully evaporated to dryness, digested in alcohol, and the solution agitated with potassa and ether. The etherial solution thus formed, if carefully evaporated, leaves the base nearly pure. It may be further purified by cautious distillation.

Obs. As some of the alkaloids are soluble in excess of the alkaline precipitant, oversaturation should be avoided; or the precipitant may be used in the carbonated form. When lime and magnesia are employed, they should be boiled for a few minutes with the solution.

Tests, &c. The identification of the pure alkaloids is extremely simple; but their detection when combined with mucilaginous, extractive, and colouring matter, is a task of considerable difficulty. The following plan may be adopted for this purpose:

1. (Merck.) Digest the matter under examination for several hours with concentrated acetic acid, added in sufficient quantity to produce a strongly acid reaction; strain, wash the insoluble matter with water acidulated with acetic acid, and gently evaporate to dryness in a water bath; boil the residuum first with rectified spirit, and next with rectified spirit acidulated with acetic acid; again evaporate the mixed liquors, dilute with water, add carbonate of potassa to a feebly alkaline reaction, evaporate to a syrup, and set it aside; after 24 hours, again dilute with water, filter, wash the insoluble portion with cold water, and digest with concentrated acetic acid; this last solution is diluted with water, decolorized with animal charcoal, (if necessary,) and is then ready for testing. The above method may be applied to the stomach and viscera and their contents, and to food, &c., in cases of poisoning.

The principal alkaloids and their salts in the state of powder may be thus distinguished:

1. The powder is treated with *nitric acid;* this is coloured *red*, by *brucia*, *delphia*, *morphia*, and commercial *strychnia.* If the reddened acid becomes *violet* on the addition of protochloride of tin, it is *brucia;* if it becomes black and carbonaceous, it is *delphia;* if the powder is fusible *without* decomposition, and strongly decomposes Iodic acid, it is *morphia;* if it is not fusible without decomposition, and does *not* decompose Iodic acid, it is *strychnia.* If instead of a *red*, the powder strikes a *green* colour with nitric acid, it is *solania;* if insoluble in ether, and *not* reddened by nitric acid, it is *emetia;* if soluble in ether, not reddened by nitric acid, but melts and volatilizes with heat, it is *atropia;* if it is thus affected by ether or nitric acid, but does *not* volatilize, it is *veratria.*

2. The powder is treated with a drop or two of *strong sulphuric acid;* a *red* colour is produced by *brucia*, *nicotina*, *salicine*, and *veratria.* If the reddened mixture has at first a roseate hue, turning deep red on the addition of nitric acid, it is *brucia;* if the original substance moistened with solution of potassa evolves the odour of tobacco, it contains *nicotine:* if the red colour produced by the acid is permanent, and of an intense blood hue, and the powder agglutinates into lumps like resin, it is *salicine;* if the colour is at first yellowish, changing to blood-red, and ultimately to crimson and violet, it is *veratria.* If instead of the substance being reddened by strong sulphuric acid, no particular action ensues in the *cold*, it contains either *conia* or *strychnia;* if a fragment of bichromate of potash being now dropped in, produces a rich violet colour, it is *strychnia:* if the

original matter on being heated, or treated with solution of potassa, evolves a penetrating, disagreeable odour, somewhat analogons to that from hemlock, or to a mixture of those from tobacco and mice, it is *conia.*

The presence of one or more of the alkaloids being shewn by any of the above methods, a portion of the original clear solution or powder, or of the precipitates or filtrates above referred to, must be treated with their characteristic tests, as given under the individual notices of these articles, so as to set at rest all doubt as to their identity. *No single test must ever be relied on.*

Pois., &c. Some of the alkaloids act as *narcotic*, or *stupefying poisons;* others are classed with the *narcotico-acrid poisons*, or those which produce both narcotism and irritation of the parts they touch. The general symptoms produced by *opium* and its preparations may be taken as an example of the former; those of *aconite* and *strychnia* of the latter. In *large* doses, of the greater number, narcotism predominates; in *smaller* ones, irritation: they are rarely co-existent. No common *antidote* to the effects of this class of substances has yet been discovered. The treatment recommended for poisoning by *aconite*, is perhaps the best that can be adopted.

Concluding Remarks. Closely allied to the alkaloids there also exists an extensive series of neutral proximate principles, which differ from those substances chiefly in the absence of basic properties, and most of them being destitute of nitrogen. They are usually bitter, and represent the active properties of the plants in which they are found, and some possess considerable medicinal energy. These bodies are frequently confounded with the alkaloids, but these substances evidently belong to two distinct classes. Of this kind are *Asparagin, Elaterin, Gentianin, Picrotoxin, Salicin*, &c. See the *individual alkaloids under* their respective heads.

ALKANET. A reddish-purple dye obtained from the anchusa tinctoria. It was formerly used as a skin paint; hence the name.

ALKANET. Syn. *Orchanet, Dyer's Alkanet.* A species of bugloss, a deciduous herbaceous plant, with a perennial root, inhabiting the shores of the Mediterranean, Asia Minor, Greece, &c. It is largely cultivated in the neighbourhood of Montpellier. The root, (*alkanet root; radix alkannæ tinctoriæ; radix anchusæ; r. a. tinctoriæ;*) contains a beautiful blood-red colour, which it freely gives out to oils, fats, wax, spirits, essences, and similar substances, by simply infusing it in them, and is consequently much employed to colour these articles. Wax, tinged with alkanet, and applied on warm marble, stains it of a rich flesh colour, which sinks deep into the stone, and possesses considerable durability. The spirituous tincture of alkanet also imparts a deep red to marble.

Uses. It is largely employed by the *druggists* and *perfumers* to colour their oils, lip-salves, plasters, pomatums, &c.; by the *varnish-makers*, to tinge their varnishes and lacquers; by *statuaries* to stain marble; by *dairy-farmers* to colour their cheese; by *wine-merchants* and *bottlers* to stain the corks of their port wine bottles, and as colouring and flavouring for factitious port wine; and by *dyers*, and others.

ALKERMES. A cordial liqueur much esteemed in some parts of the South of Europe; said to have been so named from being generally coloured with kermes. See *Cordials.*

ALKOOL. Syn. *Alkoohl, Kohol, &c.* An impalpable powder, formed of antimony, used by the females of Eastern nations to tinge the eyelids and eyelashes black.

ALLANTOINE. Syn. *Allantoic Acid; Amniotic Acid,*—Obs. A crystallizable substance discovered by Vanquelin and Buniva, and since produced artificially by Wöhler and Liebig.

Prep. 1. Evaporate the *allantoic fluid of the fœtal calf* to 1-4th or 1-5th of its volume, and set it aside for some time. The crystals thus obtained may be purified by re-solution, digestion with animal charcoal, and re-crystallization.

2. (Wöhler and Liebig.) *Uric acid*, 1 part; *water*, 20 parts; dissolve, and add *freshly precipitated and well washed binoxide of lead*, until the colour ceases to change; filter while still hot, evaporate until a pellicle forms on the surface, and set it aside to crystallize; purify as before.

Prop., &c. Brilliant prismatic, transparent, colourless crystals; tasteless; neutral; soluble in 160 parts of cold water; nitric acid converts it into *allanturic acid.* It is wrongly termed an acid.

ALLANTURIC ACID. An azotised compound produced by the action of nitric acid on allantoine.

Prep. Dissolve *allantoine* in *nitric acid* (sp. gr. 1·2 to 1·4), with a gentle heat; after cooling, pour the liquor from the crystals of *nitrate of urea* which are deposited, evaporate, and dry at about 80° Fahr. Treat the residuum with weak *water of* *ammonia*, and add *alcohol;* collect the white viscid matter thrown down, redissolve it in *water*, and again precipitate with *alcohol;* the last precipitate is the new compound. Its title to the name of an acid is doubtful.

ALLOPHANIC ACID. An acid compound formed by passing the vapour of *cyanic acid* into *alcohol.* Its properties and uses are undetermined.

ALLOXAN. Syn. *Alloxane; Alloxanum*,—Lat. *Erethric Acid* (?). A substance formed by the action of nitric acid on uric acid.

Prep. Gradually add *dry uric acid* to *nitric acid* (sp. gr. about 1·45) gently heated, until crystals begin to appear; then cool, and throw the mass on a funnel choked with *asbestos* or *fragments of glass* to drain, and afterwards drop on it a little *cold water*, to displace the last adhering portions of acid liquor; when well drained, re-dissolve in water, and crystallize, employing but little heat. The acid liquor will yield 4 or 5 crops of crystals by treating it as often with fresh uric acid. *Prod.* 80 to 90% of the uric acid employed.

Prop. &c. Efflorescent crystals; very soluble in water; taste disagreeable, astringent; reaction, acid; its aqueous solution tinges the skin purple; caustic alkalies convert it into *alloxanic acid.* It is diuretic. *Dose*, undetermined.

ALLOXANIC ACID. A product of the action of caustic alkalies on alloxan.

Prep. To an *aqueous solution of alloxan*, heated to 140° Fahr., add *baryta water*, as long as the precipitate first produced re-dissolves; filter, cool, re-dissolve the crystals of *alloxanate of baryta* which are deposited, and cautiously add *dilute sulphuric acid* until all the baryta is precipitated; the filtered or decanted liquid yields *alloxanic acid* by gentle evaporation.

Prop., &c. Small radiated crystals; soluble; taste and reaction, acid; decomposes the carbonates; dissolves zinc and iron; with the bases forms salts (*Alloxanates*,) many of which are soluble.

ALLOXANTINE. Syn. *Alloxantin.* A crystallizable substance, first obtained by Dr. Prout from uric Acid.

Prep. 1. Boil *uric acid*, 1 part, in *water*, 32 parts, and add *dilute nitric acid* until it dissolves; evaporate to $\frac{2}{3}$rds, and set it aside for 12 hours; the crystals, which will then be found deposited, may be purified by re-solution and crystallization.

2. Dissolve *alloxan* in *water*, and pass *sulphuretted hydrogen gas* through the solution, until the *alloxantine* be deposited as a crystalline mass, which must be purified by cautious washing, re-solution in boiling water, and re-crystallization.

Prop., &c. Small colourless, transparent four-sided crystals, scarcely soluble in cold water; solution reddens litmus.

ALLOY. Combinations of the metals with each other obtained by fusion. When mercury is one of the component metals, the compound is termed an *amalgam.*

Prep., &c. No general rules can be given for this purpose. Alloys of metals differing greatly in fusibility, are commonly made by adding the more fusible one, in a melted state, to the other, melted or heated to the lowest possible temperature at which a perfect union will take place between them. The mixture is usually effected under a *flux*, or some material that will promote liquefaction, and prevent volatilization and unnecessary exposure to the air. Thus: in melting lead and tin together, for solder, resin or tallow is thrown upon the surface; in tinning copper, the surface is rubbed with sal ammoniac; and in combining some metals, powdered charcoal is used for the same purpose. Quicksilver combines with many metals in the cold.

The *standard gold* of this country is an alloy of *pure gold*, 11 parts, with *pure copper*, 1 part. Formerly the alloy consisted partly of *silver*, as found in some of the older coins now in circulation. Occasionally, sovereigns are met with containing a little *palladium*, which then have a disagreeable brownish hue. Twelve parts of *standard silver* consist of $11\frac{2}{20}$ths of *pure silver*, and $\frac{18}{20}$ths of *pure copper.* (Phil. Trans. 1803.)

The following Table exhibits the composition of the more important compounds of this class:—

Table of the Principal Alloys.

NAMES.	COMBINING METALS.
Amalgams	Mercury and other metals.
Bell-metal	Tin and copper.
Brass	Copper and zinc.
Britannia metal	Tin with antimony, copper, and bismuth.
Bronze	Tin and copper.

Table of the Principal Alloys (continued).

NAMES.	COMBINING METALS.
Cannon metal	Tin and copper.
Dutch Gold	Copper and zinc.
Fusible metal	Tin, lead, and bismuth.
German silver	Copper with zinc, nickel, and iron.
Gold (*standard*)	Gold with copper.
Ditto (*old standard*)	Gold with copper and silver.
Gun metal	See Cannon metal.
Mosaic Gold	Copper and zinc.
Or-molu	Ditto.
Pewter (*common*)	Tin and lead.
Ditto (*best*)	Tin, with antimony, bismuth, and copper.
Queen's metal	Ditto.
Silver (*standard*)	Silver and copper.
Solder	Tin and lead.
Speculum metal	Tin and copper.
Tutania	See Britannia metal.
White copper (*Packfong*)	Arsenic and copper.

ALLYLE. The hypothetical radical of the essential oils containing sulphur, as those of assafœtida, garlic, mustard, onions, &c.

ALMONDS. The seeds or kernels of the almond tree. They are met with in commerce both *in the shell* (*Amygdalæ cum putamine*), and *shelled* (*Amygdalæ.*) In the retail shops, most commonly in the latter form. Those rancid, broken, or worm-eaten, should be rejected.

ALMONDS (Bitter). Syn. *Amygdalæ Amaræ*,—Lat. *Amygdala Amara*,—Ph. E. A variety imported from Mogadore, chiefly characterised by possessing the bitter flavour, and when rubbed with water, the odour of peach kernels.

Uses, &c. Bitter almonds are used to relieve the flavour of sweet almonds, to clear muddy water, and to flavour confectionary, liqueurs, &c. By pressure, they yield their bland oil, and the resulting cake is distilled for its volatile oil, after which it is again pressed into cakes (*Almond Cake;*) and used to fatten pigs, and for other purposes. Bitter almonds are seldom used in medicine, although they have been said to have cured intermittents when bark had failed. In large quantities they are poisonous, and even in the smallest quantities have been known to produce nettle-rash (*urticaria*), and other unpleasant symptoms. They have long been reputed an antidote to intoxication.

ALMONDS (Blanched). Syn. *Amygdalæ Decorticatæ.* Almonds from which the husks or seed-coat have been removed. This is effected by soaking them for a short time in warm water, until the skin can be easily removed by pressure between the thumb and forefinger. They are then peeled, rinsed in cold water, drained, and dried. When intended for the table, the last is effected by wiping them with a soft towel; but when they are intended for keeping, they are dried by a gentle heat in a stove, or in the sun, until they are brittle.

ALMONDS (Burnt). Syn. *Roasted Almonds*, *Almond Coffee.* Used to colour and flavour liqueurs and confectionary, and formerly as a substitute for coffee.

ALMONDS (Sweet). Syn. *Almonds; Amygdalæ*,—Lat. *Amygdala Jordanica*,—Ph. L.; *Amygdala Dulcis*,—Ph. E.; *Amygdalæ Dulces*,—Ph. D. Of these there are several varieties known in commerce:—"*Jordan Almonds*, which are the finest, come from Malaga. Of these there are two kinds; the one, above an inch in length, flat, and with a clear brown cuticle, sweet, mucilaginous, and rather tough; the other, more plump, and pointed at one end, brittle, but equally sweet with the former.—2. *Valentia Almonds*, (which come next in quality,) are about ⅗ths of an inch broad, not quite an inch long, round at one end, and obtusely pointed at the other, flat, of a dingy brown colour, and dusty cuticle.—3. *Barbary* and *Italian Almonds* resemble the latter, but are generally smaller and less flattened." (Brande, *Dict. Pharm.*) Another variety is imported in baskets from Spain.

Uses. Sweet almonds are nutritive, emollient, and demulcent, but frequently disagree with weak stomachs. The husk is very apt to occasion indigestion and nausea. Blanched almonds do not produce these inconveniences, and therefore should alone be used for the table. In *medicine*, almonds are employed chiefly to suspend oily substances in water. Their uses for dietetical purposes are well known. Preparations of them are also esteemed as cosmetics. The cake left after expressing the oil, (*almond cake*,) is used for washing the skin; which it is said to render beautifully soft and clear.

ALNIGHT. A cake of wax with a wick in the midst. To this may be traced to the more modern night-lights, termed "MORTARS."

ALOE RESIN. The resinous matter deposited by a decoction of aloes as it cools.

ALOES. Syn. *Bitter Aloes; Aloë*,—Lat. The inspissated juice or extract of several species of aloe. Aloes is a warm stimulating purgative, acting as such in doses of from 3 to 10 grains; and it is considered highly serviceable in most hypochondriacal and dyspeptic affections, especially in phlegmatic habits, and in cases arising from deficiency of bile. It acts on the large intestines, and principally on the rectum, and should be administered with caution where there is a tendency to prolapsus or piles, and in cases where uterine stimulants (as in pregnancy, &c.) would be improper. Aloes is more frequently taken than perhaps any known purgative. It enters into the composition of a majority of the aperient medicines prescribed by the faculty, and forms the principal ingredient of nearly all the advertised, purgative, antibilious, and universal pills of the nostrum-mongers. The fact of aloetic pills not acting until about 8 to 10 hours after being swallowed, so that if taken on retiring to rest at night, they do not generally disturb the patient before the usual time of rising in the morning, has contributed more than anything else to make such remedies popular with parties, whose habits or business avocations, would be otherwise interfered with.

There are several varieties of aloes found in commerce, among which the principal are *Cape*, *Socotrine*, and *Hepatic*. The *second*, when genuine, is the most esteemed, but the *first* is by far the most abundant, and, when good, answers every purpose for which the drug is used. (U. S. Dispens.) *Socotrine* and *Hepatic Aloes* are those generally ordered in England.

ALOES (Barbadoes). Syn. *Aloes in Gourds; Aloë Barbadensis*,—Ph. L. & E. Imported from Barbadoes and Jamaica, usually in gourds; sometimes in boxes. "Opaque, lustreless, of a liver colour, a little tending to black, with a bitter nauseous taste, and a very disagreeable odour," (Ph. L.) especially when breathed on; *powder*, a dull olive yellow.

ALOES (Cape). Syn. *Aloë Capensis*,—Lat. From the Cape of Good Hope. *Odour*, stronger than that of Barbadoes aloes; *colour*, deep greenish-brown; *appearance*, shining and resinous; *fracture*, glassy; *powder*, a lively greenish-yellow colour; almost completely soluble in boiling water, decoction paler than that of other kinds.

ALOES (Hepatic). Syn. *Bombay Aloes, East Indian do., Liver-coloured Socotrine do.; Aloë Hepatica*,—Ph. L. & D.; *Aloë Indica*,—Ph. E. Imported from Bombay and Madras; obtained from uncertain species of aloes. "Opaque, of a lively colour, bitter taste, and disagreeable odour." (Ph. L.) It is less odorous, darker-coloured, and more opaque than Socotrine aloes; its powder has also a duller colour; and weak spirit leaves much undissolved matter. The finer and brighter varieties of Hepatic aloes are commonly sold for Socotrine, and their medicinal virtues are nearly similar.

ALOES (Mocha). Syn. *Aloë de Mochâ.* Imported from Muscat. It holds an intermediate position between "Cape" and "hepatics," but contains much impurity; the latter often amounting to upwards of 25%. When melted and "doctored," it is sold for Barbadoes, Hepatic, and Socotrine aloes.

ALOES (Socotrine). Syn. *Aloë Socotrina*,—Ph. L. & E.; *Aloë*,—Ph. L., 1836. "The juice of the cut leaf of uncertain species hardened by the air." (Ph. L.) Formerly this variety was brought from the island of Socotra or Zocotra, (hence the name,) by way of Smyrna and Malta; but it is now chiefly obtained from Bombay and Madras. —*Char.* Colour, garnet red to golden red; smell, peculiar and aromatic; not unlike a decaying russet apple, especially when breathed on or warmed; taste, permanently and intensely bitter; fracture, conchoidal; softens in the hand and becomes adhesive, yet retains considerable brittleness; powder, *bright golden yellow colour;* central portions of the lumps often soft, especially when first imported. "It is brittle, bitter, of a reddish-brown colour, and has an aromatic odour. Light permeates thin recently-broken laminæ." (Ph. L.)

ALOES (Strained). Syn. *Melted Aloes; Aloë Colata*,—Lat. *Prep.* 1. *Aloes* melted in a copper pan by the heat of a steam, or water-bath, and pressed through a strong hair or wire sieve.

2. As above, but adding about twice its

weight of water; strain, and evaporate, as before.

Obs. Mocha, Indian, and other common aloes, treated in this way and coloured, are frequently sold for *melted* or *strained* "*Socotrines*" and "*hepatics.*" The colouring matter employed is usually the precipitated carbonate of iron (sesquioxide), or Venetian red in fine powder. Sometimes a little annatto is used for a like purpose. The process on the large scale, is usually carried on at *night*, in consequence of the horribly nauseous fumes evolved, which may be smelt at a great distance.

ALOESIC ACID (of Pereira). The acid existing in a watery solution of aloes. Trommsdorf supposed it to be gallic acid, but Dr. Pereira regards it as a distinct principle. It is prepared by adding *diacetate of lead* to an *infusion of aloes*, and decomposing the precipitate with *sulphuretted hydrogen.*

ALOESIN (of Pfaff.) Syn. *Aloin; Aloe-bitter, Aloe-extractive, Aloe-soap.* This article forms the principal portion of the bulk of aloes, and may be obtained by simply evaporating the cold filtered infusion or decoction. It is brown, very bitter, soluble in water and weak spirit, but insoluble in alcohol and ether. As a medicine it is milder than aloes, but the *dose* is the same.

ALOETIC ACID. Syn. *Aloïc Acid.* A substance obtained by Braconnot, by treating *aloes* with *sulphuric acid.* It resembles artificial tannin.

ALOETIC ACID (of Schunk). One of four peculiar acids discovered by Schunk among the products of the action of *Nitric Acid* on *Aloes.*

ALOIN. The brown bitter mass obtained by evaporating the cold infusion of aloes. The Messrs. Smith of Edinburgh have recently applied this name to a crystalline principle obtained by concentrating an *infusion of aloes* in vacuo, and allowing the crystals to form slowly. See *Aloesin.*

ALPHAORSELLIC ACID. An acid obtained from the South American variety of *Roccella tinctoria*, or *Dyer's roccella.* Its preparation and properties are analogous to those of Erythric acid.

ALTERATIVES. Medicines which effect some alteration in the nature or quality of the vital action, and occasion a change in the habit or constitution, establishing the healthy functions of the body, without producing any sensible evacuation by perspiration, vomiting, or purging. The preparations of *mercury* and *iodine*, when properly administered, are among the most useful and generally employed alteratives. See *Balls, Mixtures, Pills, &c.*

ALTHEINE, Syn. *Altheia, Altheina.* A name given by Braconnot to a vegetable principle which he discovered in the Althæa Officinalis, but which has since been shown by Henry and Plisson to be identical with asparagin.

ALTHIONIC ACID. A new acid discovered by Regnault in the residual liquor of the preparation of olefiant gas from alcohol and oil of vitriol.

Prep. Dilute with water and neutralize with *hydrate* or *milk of lime;* decant the solution which contains *althionate of lime,* evaporate and crystallize; dissolve the crystals in water, and precipitate with *oxalic acid;* the solution is dilute *althionic acid.*

Prop., &c. Reaction, acid; with the bases it forms salts called *althionates,* which have the same composition as the sulphovinates.

ALUM. Syn. *Potash Alum, Sulphate of Alumina and Potassa; Alumen Potassicum; Alumen, Sulphas Aluminæ et Potassæ,*—Ph. L. E. & D. The alum of commerce is a salt composed of alumina, potassa, and sulphuric acid; and in its crystallized state, a large quantity of combined water.

Prep. 1. The mineral (*Alum ore, Alum schist*, &c.) placed in heaps and moistened from time to time with *water*, becomes gradually hot, and falls into a pulverulent state. This decomposition commonly occurs either wholly or partially on the floor of the mine. If the ore does not possess this property, by mere exposure to air and moisture, it is broken into pieces and laid upon a bed of *brushwood* and *small coal,* to the depth of about four feet, when the pile is fired and fresh lumps of the alum mineral thrown on, until the mass becomes of considerable height and size; the combustion is then conducted with a smothered fire, until the calcination is complete; care being taken to prevent fusion, or the disengagement of either sulphurous or sulphuric acid, from contact between the ignited stones and the carbonaceous fuel. The pile is then allowed to cool, and is further exposed to the action of air and moisture. The residuum of the burning is next placed in large stone or brick cisterns, and thoroughly edulcorated with water, until all the soluble portion is dissolved out; the solution is then concentrated in another stone cistern, so made that the flame and heated air of its reverberatory furnace sweep the surface of the liquor. The evaporation is continued until it has *barely* reached the point at which it will deposit crystals on cooling;

when it is run off into coolers. After the sulphate of iron present has been deposited in crystals, the mother liquor, containing the sulphate of alumina, is run into other cisterns, and solution of *common muriate* or *sulphate of potassa*, or (sometimes) impure *sulphate* or *carbonate of ammonia* is added, until a cloud or milkiness ceases to be produced on adding more. It is next allowed to settle and get thoroughly cold, and the supernatant mother liquor being drawn off with a pump or syphon, the precipitate is well drained, and subsequently washed by stirring it up with a little *very cold water*, which is then drained off, and the operation repeated a second time. A saturated solution of the alum is next formed in a leaden boiler, and the clear portion is run off, while boiling hot, into crystallizing vessels, called "*roaching casks*," from which it is taken, after the lapse of about a week, in the form of large crystallized masses, which are broken up and packed in casks for sale. Sometimes the alum thus obtained is purified by a second crystallization.

2. *Clay* nearly free from carbonate of lime and oxide of iron is chosen for this purpose. It is moderately calcined (in lumps) in a reverberatory furnace until it becomes friable, when it is reduced to powder, sifted, and mixed in a stone or brick basin or cistern, with about 45% of its weight of *sulphuric acid* (sp. 1·45). Heat is then applied, the flame and hot air of a reverberatory furnace being made to sweep over the surface of the liquor. The heat and agitation are continued for two or three days, when the mass is raked out, and set aside in a warm place for a few weeks (6 to 8), to allow the acid the more perfectly to combine with the clay. At the end of this time the newly formed sulphate of alumina is washed out, the solution evaporated until of the sp. gr. of about 1·38 (1·24 for ammonia alum), and the *salt of potash* added. The remainder of the process resembles the one above described. Alum may be produced by this process for about £3. 6*s*. per ton, which is less than two thirds that of rock or mine alum.

Prop. Crystals, slightly efflorescent; soluble in 18 parts of cold, and in 1 of boiling water; taste, sweet, astringent, and acidulous; styptic; reddens litmus; when heated it melts, loses its water of crystallization, and becomes white and spongy, (*Burnt Alum;*) a very strong heat decomposes it, with the evolution of oxygen and a mixture of sulphuric and sulphurous acid (*Spirit of Alum, Aluminic Acid*); calcined with carbonaceous matter it suffers decomposition, and furnishes a pyrophoric residuum. Its solution is not affected by tincture of galls, hydrosulphuric acid, ferrocyanide of potassium, nor solution of nitrate of silver. Heated with caustic potassa or quick-lime, it does not evolve fumes of ammonia. "It is entirely soluble in water. From the solution, ammonia or potassa, when added, precipitates alumina free from colour, which again dissolves when the potassa is added in excess."—Ph. L.

Uses. The applications of alum in the arts and manufactures are numerous and important. It is used to harden *tallow* and *fats;* to render *wood* and *paper* incombustible; to *remove greasiness* from printers' blocks and rollers; to prepare a paper for *whitening silver* and *silvering brass* in the cold; to help the *separation of the butter* from milk; to *purify turbid water;* to *dress skins;* to *fix* and *brighten* the colours in dyeing; to make *lake* and *pyrophorus*, &c., &c. It is also extensively used for *clarifying liquors*, and for many other purposes connected with the arts and every day life. In *medicine*, alum is used as a tonic and astringent, in doses of 5 to 20 grs.; as a *gargle* (1 dr. to ½ pint of water); and as a *collyrium* and *injection* (10 to 15 grs. to 6 oz. of water). In *lead colic*, ½ dr. to 2 dr. of alum dissolved in gum water, every 3 or 4 hours, is said to be infallible. Powdered alum is frequently applied with the tips of the fingers, in cases of *sore throat* and *ulcerations of the mouth*, &c.

Concluding Remarks. The manufacture of alum is said to be conducted, according to the "*natural process*," when prepared from alum schist or alum ore; and, according to the "*artificial* process," when made by acting on clay with oil of vitriol. In addition to the particulars given above of its manufacture, we may add that the plan of getting rid of the ferric salts there referred to, has to some considerable extent been successfully replaced by that of precipitating the *alum*, instead of the *sulphate of iron*, by adding alkaline matter to the lixivium. The crystalline precipitate is purified by draining, re-solution, and recrystallization; whilst the sulphate of iron and Epsom salts contained in the mother liquor, are obtained by evaporation and crystallization; after which a fresh crop of alum may be got from it, by the use of alkaline precipitants as before.

By a patent which has just expired, the ferric salts are precipitated by the addition of a solution of prussiate of potash, after which the supernatant clear liquor is decanted and evaporated for future operations.

Another process has been patented for the manufacture of alum, from the *ash* or *residue of the combustion of Boghead coal,* which was hitherto regarded as almost valueless. By the latest processes the least possible quantity of boiling water or liquor is employed for making the solutions, so that they may crystallize without evaporation, and thus economise fuel; and the mother liquors of previous operations are constantly employed for this purpose, when possible.

ALUM (Ammonia). Syn. *Alumen Ammoniatum,*—Lat. This is an alum in which the sulphate of potassa is replaced by an equivalent of a like salt of ammonia. It is prepared by adding gas-liquor, putrid urine, &c., to the *acid sulphate of alumina.* Much of the common alum, especially that prepared on the continent, contains both potash and ammonia.

ALUM (Burnt). Syn. *Dried Alum; Alumen Ustum,*—Lat.; *Alumen Exsiccatum,*—Ph. L. & E.; *Alumen Siccatum,*—Ph. D. Alum deprived of its water of crystallization by heat.

Prep. 1. (Ph. L.) Take of *Alum,* 1 ℔; let it liquefy over a fire, which must be increased until all ebullition has ceased.

2. (Ph. E.) As above; the operation to be performed in a vessel of iron, or earthenware, and the residuum to be powdered.

3. (Ph. D.) As above, using a porcelain capsule.

Obs. Excessive heat should be avoided, lest a portion of the acid be driven off as well as the water. *Prod.* 53 to 55%. The properties are similar to those of common alum, but it is less soluble.—*Dose.* 10 to 20 grains in colic, especially painters' colic. It is also used as an escharotic.

ALUM (Iron). Syn. *Sulphate of Iron and Potassa; Alumen Ferri, Sulphas Ferri et Potassæ,*—Lat. A double salt, in which iron takes the place of the alumina of common alum.

Prep. (Redwood.) Take of *peroxide of iron,* 9 ℔; *oil of vitriol,* 14 ℔; dissolve, dilute the mixture with *water,* q. s., add *sulphate of potassa,* 10 ℔; evaporate, and crystallize.

Obs. An equivalent of sulphate of ammonia is often substituted for the sulphate of potassa in the above salt. It has been lately strongly recommended by Dr. Tyler Smith, as a chalybeate tonic.

ALUM (Roman). Syn. *Red Alum, Roach do., Roch do.; Albumen Romanum, A. Rubrum, A. Rupeum.* Originally imported from Civita Vecchia, where it occurs native. That now sold as such in England is nothing more than ordinary alum, coloured with Venetian red, Armenian bole, or rose-pink, (*Albumen rubrum spurium.*) This is done by shaking the fragments in a sieve over a vessel of hot water, and then stirring them up with the colour, until the surface is uniformly tinged therewith. In genuine roach alum, the colour not only covers the surface, but also partially pervades the substance of the crystals.

ALUM (Soda). Syn. *Sulphas Aluminæ et Sodæ,*—Lat. An alum in which the sulphate of potash of the common alum is replaced by a like salt of soda.

ALUMINA. Syn. *Alumine, Argil, Oxide of Aluminum, Sesquioxide of Do., Alum Earth, Aluminous Do., Argillaceous Do.; Alumina, Terra Aluminosa,*—Lat. The plastic principle of clay, in which it exists, as a hydrated silicate. In its cruder forms it supplies us with the materials for manufacturing bricks, tiles, pipes, earthenware, and porcelain; whilst in its pure and crystallized state, it constitutes the ruby and the sapphire, two of the hardest and most valuable of the gems.

Prep. 1. (Berzelius). Dissolve *alum* in 6 times its weight of *boiling water,* add a *solution of carbonate of potassa,* (in slight excess,) agitate for a few minutes, filter and wash with distilled water. The product is *hydrate of alumina,* (*Gelatinous Alumina; Aluminæ Hydras.*) To render this *perfectly* pure, it must be dissolved in weak muriatic acid, and again thrown down with ammonia, washed with water, and pressed and dried on bibulous paper, at a temperature not exceeding 120° Fahr. By exposure to a white heat in a crucible, it loses its combined water, and becomes anhydrous.

2. (Liebig.) Precipitate a *solution of alum* with a *solution of chloride of barium,* filter, evaporate to dryness, and ignite the residuum.

3. (Gay-Lussac.) Expose perfectly pure *ammonia alum* to a white heat.

4. (Sax. Ph.) As No. 1, but omitting the ignition.

5. Add *carbonate of potash* to a *solution of alum;* well wash the precipitate with *distilled water,* redissolve it in *hydrochloric acid,* reprecipitate with *ammonia,* and wash it as before.

Prop. A soft white powder; in the hydrated state, freely soluble in the acids (forming salts), and in solution of caustic potassa or soda, from which it is precipitated by sal ammoniac; anhydrous, (as after ignition,) it is scarcely acted on by acids, and when perfectly indurated or crystallized, it is wholly insoluble. Its salts are mostly colourless, non-volatile, and soluble, have a sweetish, astringent taste, redden litmus paper, and lose their acids by ignition.

Uses, &c. Moist hydrate of alumina is used to mix with oxide of cobalt and other substances as a base for the colour. It is also the base of the "lake pigments." In *medicine*, it has been employed as an antacid and astringent, in acidity of stomach, cholera, diarrhœa, and dysentery, in which it is superior to other absorbent remedies.—*Dose.* 5 to 20 gr., three or four times daily, suspended in water by gum or simple syrup.

ALUMINA (Acetate of). Syn. *Aluminæ Acetas*,—Lat. *Prep.* 1. (Van Mons.) Digest *pure hydrate of alumina* in cold *strong acetic acid*, until the latter is saturated. The filtered or decantered solution may either be evaporated by a very gentle heat to a gelatinous consistence, or preserved in its normal state. By spontaneous evaporation, long, transparent crystals may be obtained.

2. (Pereira.) *Alum*, 476 gr.; *crystallized acetate of lead*, 760 gr.; dissolve in water, (separately,) and mix the solutions. The filtered liquid contains the acetate of alumina combined with some acetate of potash.

3. Add a *solution of acetate of baryta* to another of *sulphate of alumina*, and filter.

4. *Alum*, 5 parts; *sugar of lead*, 6 parts; dissolve, mix the solutions, and after a time decant the clear.

5. *Alum*, 2 parts; (in solution;) solution of *pyrolignite of lime* (20° Baumé), 3 parts; mix.

Uses. In *calico printing* as a mordant, mixed with starch, gum, oil, &c., to thicken it. In *dyeing*, as a mordant, the thickening being omitted. Its valuable properties depend upon the feeble affinity existing between its constituents, which is counterbalanced by that of the cotton fibres at a moderate heat. Chemically pure acetate of alumina is made by the first and third formulas, but that of the former should be preferred in medicine. The products of the other forms are used for dyer's mordants. The presence of sulphate of potassa is said to assist its action on the cloth. *Dose.* ½ dr. to 1 dr. daily; for an *injection*, 10 to 20 gr., to water, 4 oz.; in gonorrhœa, &c.

ALUMINA (Sulphate of). Syn. *Tersulphate of Alumina*; *Aluminæ Sulphas*,—Lat. *Prep.* Saturate *dilute sulphuric acid* with *hydrate of alumina*, evaporate and crystallize.

Uses. As a wash for foul ulcers. M. Gannal found that a solution made with 1℔ of this salt to a quart of water, will preserve an animal body for a long time, if injected into the arteries. Even an *enema* of one quart, or an *injection into the œsophagus* of a like quantity, will suffice to preserve a body for several weeks.

ALUMINA (Tannate of). Syn. *Aluminæ Tannas*,—Lat. *Prep.* Take of *pure hydrate of alumina* (dried at 90° Fahr.), 1 part; *tannic acid* (dried), 2 parts; carefully triturate together for some time, adding sufficient water to bring them to the consistence of a syrup, and evaporate to dryness at a heat below 120° Fahr.; lastly reduce to powder.

ALUMINUM. Syn. *Aluminium*, *Alumium.* The metallic base of alumina.

Prep. (M. Wöhler.) By heating *sesquichloride of aluminum* with either *potassium* or *sodium*, as directed for preparing magnesium, a *platinum* or *iron tube*, closed at one end, being employed. The reduction takes place with such violence, that great caution is needed on the part of the operator to prevent unpleasant consequences or disappointment. The *sesquichloride of alumina* used in this process is prepared as follows:—A thick paste made of *alumina*, *powdered charcoal*, *sugar*, and *oil*, is heated in a covered crucible until all the organic matter is destroyed. The residuum is transferred to a *porcelain tube*, the one end of which is connected with *another tube* containing *dried chloride of calcium*, and the other end with a *small tubulated receiver.* The porcelain tube is then heated to redness, whilst *chlorine*, dried by passing through the chloride of calcium tube, is transmitted through the apparatus. In one or two hours, or as soon as the tube is choked, the whole is allowed to cool, and the newly-formed sesquichloride collected and preserved in *naphtha* until required for use.

Prop. Thus obtained it is a gray powder, consisting of small metallic scales, resembling platina; not acted on by cold water, soluble in the alkalies and some of the acids. Heated to redness, it catches fire and burns with great rapidity in the air, and in oxygen gas, with intense brilliancy. The powder, heated to redness in the *vapour of phosphorus*, burns vividly, and produces *sesquiphosphuret of aluminum*; mixed with *selenium* and exposed to heat, a blackish powder, (*seleniuret of alumina*,) is formed; heated until strongly incandescent, and small pieces of *sulphur* dropped upon its surface, the most brilliant combustion ensues with the formation of *sesquisulphuret of aluminum.* Both this and the seleniuret possess a semi-metallic lustre, and are easily decomposed by exposure and moisture. Its only compound with *oxygen* is *alumina.*

AMANDINE. *Prep.* 1. Take of *thick mucilage of gum arabic*, 3 *oz.; new white honey*, 6 *oz.; white potash-soap*, 3 *oz.;* well mix in a mortar; add *oil of sweet almonds*, 1½ *lb.*, and the *yelks of* 5 *large eggs;* again mix well; lastly, add of *thick pistachio milk* (made of the fresh peeled nuts and rose-water,) 4 *oz.;* incorporate thoroughly and preserve for use. Sometimes this paste is coloured by the addition of 2 or 3 *dr.* of oil tinged green with spinach leaves.

2. *Almond paste, almond oil, honey, Naples soap*, and *glycerine*, of each, 1 *oz.; yelk of* 1 *egg; balsam of Peru*, ½ *dr.;* reduce the mixture to a perfectly homogeneous paste, sprinkling in a few teaspoonsful of *spirit of wine*, and pot it immediately. Both the above are scented with the *oil of bitter almonds.—Used* to whiten and soften the skin, and prevent it chapping. A small portion about the size of a filbert, with a little warm water, produces a very white and rich lather, with which the hands and face should be rubbed lightly, and the skin wiped whilst the water is still milky.

AMADOU. Syn. *Spunk, German Tinder, Touch-match, Pyrotechnic Sponge, Surgeon's Agaric, Agaric of the Oak.* A spongy combustible substance prepared from the boletus fomentarius, boletus igniarius, and other allied species of tree fungi.

Collection, &c. The fungus is collected in August and September, and the outer bark having been removed with a knife, the inner spongy-substance is carefully separated from the woody portion below, cut into slices, and well beaten with a mallet until sufficiently soft and pliable. Some parties first boil it in water in order to separate the epidermis and porous parts, and to free it from soluble matter; after which they dry it and beat it as before. To complete its manufacture for *tinder*, it is soaked once, or oftener, in a *strong solution of saltpetre;* or in a thin paste made of *gunpowder* and *water*, which is thoroughly forced into the pores; after which it is dried, and well rubbed to free it from loose matter. When prepared with saltpetre, it is often called *red* or *brown amadou;* and when prepared with gunpowder, *black amadou.*

Uses. It is used to stop local bleeding, to spread plasters on, as a compress, and for some other like purposes. When covered with *resin-plaster*, it forms an excellent article for the protection of abraded surfaces. A small piece thus prepared, of a circular shape, having a round hole cut in the middle, the size of the apex of the corn, forms the very best corn-plaster, as from its great softness it at once protects the part from pressure, and removes the cause. It also forms one of the best shoe-socks known.

AMALGAM. Alloys containing quicksilver. Mercury unites with many of the metals by mere contact. Some, as *gold, silver, tin*, and *lead*, it is capable of dissolving in certain quantities, without losing its fluidity. Most of these compounds may be prepared by agitating or rubbing the mercury with the given metal in the state of filings or small fragments, either with or without heat. Some of the liquid amalgams crystallize after a time, becoming solid. Those with gold, silver, tin, zinc, &c., are extensively employed in *gilding, silvering*, and *dentistry*, and in other useful arts and manufactures.

AMALGAM (Ammoniacal). An unstable compound produced when a *globule of mercury* is placed in a small cavity formed in a piece of *sal ammoniac*, and the *negative pole* of a *powerful galvanic battery* is brought into contact with the metal, and the *positive pole* with the ammoniacal salt. On withdrawing the influence of the battery, the whole returns to its former condition.

AMALGAM (Electrical). *Prep.* 1. Take of *zinc* and *grain tin*, of each, 1 *oz.;* melt in an iron ladle, remove it from the fire, and add of *mercury*, (hot), 2 *oz.;* stir well together with an iron rod, pour the melted metal into a well-chalked wooden box, and agitate it violently until cold; or it may be stirred until cold and then powdered. It should be preserved in a corked glass bottle.

2. (La Baumé.) *Zinc*, 2 *oz.; grain tin*, 1 *oz.; bees' wax*, ½ *oz.; mercury*, 6 *oz.;* as last.

3. *Zinc*, 2 *oz.; tin*, 1 *oz.; mercury*, 5 *oz.*

4. *Zinc*, 2 *oz.; mercury*, 5 *oz.*

Use. For covering the cushions of electrical machines. A little of the powder is spread thinly on the surface of the rubber, previously touched over with tallow.

AMALGAM (Gilding). Syn. *Amalgam of Gold. Prep.* Take of *grain gold*, 1 part; *mercury*, 8 parts; put them into a small iron saucepan or ladle, dissolve by a *gentle* heat, (using a smooth piece of iron as a stirrer,) and pour it out on a clean plate or smooth stone slab.

Use. For gilding brass, copper, &c. The metal to be gilded is first rubbed over with a solution of nitrate of mercury, and then covered with a very thin film of the amalgam. On heat being applied, the mercury volatilizes, leaving the gold behind.

AMALGAM (Silvering). *Prep.* 1. As

the last, but substituting *silver* for *gold. Used* to silver metals.

2. *Lead, tin,* and *bismuth,* of each, 1 *oz.;* melt, skim off the dross, cool to the lowest point at which the mixture will remain liquid, and add, *quicksilver,* 10 *oz.;* mix well with an iron rod.

3. *Lead,* and *tin,* of each, 1 *oz.; bismuth,* 2 *oz.; quicksilver,* 4 *oz.* The last two are used for silvering the insides of hollow glass vessels, globes, convex mirrors, &c. The glass being well cleaned, is carefully warmed, and the amalgam, rendered fluid by a gentle heat, is poured in, and the vessel turned round and round, so that the metal may be brought into contact with every part of the glass which it is desired to cover. At a certain temperature it will be found to readily adhere to the glass.

AMALGAM (Varnisher's). *Prep.* Melt *grain tin,* 4 *oz., with bismuth,* 1 *oz.;* add *quicksilver,* 1 *oz.,* and stir till cold; then grind it very fine with *white of egg* or *varnish,* and apply it to the figure.

AMALIC ACID. A substance formed by the action of *chlorine* on *caffeine.* It possesses only feeble acid properties, and is homologous to alloxantin. Treated with *oxidising agents* it yields *Cholestrophane;* and when treated with *ammonia, Caffeine Murexide.*

AMANITINE. Syn. *Amanitina.* The poisonous principle of the *amanita muscaria,* and some other species of fungi. It is brown, uncrystallizable, and soluble.

AMARINE. Syn. *Amarina.* A name which has been given to the bitter principle of several vegetables. It has recently been applied to Benzoline.

AMARYTHRINE. The bitter principle of erythrine.

AMAUROSIS. Syn. *Gutta Serena.* A diminution, or total loss of sight, supposed to arise from paralysis of the retina or optic nerve. In general there is no visible defect of the eye, except dilatation of the pupil and immobility of the iris. It is the "drop serene," so feelingly alluded to by Milton. Mild streaming electricity has been, in some cases, successfully employed as a remedy for this distressing affection.

AMBER. Syn. *Ambra, Electrum, Succinum,*—Lat. *Succinum,*—Ph. D. A well-known yellow, semi-transparent, fossil resin.

Manufacture. Amber is *worked* in a *lathe, polished* with *whiting and water* or *oil,* and *finished off* by friction with *flannel.* During the operation the pieces often become hot and electrical, and fly into fragments, to avoid which, they should be kept cool, and only worked for a short period at a time. It is *joined* and *mended* by smearing the surfaces of the pieces with *linseed* or *boiled oil,* and then strongly pressing them together, at the same time holding them over a *charcoal fire,* or heating them in any other way in which they will not be exposed to injury. The commoner varieties are *hardened* and *rendered clearer,* either by boiling them in *rape oil* for about 24 hours; or by surrounding the pieces with *clean sand* in an iron pot, and exposing them to a gradually increasing heat for 30 or 40 hours. During this process small fragments must be kept in the sand at the side of the pot, for the purpose of occasional examination, lest the heat be raised too high, or be too long continued.

Identification. Amber may be known from *mellite* and *copal,* both of which articles are occasionally substituted for it, by the following characteristics:—*Mellite* is infusible by heat, and burns white.—A bit of *copal,* heated on the point of a knife, catches fire, and runs into drops, which flatten as they fall.—*Amber* burns with spitting and frothing, and when its liquefied particles drop, they rebound from the plane on which they fall. (M. Haüy.)—Neither *mellite* nor *copal* yield succinic acid by distillation.

Uses. It is chiefly made into mouth-pieces for pipes, beads for necklaces, and other ornaments; and is used as the basis of several excellent varnishes. It was formerly given in chronic coughs, hysteria, &c.—*Dose,* of the powder, 10 to 60 grs. The coarser kinds alone, are employed in medicine, chemistry, &c.

AMBER (Balsam of). Syn. *Balsamum Succini,*—Lat. The thick oil left in the retort after the rectification of oil of amber. In its properties it resembles the common oil.

AMBER (Factitious). Syn. *Succinum Factitium.* Mellite, copal, and anime, have each been substituted for amber in small fragments. Recently a remarkably good imitation has been produced by acting on *gutta percha* with *sulphur,* at *high temperatures,* which has been extensively passed off for genuine amber.

AMBER (Soluble). *Prep.* Heat *amber,* cautiously, in an *iron pot,* and as soon as it softens and becomes semi-liquid, stir in nearly an equal weight of *pale boiled linseed oil.* It is used as a cement for glass and earthenware, and thinned with *oil of turpentine,* as varnish.

AMBERGRIS. Syn. *Ambragrasea,*—Lat. An odorous, solid substance, supposed, by some, to be a morbid secretion of the liver or intestines of the cachalot or spermaceti whale, analogous to biliary calculi; but according to M. Beale, it consists of the mere indurated fæces of the animal; perhaps, (as suggested by Dr. Pereira,) somewhat altered by disease. From the high price of genuine ambergris, it is very frequently adulterated. When quite pure and of the best quality, it is—1. Nearly wholly *soluble* in hot *alcohol* and *ether*, and yields about 85$\frac{0}{0}$ of *ambreine;*—2. It almost wholly *volatilizes* at a *moderate heat*, and when *burnt* leaves *no* notable quantity of *ashes;*—3. It is *easily punctured* with a *heated needle*, and on withdrawing it, not only should the *odour* be *immediately evolved*, but the *needle* should *come out clean*, without anything adhering to it.

Uses. It is highly prized for its odour, which is peculiar, exceedingly diffusive, and perceptible in minute quantities; and it is found greatly to exalt the odour of other substances. It was formerly given as an aphrodisiac, in doses of 3 to 10 grs. "A grain or two, when rubbed down with *sugar*, and added to a *hogshead of claret*, is very perceptible in the wine, and gives it a flavour, by some considered as an improvement. (Brande,)

AMBERGRIS (Factitious). An article of this kind, met with in some shops, is thus made:—*Ben nuts*, 6 *oz.: spermaceti* and *farina*, of each, 8 *oz.; orris powder*, 16 *oz.; gum benzoin*, 20 *oz.; asphaltum*, 3 *oz.; grain musk* and *liquor of ammonia*, of each, 1 *oz.; ambergris*, 8 *oz.; oils of cloves* and *rhodium*, of each, 20 *drops; mucilage of gum tragacanth*, q. s.; beaten to a smooth mass, made into lumps, and dried.

AMBREIC ACID. An acid obtained by digesting *ambreine* in *nitric acid*. It resembles cholesteric acid. Its salts are termed *Ambreates*.

AMBREINE. Syn. *Ambreina*. The fatty, odorous principle of ambergris.

Prep. Digest *ambergris* in *hot alcohol* (sp. gr. 0·827) until the latter will dissolve no more, then filter. The ambreine will be deposited as this solution cools, in an irregular crystalline mass, which may be purified by recrystallization in alcohol. *Product*, about 85$\frac{0}{0}$.

Prop. Melts at about 90°; volatilizes at 212° to 220° Fahr.; nitric acid converts it into *Ambreic acid*. It resembles cholesterine.

AMIDE. Syn. *Amidet, Amidide.* A compound having amidogen in its electro-negative part. According to Professor Goodrich the right orthography of the word is *ammid;* and Brande remarks—"The term *ammonide*, from their resemblance to ammonia, would, perhaps, be more correct." The names of its compounds are made up of the name of the other ingredients prefixed to amide; as *sodamide, hydramide, &c.; amidide of sodium, amidide of hydrogen, &c.* See *Amidogen.*

AMIDINE. A substance formed by the action of boiling water on starch. It constitutes the interior substance of the starch grains, and its properties are intermediate between those of starch and gum,

AMIDOGEN. The name given by Kane to a hypothetical substance in the ammonia compounds, composed of two equiv. of hydrogen, and one equiv. of nitrogen. See *Amide.*

AMMELIDE. A white insoluble powder, prepared by dissolving *ammeline, melam*, or *melamine*, in *strong sulphuric acid*, adding *alcohol*, and washing the resulting precipitate with *cold water*. It is purified by re-solution in *dilute nitric acid*, and precipitation with *carbonate of ammonia.*

AMMELINE. A weak alkaline base prepared by dissolving *melam* in boiling *dilute hydrochloric acid.* The crystals obtained by concentrating the liquid, dissolved in *pure water*, and precipitated with *ammonia*, consist of very fine needles, having a silky lustre, insoluble in both water and alcohol. It may also be obtained from the *alkaline mother liquor from which melamine has separated*, by neutralising it with *acetic acid.*

AMMONIA. Syn. *Ammoniacal Gas, Volatile Alkali, Terhydruret of Nitrogen, Terhydride of do., Hydramide, Amidide of Hydrogen, Alkaline Air; Ammonia, Gas Ammoniacale,*—Lat. A gaseous substance forming the pungent principle of smelling salts, and the ammonia-compounds.

Prep. A mixture of *quicklime* with an equal weight of *sal ammoniac*, (both dry and in fine powder,) is introduced into a glass retort, the beak of which is joined by a collar of *Indian rubber* to a glass tube about 18 inches long, having its other end bent up ready to be placed under a gas jar, on the shelf of a *mercurial* pneumatic trough. Heat is then applied by means of a spirit-lamp, and the air contained in the apparatus having been expelled, the gas is collected for use. It cannot be dried by means of *chloride of calcium.*

Prop. Gaseous, colourless, invisible, highly pungent, acrid, irritating, and alkaline; irrespirable, unless largely diluted with air; extinguishes combustion; burns slowly in oxygen; sp. gr. 0·590; highly basic; all its salts are either volatilized or decomposed at, or under a red heat—those with a *volatile* acid sublime unchanged—those with a *fixed* acid lose their ammonia; water at 50° Fahr. absorbs 670 vols. of this gas, and the solution has the sp. gr. 0·875, (Sir H. Davy.) Water condenses easily about ⅓d its weight or 460 times its bulk. (Ure.)

Ant., *&c.* The vapour of acetic acid or common vinegar. It may be produced by sprinkling a little vinegar on a piece of hot iron, as a heated shovel.

Estim. The quantity of gaseous ammonia in *pure* water of ammonia is easily determined from the specific gravity of the liquid, or from its saturating power. See *Alkalimetry* and *Ammonimetry.*

Tests. Ammonia is recognised by—1. Its pungent odour.—2. By turning vegetable blues *green*, and yellows, *brown*, but which soon regain their previous *colours*, especially on the application of heat. *The salts of ammonia* are known by the exhalation of ammoniacal gas (recognised by its odour,) when mixed with caustic potassa, soda, or lime.

Uses. Ammonia is employed in several processes in chemistry and the arts; absorbed by water it forms liquor of ammonia, spirits of hartshorn, &c.

AMMONIA (Acetate of). Syn. *Ammoniæ Acetas,*—Lat. *Prep.* Take of *acetate of potassa* and *sal ammoniac*, equal parts; mix and distil; the oily liquid in the receiver (*binacetate of ammonia,*) forms a radiated crystalline mass on cooling. *Dry ammoniacal gas* passed into this salt, melted by a gentle heat, transforms it into the solid and inodorous *neutral acetate.*

2. *Strong acetate acid* is saturated with *ammonia* or its *carbonate;* the solution evaporated over *sulphuric acid in vacuo*, and the crystals carefully drained and pressed between bibulous paper.

3. From a *saturated solution of the salt in hot water*, suffered to cool *slowly* in a *close* vessel.

Prop., *&c.* Long slender crystals or a crystalline mass, very soluble in both alcohol and water; its solutions cannot be evaporated without loss of the base; distilled with *anhydrous phosphoric acid*, it is converted into *Acetonitrile.* An aqueous solution of Acetate of Ammonia was introduced into the Materia Medica by Boerhaave, (1732); and has since been extensively used in *medicine* as a diaphoretic and febrifuge, under the popular name of *Mindererus Spirit.* For medicinal purposes, both this salt and its solutions should be neutral to test paper, and *wholly* volatilized by heat.

AMMONIA (Arseniate of). Syn. *Ammoniæ Arsenias,*—Lat. *Prep.* 1. (Cottereau.) Take of *arsenic acid*, 1 oz.; *strong water of ammonia*, q. s., to saturate the acid; allow the solution to evaporate and crystallize spontaneously.

2. Saturate a warm *concentrated solution of arsenic acid* with *sesquicarbonate of ammonia* in *slight* excess; evaporate by a gentle heat and crystallize.

3. (*Binarseniate.*) As above, but employing two equiv. of acid.

AMMONIA (Arsenite of). Syn. *Ammoniæ Arsenis,*—Lat. *Prep.* From a *hot concentrated solution of arsenious acid*, as the last.—*Used* (chiefly) to make arsenite of iron. The properties of the above arsenical preparations are for the most part similar to those of arsenite of potassa.

AMMONIA (Benzoate of). Syn. *Ammoniæ Benzoas,*—Lat. *Prep.* 1. Dissolve *benzoic acid* in *strong water of ammonia*, to saturation, then further add *ammonia* in *slight excess*, and crystallize by refrigeration.

2. As the last, but employing a *solution of sesquicarbonate of ammonia.*

Used as a chemical test. Very soluble and difficult to crystallize.

AMMONIA (Carbonates of). Ammonia combines with carbonic acid in several proportions, but only three of them are known in commerce. (See *below.*)

AMMONIA (Carbonate of). Syn. *Monocarbonate of Ammonia, Neutral Carbonate of do.; Neutral Hydrous do.*,—Rose; *Ammoniæ Carbonas, Ammoniæ Monocarbonas,*—(Lat.) This article must be distinguished from the carbonate of ammonia of commerce, which is now generally termed the *sesquicarbonate.*

Prep. (Ph. D. 1826). *Sal ammoniac*, (powdered and well dried,) and *dried carbonate of soda*, equal parts; mix, and with a gradually increased heat, sublime from an earthen retort, into a refrigerated receiver.

Prop. Solid, crystalline; evolving a stronger ammoniacal odour than the sesquicarbonate, but feebler than that from liquor of ammonia. Its properties for the most part resemble those of the sesquicarbonate, but it is stronger.

Uses, *&c.* The neutral carbonate, in the solid form, is seldom used in medicine; but it is indirectly employed in several liquid preparations in which the sesquicarbonate is ordered. It is superior for filling smelling bottles to any other preparation of ammonia; as it is not only more pungent, but does not lose its pungency by keeping. It volatilizes more quickly than the sesquicarbonate, and the residuum, unlike that of the latter salt, continues as odorous as ever. It is the basis of several of the most popular and esteemed advertised *smelling salts* of the shops.

AMMONIA (Sesquicarbonate of). Syn. *Carbonate of Ammonia,* (of the shops;) *Ammoniæ Sesquicarbonas,*—Ph. L. & D. *Ammoniæ Carbonas,*—Ph. E. & U. S. *Baker's Salts, Volatile Salts, Subcarbonate of Ammonia.* The substance popularly known as "*smelling salts,*" or "*carbonate of ammonia.*" The London and Dublin Colleges now include it in their lists of Materia Medica.

Prep. 1. (Ph. E. 1841; Ph. L. 1836.) *Sal ammoniac,* 1 ℔; *chalk,* 1½ ℔; separately dried and pulverized; then thoroughly mixed together, and sublimed with a gradually increasing heat, as ordered for the carbonate.

2. (Commercial.) From *sal ammoniac* or *pure commercial sulphate of ammonia,* and *chalk,* equal parts, both dry and in powder, mixed as before, and sublimed from an *iron pot,* into a *long earthen or leaden receiver,* well cooled.

The receiver is usually fitted with a moveable lead cover, secured by a water joint, and has an open lead pipe in the bottom, to allow the liquid products of the distillation to drain off into a second receiver. When the *impure* sulphate of ammonia is used, the resulting salt is generally resublimed in iron pots, furnished with leaden heads kept very cool; a little water being introduced into the subliming pots to render the product translucent. The heat is usually applied by means of a common furnace, but a steam or water bath is preferable, as the temperature should not be greater than 215° Fahr.; and, indeed, need not exceed 150 or 160°.

Sesquicarbonate of ammonia is less volatile and pungent than the neutral carbonate; dissolves in 4 parts of cold and in an equal weight of tepid water; boiling water and alcohol decompose it, with the evolution of carbonic acid gas; by age or exposure to air, the surface assumes an opaque white colour, from its carbonate flying off; the remaining bicarbonate being less volatile. Sp. gr. 0·966.

Pur. It is "free from colour, transparent, of an acrid smell and taste; it changes the colour of turmeric brown; is (entirely) dissipated by heat, and is dissolved (entirely) by water. Nitric acid being added to saturation, nothing is thrown down by either nitrate of silver or chloride of barium." (Ph. L.)

Uses. It is commonly employed by the bakers in their fancy goods, and to make extemporaneous bread and pastry; by the *chemist* and *pharmaceutist* for the preparation of several of the salts of ammonia, and in analysis, &c. In *medicine,* it is used as a stimulant, antispasmodic, antacid, and diaphoretic, in acidity of the stomach, dyspeptic affections, gout, scrofula, hysteria, lowness of spirits, epilepsy, &c.; and in the convulsions attending dentition. It is also used to make effervescing draughts; and *externally,* as a counter-irritant and stimulant. In *large doses* it is emetic; in *excessive doses,* poisonous. *Dose,* 5 to 30 gr., in solution, or made into pills; or as an effervescing saline draught:

20 grs. of *sesquicarbonate of ammonia,* in solution, are used to	6 fl. dr. of lemon juice, 24 grs. of citric acid, or 25 grs. of tartaric acid;

with the addition of a few drops of any aromatic essential oil, as lemon, lavender, or bergamotte. Its use as a nasal stimulant in headaches, fainting, &c. is well known.

AMMONIA (Bicarbonate of). Syn. *Ammoniæ Bicarbonas,*—Ph. D. *Hydrated Bicarbonate of Oxide of Ammonium, Supercarbonate of Ammonia.*

Prep. 1. (Ph. D.) Take of *commercial sesquicarbonate of ammonia,* any convenient quantity; reduce it to fine powder, spread it on a sheet of paper, and expose it to the air for 24 hours; then preserve the residuum in a well-stoppered bottle.

2. (Ph. D. 1826.) Dissolve *carbonate* (sesquicarbonate) *of ammonia* in *water,* and pass a stream of *carbonic acid gas* (from *white marble* and *dilute muriatic acid,*) through it, to full saturation; let it rest, and dry the crystals that form, without heat, and preserve them in stoppered bottles. *Obs.* Crystallization is promoted by forcing in the gas under pressure.

3. By digesting *cold water* on the *sesquicarbonate of ammonia* in considerable excess, until the whole of the pungent carbonate is dissolved out. If the salt is reduced to powder, the operation is facilitated.

4. (Rose.) To the *powdered sesquicarbonate,* add *boiling water,* q. s. to dissolve it, and immediately close the vessel; crystals form as the liquid cools containing 2½ eq. of water.

Prop., &c. It for the most part resembles the sesquicarbonate, except in its taste and smell being only faintly ammoniacal. It requires 8 times its weight of cold water to dissolve it.

A saturated solution of the above salt, evaporated by *a very gentle heat,* gives small prismatic crystals, having neither smell nor taste. Its uses are similar to those of the other carbonates; but it is less caustic and unpalatable. *Dose,* 6 to 25 gr. or ½ dr.

AMMONIA (Citrate of). Syn. *Citrate of Oxide of Ammonium ; Ammoniæ Citras,*—Lat.

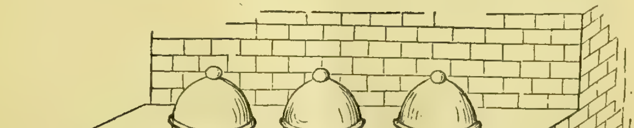
Prep. Saturate a *concentrated solution of pure citric acid* with *sesquicarbonate of ammonia* in fine powder ; (about 7 to 6 ;) employing a *gentle* heat ; and crystallize by refrigeration in a close vessel.

Uses. As a chemical test. An extemporaneous citrate made with lemon juice and drank effervescing, is employed as a mild aperient and diaphoretic, in fevers, &c.

AMMONIA (Hydriodate of). Syn. *Iodide of Ammonium ; Ammoniæ Hydriodas, Ammonii Iodidum,*—Lat. *Prep.* (P.C.) *Clean iron filings,* 1 part ; *iodine,* 2 parts ; *distilled water,* q. s. ; digest with agitation till a colourless solution is obtained ; to the clear liquid, add *sesquicarbonate of ammonia,* in *slight* excess ; filter, concentrate by rapid evaporation, and crystallize by refrigeration. The crystals should be dried by pressure between the folds of bibulous paper, and kept in a stoppered bottle. It resembles Iodide of potassium, except in being more active, and better suited to irritable and relaxed habits.

AMMONIA (Hydrochlorate of). Syn. *Muriate of Ammonia, Sal Ammoniac, Chloride of Ammonium ; Ammoniæ Murias,* —Ph. E. D. & U. S. ; *Ammoniæ Hydrochloras,*—Ph. L. A substance originally prepared by subliming the soot from camel's dung. In this country, at the present day, it is manufactured chiefly from the crude ammoniacal liquors obtained as secondary products in the manufacture of coal gas and animal charcoal.

Prep. 1. (From gas liquor.) The *crude ammoniacal liquor of the gas works,* containing the carbonate, sulphate, hydrosulphuret, and other salts of ammonia, is commonly neutralized with *sulphuric acid,* and evaporated ; the resulting brown crystals of impure *sulphate of ammonia* are then mixed with the proper quantity of *chloride of sodium* or *common salt,* and placed in iron pots, lined with clay, having a leaden dome or head adapted, (see *engr.,*) and heat is applied until the whole has sublimed. When carbonates predominate in the liquor, it is often digested with *ground plaster of Paris* (sulphate of lime,) instead of being treated with sulphuric acid, by which *sulphate of ammonia* is formed, which remains in solution, and *carbonate of lime,* which is precipitated. Sometimes the ammoniacal liquor is at once saturated with *hydrochloric acid,* or with *chloride of calcium.* The crystals which are now obtained, are *crude hydrochlorate of ammonia,* and are purified by sublimation as before.



2. (From bone liquor.) The preparation of sal ammoniac from bone-spirit salt is nearly similar to that described above.

Prop., &c. It is odourless, has a saline acrid taste, and sublimes without either fusion or decomposition ; slightly reddens litmus ; dissolves in three parts of cold and 1 part of boiling water ; is soluble in alcohol ; a piece heated on the point of a knife in a candle readily sublimes ; mixed with caustic potassa, soda, or quicklime, it evolves the fumes of ammonia. It gives a colourless solution with water ; wholly sublimes with heat, and neither chloride of barium nor sulphuretted hydrogen alters its solution ; a solution, to which a few drops of nitric acid have been added, does not yield a blue precipitate with ferrocyanide of iron.

Uses. It is much used in the *arts*, especially in the *working of metals* and in *dyeing;* it is also employed in large quantities to give a factitious pungency to snuff; in *chemistry* to form frigorific mixtures, &c.; and in *medicine* it is given as a diuretic, stimulant, alterative, and tonic.—*Dose*, 5 to 20 grs. 1 oz. to half-a-pint of *water* forms a good *chilblain lotion.*

AMMONIA (Hydrosulphurets of). There are at least *five* compounds of sulphur and ammonia known to chemists; but only *three* of them are of practical importance.

AMMONIA (Hydrosulphuret of). Syn. *Sulphuret of Ammonium, Neutral Hydrosulphuret of do. Prep.* Saturate *strong liquor of ammonia* with *sulphuretted hydrogen gas;* then add a second portion of *liquor of ammonia*, equal to that first used, and preserve it in well-stoppered bottles.

AMMONIA (Bihydrosulphuret of). Syn. *Bihydrosulphate of Ammonia, Bisulphuret of do., Bisulphuret of Ammonium, Hydrosulphuret of the Sulphuret of Ammonium, Sulpho-hydrate of Ammonium, Hydrosulphuret of Ammonia; Ammoniæ Hydrosulphuretum*,—Ph. D. *Hydrosulphate of Ammonia, Ammoniæ Hydrosulphas*,—Ph. U. S. This is the fetid preparation of the shops, commonly called *Hydrosulphuret* or *Hydrosulphate of Ammonia.*

Prep. 1. (Ph. D.) *Sulphuret of iron*, 1½ *oz.*; *water*, 15 *oz.*; place them in a two-necked bottle, and add by degrees, through a safety funnel, *commercial oil of vitriol*, 1½ *fl. oz.*; and pass the evolved gas, first through a little water placed in an intermediate phial, and then into *solution of ammonia*, (Ph. D.) 4 *fl. oz.*; observing to place the end of the tube conveying the gas near the bottom of the bottle containing the ammonia, the neck of the latter being loosely plugged with tow. Sp. gr. ·999. It should be kept in a green-glass stoppered bottle.

2. (Mr. Wooley.) *Sulphur*, 1 part; *fresh hydrate of lime*, 2 parts; *water*, q. s.; boil, filter, and to the filtered solution, add for every 16 parts of sulphur used, *sulphate of ammonia*, 66 parts. Sulphate of lime is precipitated and hydrosulphuret of ammonia remains in solution. (Pharm. Jour., ii., 655.)

3. (Commercial.) By passing *sulphuretted hydrogen gas* through a mixture composed of *strong liquor of ammonia*, 1 part, and *water*, 4 parts, to saturation.

4. (Crystallized.) By mixing together equal volumes of *ammoniacal gas* and *sulphuretted hydrogen gas*, in a vessel surrounded with ice.

Prop., &c. In the *solid form*, acicular or foliated crystals, smelling strongly of both ammonia and sulphuretted hydrogen; reaction alkaline; very volatile; forms with water a transparent solution. In the *gaseous form* it constitutes the nauseous effluvia evolved from privies, common sewers, and decomposing animal matter. The *solution* prepared as above has a very fetid odour, and exhibits the other common properties of the bi-hydrosulphuret. When *pure* it is wholly volatilized by heat, and neither the crystals nor the solution produce a precipitate in a solution of sulphate of magnesia. "Should a precipitate occur, it still contains free ammonia, and must be again subjected to the action of a stream of sulphuretted hydrogen." (Ph. D.) By age, its solution undergoes a slight change; ammonia is evolved, a deposit of sulphur takes place, and it acquires a yellow tint, "owing to the formation of *Pentasulphuret of Ammonium.*

Uses. It is principally employed as a test liquor for metals; and by the *perfumers* in dyeing hair. It is a powerful sedative, lessening the action of the circulatory system, causing nausea, vomiting, vertigo, drowsiness, &c.—*Dose*, 5 drops, 3 or 4 times daily, mixed with water, and instantly swallowed. In large doses it is poisonous.

AMMONIA (Perhydrosulphuret of). Syn. *Persulphuret of Ammonia, Sulpho-hydrosulphate of Ammonia, Boyle's Fuming Liquor, Beguin's Sulphuretted Spirit; Oleum Sulphuris Volatilis, Liquor Fumans Boylii, &c.* Authorities differ as to the precise nature of this preparation, which, since its introduction by Beguin in 1650, has passed under more aliases than perhaps any other preparation.

Prep. 1. (Beguin.) *Sulphur*, 1℔; *quicklime*, ½℔; *sal ammoniac*, 4 oz.; mix and distil.

2. (Boyle.) *Sulphur and sal ammoniac*, of each, 5 oz.; *quicklime*, 6 oz.; as last.

3. (Liebig.) Agitate the *common hydrosulphuret of ammonia*, with *pure sulphur*, until the latter ceases to be dissolved; after repose, decant the clear liquid.

Prop., &c. An orange-yellow, fuming, fœtid liquid, of an oily consistence, having the characteristics of the common hydrosulphuret in a remarkable degree. Diluted with three parts of spirits of wine it forms the *liquor antipodagricus* of F. Hoffman; of which we are told, that, about 30 drops acted as a *strong sudorific;* and applied externally, mixed with camphor, "it relieved pain like a charm." (Hoffman.) The hydrosulphurets of ammonia are now scarcely ever employed as remedies.

AMMONIA (Liquor of). Syn. *Ammonia Water, Solution of Ammonia; Liquor Ammoniæ, Aqua Ammoniæ, Solutio Ammoniæ,*—Lat. This article is now seldom made by the retail vendor, as formerly.

Prep. 1. (*Liquor Ammoniæ,*—Ph. L.) "Sp. gr. 0·960;" "nearly 10 grains of ammonia are contained in 100 grains of the solution." (Ph. L.)

2. (*Stronger Liquor of Ammonia, Liquor Ammoniæ Fortior,*—Ph. L.) Sp. gr. 0·882; 1 part to 2 of distilled water, reduces it to the strength of the weaker solution, (0·960.) "It contains nearly 30 grs. of ammonia in each 100 grs." (Ph. L.)

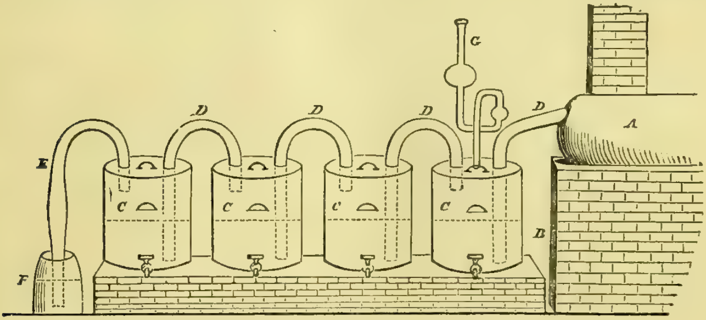
3. (*Liquor Ammoniæ,*—Ph. L. 1836.) *Hydrochlorate of ammonia,* 10 oz.; *lime,* 8 oz.; *water,* 2 pints; put the lime, slaked with water, into a retort, then add the hydrochlorate, broken into small pieces, and the rest of the water; and distil 15 fl. oz.

4. (Ph. E.) *Muriate of ammonia,* (in fine powder,) and *quicklime,* of each, 13 oz.; *distilled water,* 12 fl. oz.; *water,* (to slake the lime,) 7½ fl. oz.; the lime (cooled,) is well mixed with the muriate of ammonia, the mixture placed in a glass retort, and the ammonia distilled over (dry) into two receivers connected together; the *first* holding 4 fl. oz. of the *distilled water,* and the *second,* the remaining 8 fl. oz. Sp. gr. of the *first,* (*Stronger Water of Ammonia, Aqua Ammoniæ Fortior,*—Ph. E.,) 0·880; of the *second* (*Water of Ammonia, Aquæ Ammoniæ,*—Ph. E.,) 0·960; or it must be brought to that standard with either *water* or *liquor of ammonia,* as the case may be.

5. (*Liquor of Ammonia, Liquor Ammoniæ,*—Ph. D.) *Sal ammoniac,* and *fresh-burned lime,* of each, 8 *oz.; water,* (to slack the lime,) 4 *oz.; distilled water,* (for the receiver,) 16 *oz.;* proceed as before. Sp. gr. 0·950.

6. (*Stronger Liquor of Ammonia, Liquor Ammoniæ Fortior,*—Ph. D.) Pass *the gas evolved in the last process,* into 8 *oz.* of *liquor of ammonia,* (Ph. D., 0·950,) or into 5 *oz.* of distilled water. *Sp. gr.* 0·900.

7. (*On the commercial scale.*) This article is prepared on the large scale from a mixture of about equal parts of *quicklime* and *sal ammoniac,* or *sulphate of ammonia,* which are heated together in an iron cylinder or retort, connected with a set of refrigerators, consisting of a row of stone bottles with double necks, containing *water,* and kept very cold. (See *Engr.*) Two different methods of proceeding are adopted in this process. In the *one,* the dry ingredients are mixed together, and the resulting gas distilled over into the water, placed in the receivers. In the *other,* the *lime* is slaked with a *little water,* the *sal ammoniac,* in course powder, added, and the whole reduced to a *pap* before applying heat. In either case a proportionate quantity of water is put into the condensers, and the operation is nearly similar; but the latter method requires the least heat, and so far as the receivers and refrigerators are concerned, is, perhaps, the one most easily managed.



A, Cylindrical Iron Retort.
B, Furnace for ditto.
C C C C, Stoneware Receivers.
D D D D, Connecting Pipes.
E F, Waste Pipe and Receiver.
G, Safety Tube.

Prop., &c. Highly pungent, caustic, and alkaline; lighter than water, and presenting in a liquid form most of the characteristics of pure ammonia. It is antacid, diaphoretic, rubefacient, stimulant, and counter-irritant; and is used in various affections in which these remedies are indicated. In its *concentrated form* it is a corrosive poison.—*Dose,* 5 to 25 drops, in cold water, or milk and water. When *pure,* it "is free from colour. Exposed to the air it (entirely) escapes in highly acrid, alkaline, fugitive vapours, as shown by turmeric. A solution of lime being added, throws down nothing; hydrosulphuric acid does not discolour it; nor, when first saturated by nitric acid, does it give any precipitate with either sesquicarbonate of ammonia, or nitrate of silver, or chloride of barium." (Ph. L.) See *Ammonimetry.*

Ant. When the *fumes* have been inhaled, the patient should be exposed to a current of fresh air; and when the *liquid* has been swallowed, vinegar, or lemon-juice, mixed with water, may be administered; followed by an emetic.

Concluding Remarks. In the above it is absolutely necessary to keep the receivers as cool as possible, by means of snow, ice, or a current of very cold water, for the purpose of promoting the absorption of the gas, and to prevent its loss. On the small scale the glass receivers or bottles may be most conveniently surrounded with ice, and they should be furnished with a safety tube to prevent accidents. The water contained in the *first* bottle will be the *strongest*, if it be kept well cooled, and that in the *others* will progressively *decrease* in strength. In the shops, liquor of ammonia is kept of two or three strengths; *one* of a sp. gr. of ·880, (*stronger liquor of ammonia,*) for dissolving essential oils and filling smelling-bottles, &c.; *another* at 0·960, (*liq. of ammonia,*—Ph. L.;) and a *third* about the strength of common spirits of hartshorn, for which it is commonly sold. 1 *measure of the first* mixed with 3 *measures of distilled water*, produces a water of about 0·970; and with only 2 *measures of water*, one of about 0·960. The sp. gr. of the stronger commercial solution ranges between 0·886 and 0·910. It should be kept in well stoppered bottles, and in a cool situation.

AMMONIA (Malate of). Syn. *Ammoniæ Malas,*—Lat. *Prep.* 1. (*Neutral Malate.*) Like the arseniate, but using *malic acid.*

2. (*Bimalate; Acid Malate.*) Add a *strong solution of malic acid* to another of the *neutral malate of ammonia*, and cautiously evaporate and crystallize.

AMMONIA (Nitrate of). Syn. *Nitrate of Oxide of Ammonium; Ammoniæ Nitras, Nitrum Flammans,*—Lat. *Prep.* Saturate *nitric acid* (diluted with 3 or 4 times its weight of water,) with *sesquicarbonate of ammonia*, evaporate by a gentle heat, and crystallize.

Uses, &c. It dissolves in twice its weight of water; melts at 230°, and is decomposed at 460° Fahr. It is principally used for the preparation of *nitrous oxide or laughing gas*, of which nearly 4½ cubic feet may be procured from every pound avoird. With water, it forms a very convenient *freezing mixture*, and may be used for this purpose any number of times by simply evaporating the solution to dryness, when the salt will be obtained unaltered, ready for another operation.—*Dose.* 10 to 30 grs., as a diuretic or febrifuge.

AMMONIA (Nitro-sulphate of). Syn. *Ammoniæ Nitro-sulphas,*—Lat. Dissolve *sulphite of ammonia*, 1 part; in *water of ammonia*, 5 parts; and pass *nitric oxide gas* through the solution; wash the crystals that form (as rapidly as possible,) with *liquor of ammonia*, dry in bibulous paper, without heat, and preserve them in a well-stopped bottle.—*Dose.* 10 to 12 grs., in typhoid fevers, &c.

AMMONIA (Oxalate of). Syn. *Ammoniæ Oxalas,*—Ph. E. *Prep.* 1. Neutralize a hot *solution of oxalic acid* with *sesquicarbonate of ammonia;* evaporate and crystallize.

Uses, &c. As a test for lime, with solutions of which it produces a white precipitate soluble in nitric acid. Heated in a retort, it yields ammonia, carbonate of ammonia, cyanogen, and carbonic acid, together with a peculiar greyish white sublimate, (*oxamide.*)

AMMONIA (Phosphate of). Syn. *Ammoniæ Phosphas,*—Lat. *Prep.* (Niemann.) Saturate a *solution of phosphoric acid* with *sesquicarbonate of ammonia;* gently evaporate and crystallize. Diuretic, and discutient.—*Dose.* 3 to 10 grs.; 3 or 4 times a day; in certain forms of gout, rheumatism, and calculus.

AMMONIA (Succinate of). Syn. *Ammoniæ Succinas,*—Lat. *Prep.* 1. (Guibourt.) *Succinic acid*, 1 part; *water*, 4 parts; dissolve in a capsule, neutralize with *water of ammonia*, (in slight excess); evaporate, and crystallize.

2. (Ph. Bav.) *Spirits of hartshorn*, neutralized with a *solution of succinic acid*, evaporated and crystallized.—*Dose.* 5 to 10 grs.

3. (P. C.) *Spirits of hartshorn*, neutralized with *succinic acid*, (salt of amber,) and filtered.—*Dose.* 10 or 20 drops, or more.

Obs. The *first* is used as a test for iron; the *others* (*ammoniæ succinas impuras*) as antispasmodics.

AMMONIA (Sulphate of). Syn. *Hydrosulfamide, Sulphate of Oxide of Ammonium; Ammoniæ Sulphas,*—Lat. Crude sulphate of ammonia exists in considerable quantity in the soot from pit coals, and it is obtained as a secondary product from the ammoniacal liquor of gas works and animal charcoal manufactories.

Prep. 1. (Medicinal.) Saturate *dilute sulphuric acid* with *sesquicarbonate of ammonia,* in slight excess; filter, gently evaporate, and crystallize.

2. (Commercial.) From *gas liquor* or *bone spirit,* saturated with *weak oil of vitriol,* and the clear portion of the liquid, after repose, decanted, concentrated by rapid evaporation, and crystallized.

Uses, &c. Pure sulphate of ammonia is diuretic, aperient, resolvent, and stimulant. —*Dose.* 10 to 30 grs. It is now seldom used in medicine. The *crude* sulphate is principally employed in the preparation of sal ammoniac and sesquicarbonate of ammonia, and for manure.

AMMONIA (Tartrate of). Syn. *Neutral Tartrate of Ammonia, Tartrate of Oxide of Ammonium; Ammoniæ Tartras,*—Lat. *Prep.* 1. (Pereira.) Saturate a solution of *crystallized tartaric acid,* 150 grs.; with *sesquicarbonate of ammonia,* 118 grs.; evaporate with a gentle heat, and crystallize; or it may be evaporated to dryness and powdered.

Prop., &c. Prismatic crystals, or a crystalline mass; soluble and efflorescent. The *properties* and *doses* resemble those of citrate of ammonia.

AMMONIA (Bitartrate of). Syn. *Ammoniæ Bitartras,*—Lat. *Prep.* To a strong solution of *tartaric acid,* add another of *sesquicarbonate of ammonia* as long as a precipitate falls; collect the latter, and dry it. A crystalline powder, only slightly soluble in water, closely resembling ordinary cream of tartar. It is diaphoretic, diuretic, and deobstruent.

AMMONIACUM (Strained). Syn. *Prepared Ammoniacum; Ammoniacum Præparatum,*—Ph. L. *Prep.* (Ph. L.) Boil *ammoniacum* in *water,* enough to cover it; strain through a hair sieve, and constantly stirring, evaporate in a water bath, until on cooling, it becomes hard.

AMMONIO-CITRATES (and other ammonio-salts). See *the respective bases.*

AMMONIUM. The hypothetical base of ammonia, according to the theory of Berzelius.

AMMONIMETRY. Syn. *Ammoniometry.* The process of determining the strength of ammonia water. The strength of pure solutions of ammonia may be conveniently ascertained from their specific gravity, which may be taken in the usual manner. The specific gravity of mixtures of pure liquor of ammonia and distilled water, is found to be precisely the mean of that of their constituents.

TABLE I, *of the Per Centage of Pure Ammonia, in Water of Ammonia of the given specific gravities, at* 59° *Fahr.* By Sir H. DAVY.

Sp. Gr.	Ammonia.	Water.
0·8750	32·50	67·50
0·8875	29·25	70·75
0·9000	26·00	74·00
0·9054	25·37	74·63
0·9166	22·07	77·93
0·9225	19·54	80·46
0·9326	17·52	82·48
0·9385	15·88	84·12
0·9435	14·53	85·47
0·9476	13·46	86·54
0·9513	12·40	87·60
0·9545	11·56	88·44
0·9573	10·82	89·18
0·9597	10·17	89·83
0·9619	9·60	90·40
0·9692	9·50	90·50

TABLE II, *of the Per Centage of Pure Ammonia, and of Ammonia Water of* 0·9000 *in Water of Ammonia of the given specific gravities.* By Dr. URE.

Water of 0·900.	Ammonia in 100.	Water in 100.	Sp. Gr. by experiment.
100	26·500	73·500	0·9000
95	25·175	74·825	0·9045
90	23·850	76·150	0·9090
85	22·525	77·475	0·9133
80	21·200	78·800	0·9177
75	19·875	80·125	0·9227
70	18·550	81·450	0·9275
65	17·225	82·775	0·9320
60	15·900	84·100	0·9363
55	14·575	85·425	0·9410
50	13·250	86·750	0·9455
45	11·925	88·075	0·9510
40	10·600	89·400	0·9564
35	9·275	90·725	0·9614
30	7·950	92·050	0·9662
25	6·625	93·375	0·9716
20	5·300	94·700	0·9768
15	3·975	96·025	0·9828
10	2·650	97·350	0·9887
5	1·325	98·675	0·9945

AMULET. The ignorant and credulous of all nations have been fond of charms and amulets. The Egyptians and Persians had a great variety, which are said to have consisted of small cylinders variously ornamented with figures and hieroglyphics.

Among the Greeks and Romans they were much used in exciting or conquering the power of love. They consisted of a variety of gems, metals, and plants, small figures of deities, heroes, or animals, the bulla, and not unfrequently of words, characters, or letters, arranged in a certain order. They were appended to the neck or body, and were commonly attached to children to defend them from the evil eye. Among the Christians of the early ages, amulets were made of wood represented to have formed part of the true cross. This continued to the end of the fourth century, at which time more of such pretended relics had been produced, than would have loaded a first-class ship of war. In more modern times, scraps of paper or parchment inscribed with verses from the Bible, or with magical characters, abracadabra, and other meanless jargon, have been used for the same purpose. The celebrated talismanic medals of the Arabians are of this class, and derive their name (*Ain*) from the first letter of the inscription always beginning with that character. "They have been sanctioned by religion and astrology, and even in (comparatively) modern times by medical and other sciences. The pope and catholic clergy make and sell amulets and charms even to this day." (Ashe.) Amongst some nations they are still in common use. We scarcely need remark, that the protective and curative powers of amulets, depend entirely on the imagination of the wearer. They have therefore been wisely discarded by all, except the most ignorant, credulous and superstitious. Camphor is frequently worn as a protective against fevers and other contagious diseases.

AMYGDALIC ACID. Syn. *Amygdalinic Acid.* An acid compound obtained from the bitter almond.

Prep. Dissolve *amygdaline* in *baryta water*, and boil the solution in a glass vessel as long as fumes of ammonia are evolved; next add *dilute sulphuric acid* until it ceases to occasion a precipitate; filter, and evaporate the clear liquid to dryness in a water bath.

Prop., &c. A colourless, transparent, amorphous mass; insoluble in either alcohol or ether; soluble in water; and deliquescent in damp air. With the bases it forms soluble salts, (*amygdalates; amygdalinates.*)

AMYGDALINE. Syn. *Amygdalina.* A compound discovered by Roubiquet and Boutron-Charlard in the bitter almond.

Prep. Take *bitter almonds* from which the oil has been thoroughly expressed, reduce them to powder, and boil it repeatedly in *alcohol of* 93% or 94%; mix the several tinctures, and distil off the alcohol; mix the syrupy residuum with water, add a little *yeast*, and ferment for a short time in order to get rid of some of the sugar; after the fermentation has ceased, evaporate in a water bath to the consistence of a syrup, cool, and add *cold alcohol of* 94%; collect the precipitate, drain well, and purify by repeated re-solutions and crystallizations from *hot alcohol.* The *product* is about 3%.

Prop., &c. Soluble in water, less so in hot alcohol, and nearly insoluble in cold alcohol and ether; added, in solution, to milk of almonds, it reacts on the emulsin, and causes the formation of hydrocyanic acid and essential oil of almonds; heat decomposes it with the evolution of the odour of hawthorn; heated with alkaline solutions, it evolves ammonia, and is transformed into *amygdalic acid.*

AMYLAMINE. Syn. *Amyl-ammonia.* A colourless liquid, having a penetrating aromatic odour, and alkaline reaction, boiling at 199·5° Fahr., and forming crystalline salts with the acids, having a fatty lustre. It constitutes one of the bases of the *amyl-series.*

AMYLE. The hydrocarbon which is the radical or base of the fusel-oil compounds, (*Amyl-series.*) It is a colourless, ethereal liquid, boiling at 311° Fahr., formed along with *zinc-amyl*, when a mixture of *iodide of amyl* and *pure zinc*, is exposed in a sealed glass tube to a temperature of 374° Fahr.

AMYLE (Acetate of). Syn. *Acetate of Oxide of Amyle. Prep. Fusel-oil*, 1 part; *acetate of potassa*, (dry), 2 parts; mix; add *concentrated sulphuric acid*, 1 part, and distil; purify the distillate by washing it with *dilute solution of potassa* and redistilling it from *dried chloride of calcium.*

Prop., &c. Liquid; insoluble in water; soluble in alcohol; boils at 272° Fahr. The odour and flavour of this preparation remarkably resemble those of the Jargonelle-pear. Diluted with alcohol, it is now extensively manufactured and sold under the name of *Essence of Jargonelle-pear*, for flavouring liqueurs and confectionary.

AMYLE (Bromide of). A colourless, volatile, heavy liquid, prepared by distilling a mixture of *phosphorus*, 1 part; *bromine*, 8 parts; and *fusel-oil*, 30 to 32 parts.

AMYLE (Carbonate of). Syn. *Carbonate of Oxide of Amyle. Prep.* (Medlock.) Saturate *fusel-oil* with *phosgene gas*, and treat the resulting compound with water.

AMYLE (Chloride of). *Prep.* 1. From *fusel-oil* and *pentachloride of phosphorus*, equal parts, distilled together; washing the distillate with very weak *solution of potassa*, and rectifying from *dried chloride of calcium*.

2. By saturating *fusel-oil* with *dry hydrochloric acid gas*.

Prop. Liquid, colourless, aromatic, odorous; insoluble in water, and boiling at 215° Fahr.

AMYLE (Hydrate of). Syn. *Fusel-oil* (pure), *Hydrate of Oxide of Amyle, Amyl-Alcohol. Prep.* By washing *crude fusel-oil* with water, and distilling it in a retort furnished with a thermometer, and only collecting that portion which distils over from the liquid between 260° and 280° Fahr.; and rectifying the distillate until it has a fixed boiling point at 268·5° Fahr.

Prop., &c. A thin, oily, hot-tasted fluid, with a strong and suffocating odour; sp. gr. 0·818; platinum black assisted with a gentle heat, converts it into *valerianic acid*.

AMYLE (Iodide of). *Prep.* By distilling a mixture of *phosphorus*, 1 part; *iodine*, 8 parts; and *fusel-oil*, 15 parts.

Prop., &c. A colourless liquid heavier than water, boiling at 295° Fahr., and decomposed by a strong light.

AMYLE (Oxalate of). Syn. *Essence of Bugs*. Prepared by heating *fusel-oil* with *oxalic acid* in excess, and distilling the oily liquid which separates at 500° Fahr.

AMYL-ETHER. From *amyl-alcohol* and *concentrated sulphuric acid*, distilled together, and afterwards rectified several times, until the boiling point reaches 349° Fahr., and the sp. gr. falls to 0·779.

AMYLENE. Syn. *Amilene*. A compound obtained by repeatedly distilling *fusel-oil* along with *anhydrous phosphoric acid*. It is an ethereal liquid, lighter than water, having an aromatic odour, and boiling at 102° Fahr.

AMYLIC ACID. A volatile acid obtained by M. Tünnermann, by distilling a mixture of *starch, black oxide of manganese, hydrochloric acid*, and *water*. Its compounds with the acids were formerly termed *amylates*. It is identical with formic acid.

AMYLINE. Syn. *Amilin*. The insoluble portion of starch which constitutes the outer covering of the granules.

ANACARDIC ACID. An acrid, fatty substance, found in the fruit of the *anacardium occidentale* or cashew nut.

ANÆMIA. Exsanguinity; deficiency of blood. This may be *accidental*, arising from hæmorrhage; or *habitual*, arising from an insufficient formation of blood, and consequent imperfect nutrition. The most striking features of the latter variety are, a general paleness, ghastliness, or bloodlessness of the surface of the body, particularly of the face and lips; extreme emaciation, languor, &c. The pulse is generally quick and feeble, and the appetite irregular, and colicky symptoms are not unfrequent. This affection deserves the most serious attention, and medical aid should be early sought. In the absence of such assistance, gentle stimulants and tonics may be had recourse to, together with a light and nutritious diet. Small doses (frequently repeated) of the *phosphate, lactate*, or *citrate of the protoxide of iron*, with a glass or two of *generous wine* or *malt liquor*, may be taken daily, and a preference should be given to the "red meats," as *beef, mutton*, or *venison*. The bowels may be kept regular by the occasional use of some mild laxative, and extreme irritability or griping allayed by small doses of *morphia* or *opium*. Should the pulse indicate the disuse of iron, *bark* may be substituted for it, for a time; or the doses alternated with others of bark. Fresh air and gentle out-door exercise should also be sought as much as possible.

ANALYSIS. The consideration of this important branch of chemical science, on which indeed all the others depend, is not the object of the present work; nor would its limits permit such a course. We must therefore refer the reader to some treatise exclusively on the subject for a development of the mysteries and wonders of analytical chemistry. To each article or class of articles of importance noticed in this work, are appended simple means of determining their *purity*. Carefully applied, this information will be found all that the majority of our readers will require.

ANASARCA. Dropsy of the cellular membrane immediately under the skin. It generally occurs among persons of the lymphatic temperament, inhabiting low, dark, damp, ill-ventilated apartments, and who suffer from insufficient nourishment, irregular habits, or debility induced by other diseases. It generally attacks the feet and legs first, and gradually extends upwards: sometimes affecting the face. The swelling is most evident in the evening. One of its chief characteristics, is, that the skin is easily depressed, and retains the mark of the finger for some time. There is also generally great thirst, and the urine, which is scanty in quantity, deposits a deep red sediment on standing. See *Dropsy*.

ANATOMICAL FIGURES. Models in wax or other materials to illustrate the healthy or diseased structure of the body. Mademoiselle de Beheron, the daughter of an eminent Parisian surgeon, was the first successful artist in this way. Her figures were made of wax with a "foundation" or support of rags, and were modelled upon corpses, and upon the living objects, in certain cases. The perfection to which this comparatively new art has been carried, was shown in the admirable models contributed to the "Great Exhibition of 1851."

ANATOMICAL PREPARATIONS. Objects of interest in both surgical and pathological anatomy, and specimens in natural history, are prepared by subjecting them to certain antiseptic processes by which their disposition to change is counteracted, and the integrity of their structure preserved. They are also frequently injected with coloured fluids which subsequently harden, in order to display more fully the minute vessels, or the microscopic anatomy of the several parts. See *Injection, &c.*

ANCHOVY. Anchovies are *prepared for sale* by salting and pickling, and afterwards packing them in the small kegs in which they are imported into this country. The small fish are valued more than the larger ones. The anchovy has a fine and peculiar flavour, and is eaten as a delicacy all over Europe. It is said to be aperitive, stimulant, and stomachic. The common sprat is often pickled and sold for the anchovy, but the latter may be known by the greater thickness of its head, the dusky brown colour of its back, and the reddish colour of its flesh.

ANCHOVIES (British). See *Sprats.*

ANCHUSIC ACID. The colouring matter of alkanet root, (*anchusa tinctoria.*) It is now generally termed *anchusine*, as it is destitute of acid properties.

ANEMONINE. Syn. *Anemonina*, *Anemonia.* An acrid crystallizable substance, extracted by *hot alcohol* from the *anemone pulsatilla*, *nemorosa*, and *pratensis.* It is combustible and burns like camphor. By the action of *baryta water* on this substance, Löwig obtained a substance which has been called *anemonic acid.*

ANGELICA (Candied). *Prep.* 1. *From the root.* (*Radix Angelicæ Condita.*) Boil the *fresh roots* (after slicing them and removing the pith,) in *water*, to deprive them of part of their bitterness and aroma; then drain them and put them into *syrup boiled to a full candy height*, and boiling hot; let them remain until nearly cold, when they may be taken out and carefully dried.

2. *From the stems.* (*Caules Angelicæ Conditi; Rami Angelicæ Conditi.*) From the tender stems, stalks, and midribs of the leaves, as last. Used as a sweetmeat and dessert. It is said to be cordial, stomachic, tonic, and aphrodisiac.

ANGELICIC ACID. A volatile substance noticed by L. A. Buchner, jun., in angelica root.

ANGELICINE. A substance obtained from the root of angelica. It is probably oxidized extractive.

ANGINA PECTORIS. An organic disease of the heart or great vessels, giving rise to a distressing feeling of difficulty of respiration and oppression at the chest. The pain is usually felt at the lower part of the chest, inclining to the left side, and, in acute cases, extending to the left arm. The suffering often amounts to agony, and is accompanied with palpitation, extreme anxiety, and a sense of impending suffocation and dissolution. The duration of these distressing symptoms varies from a few minutes to several hours. In the *chronic* form of the disease the symptoms are less violent, but more frequent and permanent. The fits are commonly induced by rough exercise, excessive mental emotion, and other like exciting causes. From the peculiar nature of this disease and the difficulty of its diagnosis, it is one that none but an experienced medical practitioner has any chance of treating successfully. Friction, stimulants, and counter-irritants, may be applied to the chest, and to the lower extremities; and a life of great tranquillity, with a carefully regulated light and nutritious, but unexciting diet, uniformity of habits, and placid occupation of the mind, great cleanliness, the use of flannel next the skin, and above all, pure air should be sought as much as possible. These will assist the efforts of the physician, and beyond them the patient cannot safely move. Recently, hydrocyanic acid (in small doses, cautiously administered,) has been stated to be almost specific in this distressing affection. There is no popular name for this peculiar disease.

ANGOSTURIN. Syn. *Angusturia*, *Cusparin.* A peculiar neutral principle obtained from angostura or cusparia bark.

Prep. Digest *coarsely powdered angostura bark* in *cold alcohol*, until a concentrated tincture is obtained; then filter, and allow crystals to form by spontaneous evaporation.

Prop., &c. Crystals, soluble in alcohol and alkaline lyes; slightly soluble in water; non-volatile.

ANILIC ACID. Syn. *Indigoic Acid*, *Indigotic Acid.* The name given by Dumas to the indigotic acid of Chevreul.

Prep. Add gradually, *indigo*, in powder, to a boiling mixture of *nitric acid*, 1 part, and *water*, 12 or 15 parts, (10 parts, —*Fownes;*) until effervescence ceases; a little *water* being dropped in from time to time to prevent the formation of carbazotic acid; decant the liquid whilst hot; cool; re-dissolve the deposited crystals in *boiling water*, and add *acetate of lead* as long as a brown precipitate falls; the filtered liquor, on cooling, deposits crystals of *anilate of lead*, which, by re-solution in *boiling water*, and decomposition with *dilute sulphuric acid*, furnish a liquid which deposits nearly pure *anilic acid*, as it cools.

Prop., *&c.* Colourless, fusible, yellowish-white needles; scarcely soluble in cold water, freely soluble in boiling water and in alcohol; volatile; and with care may be sublimed unchanged; with the bases it forms soluble and crystallizable salts, called *anilates* or *indigotates.*

ANILINE. Syn. *Indigogene.* An organic base, existing among the products of the distillation of coal, and of some other substances. It is obtained artificially chiefly from indigo or its derivatives.

Prep. 1. (Zinin.) An *alcoholic solution of nitrobenzol*, is treated with *ammonia* and *sulphuretted hydrogen*, until after some hours a precipitation of sulphur takes place; when the brown liquid is repeatedly saturated with fresh *sulphuretted hydrogen*, until no more sulphur separates, the reaction being aided by the occasional application of heat; an *excess of acid* is then added, the liquid filtered, boiled to expel the alcohol and unaltered nitrobenzol, and next submitted to distillation with *caustic potassa* in excess; the *aniline* found in the receiver may be rendered quite pure by forming it into an *oxalate*, repeated crystallizations from *alcohol*, and distillation with excess of *caustic potassa*, as before.

2. *Powdered indigo* is boiled in a *highly concentrated solution of caustic potassa*, as long as hydrogen gas is evolved; the brownish-red liquid containing *chrysanilic* and *anthranilic acid*, distilled in a retort, yields aniline, which condenses in oily drops about the neck of the retort and in the receiver; by separating it from the ammoniacal liquor with which it is accompanied, and re-distilling it, it is obtained nearly colourless. It may be further purified as above.

3. By fusing *isatine* with *solid hydrate of potassa.*

4. By treating an *alcoholic solution of benzine* with a little *zinc* and *hydrochloric acid.*

5. (Ure.) By distilling *coal tar* in a large iron retort, and separately collecting the products, especially the latter and denser ones; which are then to be strongly agitated along with *hydrochloric acid* (in excess,) in a glass globe, and the acid solution treated with *milk of lime* (in excess,) and distilled.

Prop., *&c.* A thin, oily, colourless liquid; smelling faintly vinous; soluble in alcohol and ether; scarcely soluble in water; neutral to test paper; with the acids it forms crystallizable compounds of great beauty; boils at 359° to 360° Fahr.; *sp. gr.*, 1·028.

ANILOTIC ACID. A product obtained along with *helicin and helicoidin*, by acting with *dilute nitric acid* on *salicin.* With stronger acid and a higher temperature, *anilic acid* is formed.

ANIMAL SUBSTANCES. The bodies of animals are composed of certain proximate principles or compounds which are derived, either directly or indirectly, from the vegetable kingdom, and whose ultimate constituents or elements are all found in the inorganic world. Of these substances the following are the principal:—

Nitrogenised.		*Non-nitrogenised.*
Albumen	Fat	Butyric acid
Caseine		Oleic acid
Chondrine		Margaric acid
Fibrine		Stearic acid
Gelatine		Glycerine
Globulin		&c.
Hæmatosin		Lactic acid
Kreatine		Pepsin
Proteine		Sugar of milk
Taurine		&c.
Urea		
&c.		

From the various combinations and modifications of these principles, result all the different solids and fluids that enter into the composition of the animal body. Woven together by the vital power, they form the numerous textures or tissues of which our frames are composed, and instinct with life, become endowed with the faculty of performing all the numerous functions inseparable from its maintenance.

Animal substances are recognised as organic principles by becoming carbonized by heat; and those that contain nitrogen, by rapidly passing into a state of putrefaction when exposed to the air and moisture, and by yielding ammonia when heated with caustic potassa or quicklime, or when submitted to destructive distillation.

The proportion which the fluids bear to the solids forming the animal body, is as about 9 to 1. A body weighing 120℔, was found, after some days of careful desiccation, to weigh only 12℔. (Chaussier.) See *Food, Putrefaction, &c.*

ANIMATION (Suspended). Syn. *Asphyxy; Asphyxia.* No general rules can be given suitable to every case. Whenever it is possible to procure medical aid, it should, therefore, be immediately sought, as the delay of a single minute may put the patient beyond the reach of assistance. The principal object is to effect a restoration of the respiratory and circulatory functions, the former of which has been arrested by the external condition of the patient; the latter, by the contact of morbidly carbonized blood with the capillary vessels of the lungs. The first thing to be attempted, is the restoration of warmth by active friction with the warm hands, flannels, &c.; the second, the re-establishment of natural respiration by any means at hand; of which, perhaps, none is simpler or better than alternate pressure and its relaxation, applied to the thorax and abdomen, so as to induce expiration first, and inspiration immediately afterwards, by the natural action and elasticity of the ribs and diaphragm. A third effort may be made by suddenly dashing cold water on the face and general surface, previously warmed by the frictions, in the hope of inducing a more decided inspiration. If these measures fail, artificial respiration should be promptly had recourse to. The warm bath, and slight electrical shocks or continued streaming electricity, may also be applied. See *Drowning, Hanging, &c.*

ANISETTE. A cordial liqueur flavoured with *anise, fennel,* and *coriander seed,* and sweetened with *sugar.* See *Cordials.*

ANISIC ACID. Formed by acting on the solid crystalline volatile oil (*stearoptène*) of aniseed with nitric acid.

ANISOINE. A white, solid, neutral substance, obtained by acting on the stearoptène of oil of aniseed with sulphuric acid.

ANISOLE. A species of oxygenated oil, formed by treating *anisic acid* with *lime* or *baryta,* in excess.

ANISYLE. The assumed radical of the compounds obtained from the essential oil of aniseed.

ANNEALING. The process by which *glass* and *porcelain* are rendered less frangible, and metals which have become brittle, again rendered tough and malleable. *Glass vessels,* and other *articles of glass,* are annealed by being placed in an oven or apartment near the furnaces at which they are formed, called the "*leer,*" where they are allowed to cool slowly, the process being prolonged according to their bulk. *Steel, iron, and other metals* are annealed by heating them and allowing them to cool slowly on the hearth of the furnace, or in any other suitable place, unexposed to the cold.

ANNOTTA. Syn. *Anotto, Annatto, Annatta, Arnatta, &c.* A colouring matter forming the pellicle of the seeds of the *bixa orellana* (Linn.), an exogenous tree, common in Cayenne, and some other parts of tropical America. Annotta is frequently adulterated. When pure it contains about 28% of resinous colouring matter, and 20% of colouring extractive matter. (Dr. John.) The presence of *red lead* may be detected by heating it on a piece of charcoal in the reducing flame of the blow-pipe, by which means a bead of metallic lead will be obtained. If it contains *ochre,* a given weight may be incinerated, and the ash washed and dried; the undissolved residuum is the amount of the adulteration, (nearly). Good annotta is of a flame colour; brighter in the middle than on the outside; feels soft and smooth to the touch; has a good consistence, and a strong smell.

Uses, &c. It is used to colour varnishes and lacquers; as a pigment for painting velvet and transparencies; as a colouring matter for cheese, (1 *oz.* to 1 *cwt.* of curd;) for which purpose it is not injurious, if pure; and as a dye stuff for cotton, silk, and wool, especially the last two, to which it imparts a beautiful orange yellow hue, the shade of which may be modified by using different proportions of pearlash with the water it is dissolved in, and by giving the stuff different mordants before putting it into the dye bath. The hues thus imparted are all more or less fugitive. See *Cheese, &c.*

ANNOTTA (English). Syn. *Trade Annotta, Reduced Annotta. Prep.* From *egg* or *flag annotta,* 24 *lb.; gum tragacanth,* 10 *lb.; starch* 6 *lb.; soap,* 2½ *lb.; train oil,* 2 *lb.: red bole or Venetian red,* 1 *lb.; water, q. s.;* mixed by heat in a copper pan, and formed into rolls. *Used* for common purposes. Distinguished from genuine annotta by its very partial solubility in *alcohol.*

ANNOTTA (Purified). Syn. *Orelline, Orellina; Essence of Annotta. Prep.* Boil *annotta* in a *solution of pearlash,* until it will dissolve no more; then precipitate with *oil of vitriol,* previously diluted with twenty times its weight of water, carefully avoiding excess; wash the precipitate with cold water; drain and dry it. The product possesses all the properties of the best annotta in a concentrated form.

ANNOTTA (Solution of). *Prep.* A solution of equal parts of *annotta* and *pearlash,* in *water.* Sold in bottles.

ANNOTTA DYE. *Prep.* The *annotta,* cut into small pieces, is boiled in a copper with an equal weight of *good pearlashes,* and a *little water,* and when dissolved, the solution is diluted with water to the required strength. *Use, &c.* The articles, previously rinsed in clean water, are steeped or boiled in this dye-liquor; then drained out and rinsed in clean water. By adding more pearlash to the bath a brighter yellow is produced; and the hue is reddened with vinegar, alum, or lemon juice, or a short steep in a weak Brazil wood or carthamus bath.

ANODYNES. Medicines which allay pain. Some, (as the *paregorica,*) act by actually assuaging pain; others, (*hypnotica,*) by inducing sleep; whilst a third class, (*narcotica,*) give ease by stupifying the senses, or lessening the susceptibility to pain. Among the principal anodynes are *opium, morphia, camphor, ether, chloroform,* and other medicines of the like kind.

ANODYNE (Infantile). *Prep.* Take of *syrup of red poppies,* 1 oz.; *aniseed water,* 3 oz.; *brandy,* ¾ oz., or *rectified spirit,* ½ oz.; *calcined magnesia,* 2 dr.; mix. An excellent anodyne and antacid for infants. *Dose.* A small teaspoonful as required.

ANO ZABAGLIONE. *Prep.* Put 2 *eggs,* 3 teaspoonfuls of *sugar,* and 2 small glasses of *marsala,* into a chocolate cup, placed in boiling water, or over the fire, and keep the mixture rapidly stirred, until it begins to rise and harden a little; then serve it up in glasses. A pleasant Italian receipt for a cold; very nutritious.

ANTACIDS. Medicines which remove acidity of the stomach, and thus tend to relieve heartburn, dyspepsia, and diarrhœa. The principal antacids are the *carbonates of potassa, soda, ammonia, lime,* and *magnesia. Ammonia* is the most powerful, and when the acidity is conjoined with nausea and faintness, or is accompanied with symptoms of nervous derangement or hysteria, is undoubtedly the best; when great irritability of the coats of the stomach exist, *potash* is to be preferred; when the acidity is accompanied with diarrhœa, *carbonate of lime* (prepared chalk); and when with *costiveness, magnesia.* The *dose* of the *carbonates* of *potassa* and *soda,* in powder, is *half a teaspoonful;* of chalk, *a teaspoonful;* of *magnesia a dessert-spoonful;* and of *carbonate of ammonia,* 10 grs., or a teaspoonful of the solution. All these are taken in water, and may be advantageously combined with some simple aromatic, as *ginger, cinnamon,* or *peppermint.*

ANTHELMINTICS. Syn. *Vermifuges.* Medicines which cause the destruction or expulsion of intestinal worms. Among the principal anthelmintics are *aloes, cabbage-tree bark, calomel, castor oil, common salt, cowhage, gamboge, Indian pink, kousso, male fern, oil of turpentine, scammony, sesquioxide of iron, tansy, tin* (in powder,) and *worm seed.* All *tonics* and *stomachics* may be also regarded as anthelmintics. See *Worms.*

ANTHRACINE. Paranaphthaline.

ANTHRACITE. Syn. *Anthracolite, Stone Coal, Mineral Charcoal.* Anthracite burns without either flame or smoke, emits an intense heat, and leaves scarcely any ash; but it is difficult to kindle, and requires a lively draught for its combustion. It is used as a common fuel in the United States of America although scarcely employed in Europe. Its adoption in this country would at once remove the smoke nuisance, and also produce a vast annual saving to the community. By contracting the throat of the chimney a little, and avoiding the use of the poker, it may be burnt in a common grate. The Americans use a little charcoal as "kindle," and seldom supply fresh coal to the fire oftener than twice a day.

ANTHRACOKALI. *Prep.* 1. (Dr. Polya.) *Mineral coal* (in fine powder), 160 parts; *liquor of potassa,* 192 parts; mix in an iron capsule, boil, with constant stirring, to dryness, and continue the stirring at a reduced heat, until the whole is converted into a homogeneous black powder, which must be at once placed in well-stoppered bottles.

2. (Ph. Hamb. 1845; Ph. Baden. 1841.) *Hydrate of potassa,* 7 dr.; melt, and add, *kennel coal,* 5 dr.; as last.

Prop., &c. A deliquescent black powder, with a caustic taste, and empyreumatic smell. *Dose.* 2 to 3 grs., two or three times daily; and *externally,* made into a pommade; in skin diseases, scrofula, chronic rheumatism, &c.

ANTHRACOKALI (Sulphuretted). *Prep.* (Polya.) As above, but adding *sulphur,* 4 dr., along with the powdered coal. *Use, &c.,* as the last.

ANTHRANILIC ACID. An acid obtained by Fritzsche from indigo.

Prep. Dissolve *indigo* (in powder) in a hot solution of *pure potassa* (sp. gr. 1·35), and add powdered *peroxide of manganese,* until the liquid on dilution and exposure to the air ceases to form indigo blue; then neutralize the alkali with *dilute sulphuric acid,* dissolve out the newly formed *anthranilate of potassa* with *alcohol,* and decompose it with *acetic acid,* when orange-coloured crystals of impure *anthranilic acid* may be obtained; purify by uniting it with *lime,* crystallization, and decomposing the salt with acetic acid, when large colourless tabular crystals will be deposited as the solution cools.

Prop., &c. Fusible; volatile; yielding crystals resembling those of benzoic acid; sparingly soluble in water; soluble in alcohol, and ether; with the bases it forms salts, called *anthranilates.*

ANTHRANITIC ACID. An acid obtained by fusing *powdered indigo* with *hydrate of potassa,* at about 570° Fahr. It is identical with salicylic acid.

ANTIARINE. Syn. *Anthiarine; Antiaria, Upasia.* The active principle of the upas poison of Java. It is extracted from the partially *inspissated juice* of the upas tree by *alcohol,* and may be obtained under the form of small pearly crystalline scales, by careful evaporation. It is soluble in 27 parts of boiling water; freely soluble in alcohol; scarcely so in ether; heat decomposes it. It is a frightful poison, to which no antidote is known.

ANTI-ATTRITION. Syn. *Axle Grease, Friction Compo'. Prep.* 1. *Black lead,* 1 part; *tallow* or *grease,* 4 parts; mix and grind perfectly smooth. Expired patent. Some add to every cwt., *camphor,* 7 *lb.*; but the addition is useless.

2. To the above add a little *bees-wax,* to harden it. For the axles of railway carriages.

3. (Booth's.)—*a. Scotch soda,* ½ *lb.; boiling water,* 1 *gall.; palm oil* or *tallow,* 10 *lb.*; agitate well together until the mixture is cooled down to 60° or 70° Fahr.—*b. Soda,* ½ *lb.*; *water,* and *rape oil,* of each, 1 *gall.*; *tallow* or *palm oil,* ½ *lb.*; as last. Expired patent.

4. (Mankettrick's.) *Caoutchouc* (dissolved in oil of turpentine), 4 *lb.: Scotch soda,* 10 *lb.; glue,* 1 *lb.;* (dissolved in) *water,* 10 *galls.; oil,* 10 *galls.;* thoroughly incorporate by assiduous stirring, adding the caoutchouc last.

5. *Finest rape oil,* 1 *gall.: caoutchouc,* (cut small,) 3 *oz.*; dissolve with heat.

Use. To lessen friction in machinery, and to prevent the "bearings" rusting. The simplest are perhaps the best. The last is called by the French, *Liard.*

ANTIBILIOUS. Applied to medicines that are supposed to remove ailments depending on disordered action of the liver. *Aperients* and *mercurials* belong to this class. See *Abernethy Medicines, &c.*

ANTIDOTE. Medicines used to prevent or remove the effects of poison or disease. The principal poisons and their antidotes will be found noticed under their respective heads.

ANTIFERMENT. A substance extensively sold in the cider districts, for the purpose of arresting fermentation in that liquor.

Prep. 1. *Sulphite* (not sulphATE) *of lime,* in fine powder, and as newly prepared as possible.

2. *Sulphite of lime,* 2 parts; *black mustard seed* (ground in a pepper mill), 3 parts; mix.

3. *Mustard seed* (new), 13 *lb.; cloves,* 1 *lb.;* mix, and either grind or bruise them together.

4. To the last, add *ground capsicum,* 10 *oz.*

Use, &c. The products of the above formulæ are infinitely superior to those commonly met with in trade; and are quite harmless, as respects the quality and wholesome character of the liquor. A portion of any one of them added to cider, or perry, tends to allay the fermentation, when it is excessive, or has been renewed. The third and fourth may be advantageously used for wine and beer as well as cider.

ANTIGUGGLER. A piece of bent tube of glass or metal inserted into casks and carboys, to admit air over the liquor, in order that it may be poured out or drawn off, without disturbing the sediment.

ANTIMONIALS. Syn. *Antimonialia,*—Lat. Medicines in which antimony or one of its compounds is the leading or characteristic ingredient. Of these the *teroxide, oxysulphuret,* and *potassio-tartrate of antimony, and antimonial powder,* are the principal. They are regarded as liquefacient, alterative, resolvent, sedative, emetic, sudorific, and expectorant. In *small doses,* they act as *nauseants* and *diaphoretics;* in *medium doses,* as *emetics* and *purgatives;* and in *large doses,* as *emetics, purgatives,* and *sedatives.*

ANTIMONIC ACID. Syn. *Peroxide of Antimony; Acidum Antimonicum, Acidum Stibicum,*—Lat. *Magistery of Diaphoretic Antimony,—Obs.* Antimony in its highest stage of oxidation.

Prep. 1. Add *dilute sulphuric acid* to the *water used to wash diaphoretic antimony,* as long as a precipitate falls; collect the powder on a calico filter, wash it with *distilled water,* and dry it by a gentle heat.

2. Digest *metallic antimony* (in small fragments,) in *concentrated nitric* or *nitro-hydro-chloric acid;* evaporate by a gentle heat until the excess of acid is expelled; then throw the solution into cold water, and proceed as before.

3. By decomposing the *pentachloride of antimony* with excess of water, and proceeding as last.

4. *Metallic antimony* (in powder), 1 part; *powdered nitre,* 6 or 8 parts; ignite or deflagrate in a silver crucible, and when cold, powder, wash out the excess of alkali with hot water, decompose the remaining *antimoniate of potassa* with *hydrochloric acid,* and wash and dry the precipitated *antimonic acid.*

Prop. The hydrated acid (freshly precipitated) is a white powder, which reddens litmus; and is insoluble in water, unless it is soured with tartaric or muriatic acid. By exposure to a heat short of redness, it loses its water, assumes a pale straw colour, and becomes anhydrous and insoluble in water, even when acidulated. At a full red heat it parts with a portion of its oxygen and becomes antimonious acid. It combines with some of the bases forming *Antimoniates.*

Uses, &c. In *medicine,* as a diaphoretic; *Dose.* 2 to 10 grs. It appears almost inert, and is seldom used.

ANTIMONIOUS ACID. Syn. *Binoxide of Antimony, Deutoxide of do.; Acidum Antimoniosum,*—Lat. A compound of antimony and oxygen intermediate between the basic oxide and antimonic acid, by some called *peroxide of antimony.*

Prep. 1. By exposing either *metallic antimony,* or its *oxide* or *sulphuret,* for some time to a strong heat in an open vessel.

2. From *antimonic acid,* heated as last.

3. From the *antimonite of an alkali by* adding an *acid.*

Prop., &c. A greyish white, infusible powder, destitute of volatility, and insoluble in either water or acids, unless recently precipitated. Its salts, of which little definite are known, are termed *antimonites.*

Uses. It forms the basis of *James's fever powder* and the *pulvis antimonialis* of the pharmacopœias. Like antimonic acid it is very inactive and uncertain in its operation.

ANTIMONY. Syn. *Antimonium, Stibium,* —Lat. *Regulus of Antimony,*—Obs. The term *antimony* was formerly applied to the native sulphuret or the greyish black semi-crystalline ore of antimony; but it is now solely appropriated to express the pure metal.

Prep. Metallic antimony is freed from impurities by fusion, and the sulphuret is commonly reduced to the metallic state by exposure on the concave hearth of a reverberatory furnace, and subsequent fusion in crucibles with coal dust. To free it from iron, a little antimonic oxide is generally added; and when the ore contains arsenic, some iron or its oxide, and carbonate or sulphate of soda are used in the same way. It is seldom prepared on the small scale. The following formulæ have been recommended:

1. (Ph. Castr. Ruthena, 1840.) *Sulphuret of antimony,* 16 parts; *cream of tartar,* 6 parts; both in powder; put the mixture, in small quantities at a time, into a vessel heated to redness; when the reaction is over, fuse the mass, and after a quarter of an hour, pour it out, and separate the metal from the slag. Nearly pure.

2. *Sulphuret of antimony,* 8 parts; *cream of tartar,* 6 parts; *nitre,* 3 parts; as last.

3. *Sulphuret of antimony,* 2 parts; *iron filings,* 1 part; calcine at a strong heat in a covered crucible.

4. (Wöhler.) *Sulphuret of antimony,* 10 parts; *nitre,* 12 parts; *dry carbonate of soda,* 15 parts; deflagrate together, powder, wash with *water,* and smelt the remainder with *black flux.* Nearly pure.

5. *Protoxide of antimony* and *bitartrate of potassa,* equal parts; mix, fuse as before, and pour the metal into small conical moulds. Pure.

6. (Commercial.)—*a. Sulphuret of antimony,* 100 parts; *metallic iron,* 40 parts; *dry crude sulphate of soda,* 10 parts; fuse together. *Prod.* 60 to 65 parts of antimony, besides the scoriæ or ash, which is also valuable.

b. (Berthier.) *Sulphuret of antimony,* 100 parts; *hammerschlag* (rough oxide of iron from the rolling mills), 60 parts; *crude carbonate of soda,* 45 to 50 parts; *charcoal powder,* 10 parts; as last. *Prod.* 67 parts.

Prop. Colour, bluish white; lustrous; semi-crystalline; extremely brittle (may be powdered); and imparts brittleness to its alloys; volatile; inflammable at high temperatures, melts just under redness (810° Fahr.); fumes, boils, and volatilizes at a white heat, and when suddenly exposed to the air, inflames and is converted into the *teroxide,* which is deposited in beautiful flowers or crystals; hot hydrochloric acid dissolves it, forming *terchloride of antimony;* nitric acid converts it into *antimonic acid.* Sp. gr., 6·7 or 6·8.

Tests. Metallic antimony may be recognised by the above properties; its *oxide,* *salts*, &c., by the following reactions:—1. Sulphuretted hydrogen gives, with acid solutions, an orange-red precipitate, sparingly soluble in ammonia, but readily soluble in pure potassa and alkaline sulphurets, and in hot hydrochloric acid with the evolution of sulphuretted hydrogen gas. — 2. Hydrosulphuret of ammonia gives an orange-red precipitate, readily soluble in excess of the precipitant, if the latter contains sulphur in excess; and the liquor containing the redissolved precipitate gives a yellow or orange-yellow precipitate on the addition of an acid.—3. Ammonia and potassa, and their carbonates, give (excepting in solutions of tartar emetic) a bulky white precipitate; that with *ammonia* being insoluble in excess of the precipitant; that with *potassa* readily so; whilst those with the *carbonates of ammonia* and of *potassa* are only soluble on the application of heat. *The quantity of pure antimony in commercial samples* may be determined by treating them (in powder) with nitric acid, which oxidizes the antimony and leaves it in an insoluble state, whilst it dissolves the other metals. The oxide is collected on a filter, washed, dried, ignited, and weighed, when its weight multiplied by ·843, gives the required quantity of pure metal.

Pur. The antimony of commerce generally contains a small quantity of arsenic, together with variable quantities of iron, lead, sulphur, and tin. These impurities may be detected in the way noticed under the respective metals and sulphur.

Uses. In the *arts*, antimony enters into the composition of several valuable alloys. Combined with *lead* it forms *type metal;* with *lead* and *tin*, *pewter*, *Britannia metal*, *music plate metal, &c.* It is added to the alloy for *concave mirrors* to give them a finer texture; to *bell metal*, to render it more sonorous; and to various other metals to increase their hardness and fusibility. Metallic antimony is now seldom used in medicine; but some of its preparations are much esteemed as useful and efficacious remedies. See *Antimonials*, and the following articles:

ANTIMONY ASH. Syn. *Calcined Antimony; Antimonium Calcinatum, Cinis Antimonii,*—Lat. Prepared by roasting the *common black sulphuret of antimony* on an iron plate set under a chimney to carry off the fumes. It has an ash-grey colour, and is emetic in small doses. *Used* as a cheap substitute for oxide of antimony by the manufacturers of tartar emetic.

ANTIMONY (Calx of). Syn. *Calx Antimonii,*—Lat. Sometimes applied to antimony ash, but more commonly to crude, unwashed diaphoretic Antimony.

ANTIMONY (Sulphurated Calx of). Syn. *Antimonii Calx Sulphurata,*—Lat. *Prep.* (Hufeland.) *Burnt oyster shells,* 10 parts; *sulphur*, 4 parts; *crude antimony*, 3 parts; powder, mix, and calcine in a luted crucible for an hour. *Dose.* 1 to 6 grs. in gout, rheumatism, and scrofula.

ANTIMONY (Cerusse of). Syn. *Antimonii Cerussa,*—Lat. *Prep.* (Bate.) As diaphoretic antimony, merely using the metal instead of the sulphuret.

ANTIMONY (Chlorides of). Three compounds of *chlorine* and *antimony* have been noticed by chemists, but only one of them has been applied to any useful purpose in medicine or the arts.

ANTIMONY (Terchloride of). Syn. *Chloride of Antimony, Protochloride of do., Sesquichloride of do., Hydrochlorate of do., Muriate of do., Butter of do.; Antimonii Chloridum, Ant. Sesquichloridum, Ant. Hydrochloras, Ant. Murias, Ant. Butyrum,*—Lat. This is the common chloride or muriate of antimony of the shops. It is regarded as a *terchloride* by those who adopt the atomic weight of antimony as given by Berzelius and his school, and as a *sesquichloride* by those who estimate the equiv. at only half that number. The same remarks also apply to the other compounds of antimony.

Prep. 1. (Liquor Antimonii Terchloridi, —*Ph. D.*) Take *prepared sulphuret of antimony* (Ph. D.), 1 *lb.*; *commercial muriatic acid*, 4 pints; carefully mix at a gentle heat, in a porcelain capsule, (under a flue with a quick draught, to carry off the fumes,) constantly stirring, and gradually increasing the heat as the effervescence slackens; boil for 15 minutes, cool, filter through calico, boil down to a quart, cool, and preserve in well-stoppered bottles. *Sp. gr.*, 1·470.

2. (Liquor Stibii Muriatici; Liq. Stibii Chlorati,—*Ph. Bor.* 1846.) *Black sulphuret of antimony* (in powder), 1 ℔; *commercial hydrochloric acid*, 4 ℔; dissolve as before; evaporate the filtered solution to 1½ ℔, add *hydrochloric acid*, 9 oz., and *distilled water*, 1½ ℔, or q. s. to reduce the sp. gr. to from 1·345 to 1·350.

3. (Liebig.) *Pure metallic antimony*, 2 parts; *bichloride of mercury*, 5 parts; both in fine powder; mix and distil as before. Chemically pure.

4. (Soubeiran.) *Sulphuret of antimony*, 1 part; *hydrochloric acid*, 5 parts; dissolve by a gentle heat, decant, evaporate, and then distil almost to dryness.

5. (Commercial.) Take *ash* or *calx of antimony*, 3¼ *lb.; common salt*, 2 *lb.; oil of vitriol*, 1½ *lb.; water*, 1 *lb.*; proceed as before. *Prod.*, 2½ *lb.*

6. From *roasted sulphuret* or *glass of antimony*, 7 *lb.; salt*, 28 *lb.; oil of vitriol*, 21 *lb.; water*, 14 *lb.;* as before.

7. From *crude sulphuret of antimony* (powdered), 25 *lb.; strongest commercial hydrochloric acid*, 1 *cwt.; nitric acid*, 3½ *lb.;* as before; the product being coloured with a little *pernitrate of iron*, and made up to the sp. gr., 1·4. The quality is improved, and the process more easily conducted if the crude antimony is roasted before dissolving it in the acid.

Prop., &c. When pure and nearly free from water, it somewhat resembles butter, melts with a gentle heat, and partially crystallizes on cooling; it is very deliquescent, and quickly passes into an oil-like liquid when exposed to damp air; very soluble in strong hydrochloric acid; water more or less decomposes it, according to the quantity; when perfectly pure and anhydrous, it forms a white and highly crystalline mass, rapidly decomposed by air and moisture. The sp. gr. of the solution of the shops varies from 1·25 to 1·4, in which state it is a transparent fuming yellow liquid (unless when artificially coloured), and extremely acid and caustic. The *liquid terchloride* submitted to distillation at first parts with its water and excess of acid, after which the salt itself is volatilized. By changing the receiver as soon as the distillate concretes on cooling or produces a copious white precipitate on falling into the liquid already passed over, the pure and anhydrous terchloride may be obtained. It is used as a caustic or escharotic to the wounds caused by rabid and venomous animals, and to repress excessive granulations in ulcers. It is the caustic most commonly used by farriers. It is also used as a source of both oxychloride and oxide of antimony. The residuum in the retort when corrosive sublimate is used, is sulphuret of mercury, and has been termed *cinnabar of antimony.*

ANTIMONY (Pentachloride of). Syn. *Perchloride of Antimony.* Prepared by passing *a stream of chlorine gas* over *metallic antimony* in powder, and gently heated. A mixture of terchloride and pentachloride of antimony is found in the receiver, from which the latter may be separated as a colourless volatile liquid, by careful distillation.

ANTIMONY (Crocus of). Syn. *Saffron of Antimony, Liver of do.; Crocus Antimonii, Crocus Metallorum, Hepar Antimonii*,—Lat. *Prep.* 1. From *sulphuret of antimony* and *saltpetre*, equal parts, deflagrated together by small portions at a time, and the fused mass (separated from the scoriæ) reduced to fine powder.

2. (*Antimonii Crocus*,—Ph. L. 1788.) *Sulphuret of antimony*, 1℔; *nitre*, 1℔; common salt, 1 oz.; as before.

Prop., &c. In its medicinal properties it greatly resembles diaphoretic antimony. When repeatedly washed or boiled in water, and dried, it forms *washed saffron of antimony*, (crocus antimonii lotus.) Formerly used to make tartar emetic.

ANTIMONY (Diaphoretic). Syn. *Calx of Antimony, Calcined Antimony, Antimoniate of Potash, Stibiated Kali; Antimonium Diaphoreticum, Calx Antimonii, Antimonium Calcinatum, Potassæ Antimonias*,—Lat. An old preparation with numerous synonyms, of which the first two of the above are those only which are now in in use.

Prep. 1. (*Antimonium Calcinatum*,—Ph. L. 1788.) *Sesquisulphuret of antimony*, 8 oz.; *nitre*, 24 oz.; reduce them to powder, mix, and deflagrate by spoonfuls in a red hot crucible, calcine for half an hour, cool, powder, wash away the soluble matter with water, and dry by a gentle heat.

2. (*Antimonium Diaphoreticum Ablutum*,—Ph. Bor. 1847. *Metallic antimony*, 1 part; *nitre*, 2 parts; as last, drying the washed powder at a heat not exceeding 104° Fahr.

Prop., &c. A white or grayish white powder, without either smell or taste; gently diaphoretic and laxative; its activity greatly depending on the quantity of acid in the stomach. *Dose.* 1 to 6 grs. or more. It was formerly used to make tartar emetic. The "flowers" which collect on the sides of the crucible must be rejected, as they are powerfully emetic. The water used for the "washings" yields a precipitate of *antimonic acid* on the addition of sulphuric acid.

ANTIMONY (Ethiops of). Syn. *Æthiops Antimonialis*,—Lat. *Prep.* 1. From *quicksilver*, 1 part; *sulphuret of antimony*, 2 parts; triturated until the globules of the former entirely disappear.

2. *Sulphuret of antimony*, 3 parts; *black sulphuret of mercury*, 2 parts; triturated together. An old remedy in certain skin diseases, still highly esteemed by some practitioners. *Dose.* 3 to 5 grs., gradually increased to 20 or 30 grs.

ANTIMONY (Flowers of). Syn. *Flores Antimonii*,—Lat. *Prep.* Throw *powdered* *sulphuret of antimony*, by spoonfuls, into an ignited tubulated retort, that has a short and very wide neck, until as many "flowers" collect in the receiver as are required. Emetic in doses of 1 to 3 grs.

ANTIMONY (Argentine Flowers of). Syn. *White Oxide of Antimony; Antimonii Flores Argentini*,—Lat. *Prep.* Keep *metallic antimony* melted in a vessel, freely exposed to the air, and furnished with a cool place for the flowers to rest on, and collect them as deposited. They are teroxide of antimony in a crystalline form, and received the name of *argentine*, from their silvery whiteness and beauty.

ANTIMONY (Glass of). Syn. *Vitrified Antimony, Gray Oxide of Antimony; Vitrum Antimonii, Antimonium Vitrificatum, Ant. Vitrifactum, Oxydum Antimonii Vitrificatum*,—Lat. *Prep.* (Ph. L. 1788.) Roast *crude sulphuret of antimony* in a shallow earthern vessel, over a moderate fire, until it turns whitish gray and ceases to emit fumes at a read heat; then heat it in a crucible until it fuses into a clear brownish red glass, and pour it out on an iron plate. If calcined too much, a little more crude antimony may be added to make it run well.

Prop., &c. It is emetic, in fine powder, in doses of 1 to 3 grs.; but uncertain and violent in its operation. It has been used as a cheap source of the teroxide by the manufacturers of tartar emetic.

ANTIMONY (Cerated Glass of). Syn. *Antimonii Vitrum Ceratum*,—Ph. L. 1746. *Prep.* (Dr. Young.) *Glass of antimony*, in fine powder, 1 oz.; *yellow wax*, 1 dr.; melt together in an iron ladle, and keep it over a gentle fire free from flame (constantly stirring), for about half an hour, or until it acquires a snuff-colour, then pour it out on a piece of white paper (or plate), and when cold, powder it. *Dose.* 2 to 10 grs., in dysentery, &c.

ANTIMONY (Liver of). Syn. *Hepar Antimonii*,—Lat. *Prep.* From *sulphuret of antimony*, 1 part; and *dry carbonate of soda* or *potash*, 2 parts; melted together, and heated until it acquires the proper colour, and then cooled, and powdered. It is a mixture of teroxide of antimony, sulphuret of potassium, carbonate of potash, and undecomposed tersulphuret of antimony. It is chiefly used by *farriers* as a strong purge for horses, in greasy heels, &c.; and by *chemists*, as a source of the crude oxide. The crocus of antimony, before noticed, sometimes passes under the same name, and is sold for it.

ANTIMONY (Oxides of). Chemists were formerly much divided in opinion as to the number of compounds formed by antimony with oxygen. The terms (*protoxide, teroxide, sesquioxide*, &c.) applied to the basic oxide depend upon the views taken as to its atomic composition, as noticed under *Chloride of Antimony.*

ANTIMONY (Teroxide of). Syn. *Oxide of Antimony, Protoxide of do., Sesquioxide of do.; Antimonii Teroxydum*,—Ph. L.; *Ant. Oxydum*, —Ph. E. & D. This is probably the only true oxide of antimony.

Prep. 1. (Ph. E.) *Sulphuret of antimony* (in fine powder), 4 oz.; *hydrochloric acid*, 1 pint; dissolve with a gentle heat, boil for half an hour, filter, and pour the fluid into *water*, 5 pints; collect the precipitate on a calico filter, wash it first with *cold water*, and then with a *weak solution of carbonate of soda*, and again with *cold water* till it ceases to affect test paper; lastly, dry it by the heat of a vapour bath.

2. (Ph. D.) *Solution of terchloride of antimony*, (Ph. D.), 16 fl. oz.; *water*, 2 galls.; mix well, collect the sediment, (*oxychloride of antimony, Algaroth's powder*,) on a calico filter, and wash it with *water* until the latter only slightly reddens litmus paper, then agitate it occasionally for ½ an hour with *liquor of potassa*, 1 pint, diluted with *water*, q. s.; again collect it on a filter, and wash it with *boiling water*, until the "washings" cease to be affected by nitrate of silver; lastly, dry it at a heat not above 120° Fahr.

3. (Ph. L.) *Tersulphuret of antimony*, 1℔; *sulphuric acid*, 15 oz.; mix in an iron capsule, (under a flue,) stirring with an iron spatula, and gradually increasing the heat until nothing remains but a whitish pulverulent mass, which after it becomes cool, is to be well washed with cold water (as above,) and dried. In this state, which, according to Mr. Phillips, is that of a *disulphate*, it is used to make tartar emetic. By boiling it with *water*, holding in solution a little *carbonate of soda*, and subsequently washing it with *pure water*, the acid of this disulphate is removed, and oxide of antimony obtained under the form of a greenish-white powder. This is a modification of the process of Hornung, and that now generally adopted by English manufacturing chemists.

4. (Mr. R. Phillips.) From *powdered metallic antimony* and *sulphuric acid*, as last. (*Exp. Exam. Lond. Pharm.* 1811.)

5. (Tyson.) By decomposing *oxychloride of antimony* with *sesquicarbonate of ammonia.*

6. By burning metallic antimony. This form of the oxide was christened *flores antimonii* by Basil Valentine. See *Flowers of Antimony.*

Prop., &c. A grayish white or buff-coloured, tasteless, inodorous powder, (*white*, when recently precipitated,) fusible at a red heat into a yellow fluid which concretes on cooling into a crystalline mass; volatilized unchanged when strongly heated in closed vessels, but in contact with air, converted into antimonious acid; feebly basic, producing salts which readily suffer decomposition. It is "entirely soluble in hydrochloric acid, and in a boiling solution of bitartrate of potassa; snow white (when recent); fusible at a red heat." (Ph. E.) It is used chiefly to make tartar emetic and some other saline compounds of antimony. *Dose.* 2 to 10 grs.; as a diaphoretic. See *Antimonic* and *Antimonious Acid.*

ANTIMONY (Oxychloride of). Syn. *Muriatic Oxide of Antimony, Nitro-muriatic do.; Antimonii Oxychloridum, Ant. Oxydum Muriaticum,*—Lat. *Algaroth's Powder, Angelic Powder, Pulvis Algarothi, Pulvis Angelicus,*—Obs. *Prep.* 1. By pouring the common *liquid chloride* (butter) *of antimony* into water, collecting the precipitate, and washing it with water.

2. (*Antimonii Oxydum Nitro-muriaticum,*—Ph. D. 1826.) *Sulphuret of antimony*, 20 parts; *muriatic acid*, 100 parts; *nitric acid*, 1 part; dissolve and proceed as last. It consists of teroxide of antimony, mixed with a little of the chloride, ($5SbO_3$, $SbCl_3$) and is therefore wrongly termed an oxychloride. If allowed to stand for some time in the liquor from which it has been precipitated it becomes more or less crystalline.

ANTIMONY (Oxysulphuret of). Syn. *Amorphous Sulphuret of Antimony, Amorphous Tersulphuret of Antimony, Amorphous Sesquisulphuret of do., Red Sulphuret of do., Precipitated Sulphuret of do.; Antimonii Oxysulphuretum,*—Ph. L. *Ant. Sulphuretum Aureum,*—Ph. E. *Ant. Sulphuretum Præcipitatum,*—Ph. D; Ph. L., 1824. This is a hydrated amorphous tersulphuret of antimony obtained by precipitation, and contaminated with a small and variable proportion of the teroxide which is thrown down along with it.

Prep. 1. (Ph. L.) *Tersulphuret of antimony*, in fine powder, 7 oz.; *solution of soda*, (potassa, Ph. L. 1836,) 4 pints; *distilled water*, 2 galls.; gently boil together for two hours, constantly stirring, and adding *fresh water* as it wastes; filter, (through linen,) add *diluted sulphuric acid*, q. s. to throw down the oxysulphuret, well wash the precipitate with *water*, and dry it by a gentle heat.

2. (Ph. E.) *Sulphuret of antimony*, 1 oz.; *solution of potassa*, 11 fl. oz.; *water*, 2 pints; boil as before, filter, precipitate, whilst hot, with *sulphuric acid*, in excess, and wash and dry as before.

3. (Ph. D.) *Prepared sulphuret of antimony*, 5 *oz.; carbonate of potash*, (dried at a low heat,) 4 *oz.;* mix well in a mortar, heat the mixture in a Hessian crucible (gradually and cautiously) to low redness, and pour the melted mass on a clean flag, (or plate of iron;) when cold, reduce it to powder in a porcelain mortar, and add it in successive portions to *boiling water*, 10 *pints*, (in an iron vessel;) boil for 20 minutes, and filter through calico, allowing the filtrate to drop into *sulphuric acid*, 2 *fl. oz.*, diluted with *water*, 1 *quart;* then collect the precipitate on a calico filter, wash it with *warm water*, and dry it on porous bricks in a warm atmosphere.

4. (Ph. Han. nova, 1831.) From *levigated black antimony* and *sulphur*, equal parts; *liquor of potassa*, q. s.; boiled together until nearly dissolved; the solution mixed with *twice its volume of hot water* and filtered; after 24 hours further mixed with 3 *times its volume of water* and precipitated with *dilute sulphuric acid.* Very bright; consists chiefly of pentasulphuret.

5. (Commercial.) *Sulphuret of antimony*, 5 parts; *quicklime*, 10 parts; *water*, 100 parts; boil as before, and precipitate with *hydrochloric acid*, in excess, and *added at once* or as *quickly as possible.*

6. From *sulphur*, 1 part; *sulphuret of antimony*, 2 parts; *salt of tartar*, 4 parts; fused together and precipitated with excess of *sulphuric acid;* as in No. 4, (above.) Very bright coloured.

7. From *sulphuret of antimony*, 7 parts; *dry carbonate of soda*, 6 parts; *hydrate of lime*, 4 parts; *sulphur*, 1 part; *sulphuric* or *muriatic acid*, q. s.; as above. Very bright coloured.

8. As the process 5, (above,) but precipitating the solution with a mixture of *hydrochloric acid*, 93 parts; *sulphuric acid*, 7 parts. The product contains a little sulphate of lime.

Prop., &c. A red, brownish-red, or orange-coloured, odourless, and almost tasteless powder; insoluble in water; soluble in liquor of potassa, forming a colourless solution, readily catches fire, and burns with a bluish-green flame, exhaling sulphurous fumes and leaving a grayish-white oxide behind. When pure it is "of a golden-red colour; entirely soluble in boiling solution of potassa; almost entirely soluble in hot hydrochloric acid, hydrosulphuric acid being evolved, and a little sulphur remaining. These solutions are free from colour." (Ph. L.)

Uses, &c. It is diaphoretic, expectorant, emetic, or tonic, according to the dose, similar to the other antimonials. *Dose.* 1 to 10 grs. It is chiefly used as an alterative, (1 to 4 grs., in pills, 2 or 3 times, daily, combined with mercury, or with opium, guaicum, or sarsaparilla,) in chronic and other skin diseases, glandular enlargements, secondary syphilis, chronic rheumatism, and liver complaints.

Obs. It has been a matter of complaint among manufacturers of the above article that the processes and proportions ordered by the British Colleges produce a darker coloured and less showy preparation than that demanded in trade. The variations of colour chiefly depend on the quantity of water employed, the temperature of the liquor at the time of the precipitation, the quantity of the precipitant, and the mode in which it is used; and to these variations in the process, trivial differences of composition may also be referred. The superior brightness of the products of the processes, 4, 5, 6, and 7, arises chiefly from their containing a larger quantity of the true golden sulphuret or pentasulphuret, than those prepared according to the directions of the British Colleges. They contain more sulphur, and are, indeed, distinct, though similar preparations. The bright oxysulphuret of the shops appears to consist chiefly of pentasulphuret of antimony, and water. In this case the college orders *one* preparation; whilst the trade uses *another*. See *Kermes.*

ANTIMONY (Panacea of). Syn. *Panacea Antimonii,*—Lat. *Prep. Crude antimony,* 6 oz.; *nitre,* 10 oz.; *common salt,* 1½ oz.; *charcoal,* 1 oz.; all in fine powder; mix, deflagrate by spoonfuls in a red-hot crucible, keep the mixture heated for a quarter of an hour, cool, reject the uppermost spongy scoriæ, powder the remainder, well wash it with water, and carefully dry it. It should be of a fine golden colour. It is the active ingredient in Lockyer's pills.

ANTIMONY (Potassio-tartrate of). Syn. *Tartar Emetic, Tartarized Antimony, Tartrate of Antimony, Tartrate of Antimony and Potassa, Stibiated Tartar, Antimoniated Tartar, Antimonio-tartrate of Potassa; Antimonii Potassio-tartras,*—Ph. L. *Antimonium Tartarizatum,*—Ph. E. & D.; and Ph. L. 1824. *Tartarus Emeticus,*—Ph. L. 1720. For a long period tartar emetic was used in medicine with caution, and regarded with suspicion, but it has gradually increased in importance and won its way into the general esteem of the medical profession, until it appears likely, ere long, to supersede all other antimonials.

Prep. 1. (Ph. L.) *Teroxide of antimony,* (Ph. L.—*disulphate,*) 9 oz.; *bitartrate of potassa,* 10 oz.; *water,* 5 pints; boil for half an hour, filter while hot, and set aside that crystals may form, which are to be collected, drained, and dried. By evaporating the mother liquor, more crystals may be obtained.

2. (Ph. E.) *Oxide of antimony,* (Ph. E.—*oxychloride,*) 3 oz.; *bitartrate of potassa,* 4¼ oz.; *water,* 27 fl. oz.; mix, boil for an hour, filter, and crystallize as before.

3. (Ph. D.) *Oxide of antimony,* (Ph. D.,) 5 *oz.; bitartrate of potassa,* 6 *oz.; water,* 1 quart; make a paste with a little of the water, and in 24 hours add the rest of the water (boiling); boil for 15 minutes, in glass or porcelain, stirring frequently, filter through calico, and set aside the clear liquor; after 12 hours decant the liquor from the crystals, boil it to ⅓d, and crystallize as before. The crystals are to be dried on bibulous paper, without heat, and preserved in a bottle.

4. (Ph. L. 1836.) *Sesquisulphuret of antimony,* (in powder,) and *nitrate of potash,* of each, 2 ℔; mix well, add *hydrochloric acid,* 4 fl. oz.; spread the mixture on an iron plate, and ignite it; cool, rub the residuum to powder, wash it well with boiling water, and boil it for ½ an hour with *bitartrate of potash,* 14 oz., dissolved in *water,* 1 gall.; strain while hot, and crystallize as before.

5. (Commercial.) *Teroxide of antimony,* (Ph. L.,) 51 parts; (or its equiv., if impure, or in any other form;) *crystallized bitartrate of potassa,* (in powder,) 63 parts; *water,* 560 parts; as before.

6. (*In powder.*—M. Hoffmann.) *Tartar emetic,* 6 oz.; *boiling water,* 32 oz.; dissolve, add *alcohol,* 64 oz.; and collect and dry the precipitate. An *impalpable* powder, invaluable for ointments, &c. The loss of tartar emetic does not exceed 25 to 30 grs., and the alcohol is recovered by distillation.

Prop. White, transparent, inodorous, rhombic octahedrous crystals, which decrepitate in the fire, and effloresce, and become white and opaque by exposure to the air; insoluble in alcohol; soluble in 14½ parts of water at 60° Fahr., and in 2½ parts at 212°; solution reddens litmus, tastes disagreeably styptic and metallic, and suffers spontaneous decomposition from age; alkalies and their carbonates throw down teroxide of antimony; heat decomposes it. Its action is that of a powerful local irritant, causing a pustular eruption, which permanently marks the skin; for this purpose it is used in the form of solution, ointment, or plaster. In *small doses*, ($\frac{1}{12}$ to $\frac{1}{6}$ gr.,) it acts as an expectorant and diaphoretic; in *somewhat larger doses* ($\frac{1}{4}$ to $\frac{1}{2}$ gr.) it excites nausea, and sometimes vomiting, occasioning depression and relaxation, especially of the muscular fibre; in *large doses*, (1 to 3 grs.,) it acts as an emetic and sudorific, (and often as a purge,) depressing the nervous functions, and producing a feeling of feebleness, exhaustion, and relaxation, greater than that produced by other emetics; in *excessive doses*, it acts as an irritant poison, and has in some instances caused death. It is usually exhibited in solution.

Pur. It is "free from colour, and (wholly) soluble in water. The solution is unchanged by ferrocyanide of potassium. Hydrosulphuric acid being added, gives a precipitate of a reddish colour; neither chloride of barium nor nitrate of silver throws down anything but what is again dissolved on the addition of water. With nitric acid it gives a precipitate which is soluble in excess of the same acid. From 100 grs. dissolved in water, hydrosulphuric acids throws down 49 grs. of tersulphuret of antimony." (Ph. L.) "Dissolved in 40 parts of water, the solution is not affected by its own volume of a solution of 8 parts of acetate of lead in 32 parts of distilled water and 15 parts of acetic acid." (Ph. E.) The powder should be *perfectly* white, and the precipitate, formed by adding to its boiling solution a few drops of a solution of carbonate of soda, should *not* redissolve. If it does, the salt contains cream of tartar. (Hennel.) If the powder is *yellow* or *yellowish*, it contains iron.

Obs. By each of the formulæ given by the British Colleges, an excellent article of tartar emetic may be produced, preference being given to that of the London Pharmacopœia, as embracing the most recent improvements, and being vastly superior to those which have preceded it, both in the excellence of the product and the economy of the process. On the large scale, the ash, crocus, and glass of antimony, are frequently had recourse to as cheap sources of the teroxide, but the economy of their adoption is questionable, reference being had to the beauty and purity of the product, which are points, which as well as mere quantity, should receive consideration by the manufacturers of pharmaceuticals. In the last Lond. Pharm. the preparation of the oxide, and its conversion into tartar emetic, are included in one formula, although distinct processes.

ANTIMONY (Sulphate of). Syn. *Vitriolated Antimony; Sulphas Antimonii, Vitriolum Antimonii,*—Lat. *Prep.* (Van Mons.) *Antimony*, 2 parts; *sulphuric acid*, 3 parts; stir together over a gentle fire till it assumes a grayish-white colour; cool, powder, remove the excess of acid by washing it with water, and dry the powder. It is an insoluble *sub-sulphate.*

ANTIMONY (Sulphurets of). Several sulphurets of antimony have been noticed by writers on the subject, but only two definite compounds of this class appear to exist. They are the *tersulphuret* and *pentasulphuret*, and are analogous in their composition to the like compounds formed by antimony with chlorine and oxygen.

ANTIMONY (Tersulphuret of). Syn. *Sulphuret of Antimony, Black Sulphuret of do., Sesquisulphuret of do.; Antimonii Tersulphuretum,*—Ph. L. *Ant. Sulphuretum,*—Ph. E. & D. *Ant. Sesquisulphuretum,*—Ph. L. 1836. This is the native gray mineral commonly known as *crude antimony* or *antimony ore*, or *sulphuret of antimony*, and from which the other compounds of antimony are chiefly obtained.

Prep. The fused sulphuret is separated by heat from the less fusible earthy matter with which it is contaminated, after which it is run into "loaves" or large cakes, in which form it is sent to market.

1. (*Prepared Sulphuret of Antimony, Antimonii Sulphuretum Preparatum,*—Ph. D.) Made by reducing the *sulphuret of commerce* to powder, and separating the finer particles for use, in the way directed for *prepared chalk.* That of the shops is merely ground in mills without elutriation.

2. (*Amorphous Tersulphuret of Antimony.*) By precipitating a *solution of tartar emetic*, with *sulphuretted hydrogen.* The oxysulphuret of the pharmacopœia is an impure hydrated amorphous tersulphuret of antimony.

Pur. Commercial sulphuret of antimony frequently contains lead, iron, copper, and arsenic, and sometimes manganese. Its goodness is commonly estimated by its compactness and weight, the largeness and distinctness of the striæ, and the volatility of the sulphuret. "Striated; (entirely) soluble in hot hydrochloric acid." (Ph. L.)

Uses. It is principally employed as a

source of metallic antimony and in the preparation of other antimonials. Exhibited alone, it possesses little activity, unless it meets with acid in the primæ viæ, when it occasionally acts with considerable violence both as an emetic and cathartic. *Dose.* 10 to 30 grs., in powder; as an alterative and diaphoretic; in rheumatism, gout, scrofula, and glandular affections, and in lepra, scabies, and some other skin diseases. It is a favourite remedy with farriers, who commonly mix a little of it with the food of horses to improve their coat and promote their "condition."

ANTIMONY (Pentasulphuret of). Syn. *Persulphuret of Antimony, Golden Sulphuret of do.; Antimonii Pentasulphuretum, Ant. Persulphuretum, Ant. Sulphuretum Aureum,*—Lat. *Prep.* 1. (Liebig.) Take *tersulphuret of antimony*, 72 parts; *dry carbonate of soda*, 68 parts; *hydrate of lime*, (fresh,) 52 parts; *sulphur*, 13 parts; boil for some hours, filter, evaporate, and crystallize; redissolve the crystals, (*Schlippe's salt; sulphantimoniate of sodium;*) add *dilute sulphuric acid*, collect the golden flocculent precipitate, wash it with cold distilled water, and dry it by a gentle heat.

2. (P.C.) By adding *dilute sulphuric acid* to the *mother liquor from which kermes has been deposited*, and washing the sediment, as before. The product of the process of the Ph. Hann. (*Oxysulphuret of Antimony*, No. 4), produces a nearly similar compound.

Prop., &c. It closely resembles kermes mineral and the common oxysulphuret of antimony, of the brighter coloured samples of which (of the shops,) it forms, indeed, a distinguishing component part. *Dose.* ½ to 3 grs. or more.

ANTIMONY AND LIME (Sulphuret of). Syn. *Antimonii et Calcis Sulphuretum,*—Lat. *Prep.* (Van Mons.) *Golden sulphuret of antimony*, 1 part; *quick lime*, 3 parts; triturate together, then add *boiling water*, 24 parts; evaporate to dryness, constantly stirring, and keep it in a well-stopped bottle. Diaphoretic, emetic, resolvent, and alterative. It has been highly extolled in gout, rheumatism, scrofula, and certain skin diseases, and as a cheap and most efficient substitute for James's powder. *Dose.* 1 to 6 grs.

ANTIMONY (Tannate of). Syn. *Antimonii Tannas,*—Lat. *Prep.* 1. Precipitate a *decoction of cinchona*, with a solution of *tartar emetic*, and collect the sediment.—2. From a solution of *tannin*, and *tartar emetic*, as last. *Dose.* 3 to 8 grs., in mucilage, as a contra-stimulant. A useless preparation.

ANTIPERTUSSIS. A nostrum, for hooping-cough, which, according to Dr. Paris, has for its base a salt of zinc.

ANTISCORBUTICS. Remedies for scurvy. *Lemon juice, ripe fruit, milk*, the *salts of potassa, green vegetables, meal bread, fresh meat*, and *raw* or *lightly boiled eggs*, belong to this class.

ANTISEPTICS. Substances that impede or prevent putrefaction. The principal antiseptics are *common salt, saltpetre, spices, sugar, vinegar, creasote*, and *alcohol*. See *Putrefaction*.

ANTISPASMODICS. Medicines which allay spasms and convulsions. The term is frequently incorrectly applied to anodynes and narcotics, which soothe pain, but do not repress muscular spasm. *Ammonia, assafœtida, bark, camphor, castor, chalybeates, chloroform, ether, musk, opium, saffron*, and *valerian*, have been regarded as antispasmodics.

ANXIETY. The painful restlessness and inquietude, both of body and mind, to which the term *nervous anxiety* has been applied, is, perhaps, one of the most distressing ailments, not of an organic character, that can possibly be experienced. The thoughtful, studious, and debilitated, those confined in close apartments, or who are engaged in sedentary occupations, the libertine, the drunkard, and the voluptuary, are those who are its principal victims. Fresh air, out of door exercise, the erect posture, plain, but wholesome food, warm clothing, well ventilated apartments, cold weak liquors as beverages, agreeable occupation, and above all, the cultivation of a kindly and sociable temper, will do much to effect a cure. The bowels should be kept regular, with an occasional mild aperient, and a free evacuation should take place at least once a day. A teaspoonful of carbonate of soda or magnesia, or a few drops of laudanum, taken on retiring to rest, with the use of a good pillow, will generally prevent watchfulness at night.

AORTA. The aorta is frequently the seat of aneurism, a disease not uncommonly brought on by the excessive use of ardent spirits and fermented liquors, and by luxurious living; and hence its greater frequency in men than in women, and in drunkards than in temperate persons. When this species of aneurism has attained a certain magnitude, the tumour generally bursts, and causes death, either instantaneously, or after the lapse of a few days, according to circumstances. The *treatment* is wholly medical and consists in the adoption of those means which are best calculated to lessen the action of the heart and the volume of the blood. Violent exercise, stimulants of all kinds, exciting passions and emotions, and other agents which tend to accelerate the circulation, should be avoided.

APERIENTS. Medicines or agents which gently open the bowels. Among these may be named *castor oil*, *compound extract of colocynth* (in small doses), *compound rhubarb pill*, *confection of senna*, *cream of tartar*, *drum figs*, *Epsom salts*, *ripe grapes* and *other fruit*, *phosphate of soda* (tasteless salt), *pil. rufi*, *prunes*, *raisins*, *salad oil*, *seidlitz powders*, &c. See *Pills*, *Draughts*, *&c.*

APIINE. A gelatinous substance obtained from the *apium petroselinum* or parsley. With a solution of sulphate of iron it strikes a blood-red colour.

APOCYNINE. A bitter crystallizable substance found in the *apocynum cannabinum*, or Indian hemp of North America.

APOPLEXY. A sudden suspension or loss of the powers of sense and motion; the heart continuing to beat and the lungs to act, but generally with difficulty. During the fit the patient frequently lies in a state resembling sleep, or the stupor induced by drunkenness. In the *sanguineous* or *sthenic variety*, the pulse is hard and full, the countenance flushed, and the breathing stertorous; in the *serous* or *asthenic variety*, the pulse is feeble, and the countenance pale.

Treat. In this disease, more than perhaps any other, medical aid should be *immediately* sought. In the mean time the patient should be kept easy and cool, with head and shoulders elevated, the neckcloth removed, and the clothes loosened. Crowding round the patient should be especially avoided, and a free exposure to fresh air secured in every possible way. When medical aid cannot be procured, blood should be freely taken from the arm by any person competent to do so. Cold water should be dashed on the head, the legs placed in pretty warm water, and blisters or mustard poultices applied between the shoulders. In the mean time 8 or 10 grs. of calomel may be administered, and its action promoted by the use of saline purgatives and stimulating clysters. When these means prove successful, the remainder of the treatment may consist in the administration of mild purgatives and diaphoretics, avoidance of stimulating food or drinks, and of other like exciting agents.

Prev, *&c.* The premonitory symptoms of apoplexy are *giddiness*, *pain and swimming in the head*, *loss of memory*, *drowsiness*, *noises in the ears*, *specks floating before the eyes*, *nightmare*, *frightful dreams*, *laborious respiration*, &c. When any of these symptoms occur (especially in free livers), aperient medicines and a light diet should be at once had recourse to, and wine, beer, and spirits avoided as the most dangerous poisons. If the symptoms increase or continue, active purgation, a still lower diet, and even bleeding may be had recourse to. By attending to the admonitions of nature, many cases of apoplexy may be prevented. Short, robust, and plethoric persons, having short, thick necks, are universally accounted the most liable to apoplexy; in them the fit generally comes on without warning, and when once attacked with this malady they are especially liable to the same again. But it must be recollected that the possessor of no particular constitution or temperament, to whatever class it may belong, enjoys immunity from the attacks of apoplexy, a disease more fatal among Englishmen than the natives of other countries.

APORETINE. One of the three resins obtained from *rhubarb* by Schlössberger and Dœpping. It is a black, glossy mass, slightly soluble in alcohol, ether, and water; and very soluble in potassa and ammonia.

APOSEPEDIN. A peculiar crystallizable substance obtained from putrid cheese.

APOZEM. Syn. *Apozema*,—Lat. An old pharmaceutical name for a decoction. The term is still applied on the Continent to some preparations (chiefly magistral,) of this class. See *Decoctions*.

APOZEM (Anticolic). Syn. *Degland's Colic Mixture; Apozema Anticolicum*,—Lat. *Prep.* Take of *senna leaves*, 2 oz.; *boiling water*, 1 pint; simmer gently to 16 fl. oz.; press out the liquor, add *sulphate of soda*, 1 oz.; *syrup of buckthorn*, 2 oz., and strain through flannel. By glassfuls in lead colic, or after poisoning by lead.

APOZEM (Antidartrous). Syn. *Decoction of Bitter Sweet; Apozema Dulcamaræ*,—Lat. *Prep.* (Trousseau and Reveille.) *Dulcamara*, 1 dr.; *water*, 16 oz.; boil to 9 oz.; and strain. To be taken in three doses during the day. Every other day the quantity is to be increased until 12 dr. or even two oz. are taken daily, "so that the patient may begin to feel dryness of the throat, and some disorder of vision and digestion;" and "continue at this quantity for several weeks in succession." In obstinate skin diseases.

APOZEM (Antiscorbutic). Syn. *Apozema Antiscorbuticum*,—Lat. *Prep.* (P.C.) *Roots of burdock, patience*, (rumex patientia,) and *horse-radish*, fresh *leaves of scurvy grass*, fresh *water-cress*, and fresh *buckbean leaves* (menyanthes), of each, 1 oz.; *boiling water*, 5 pints; infuse 2 hours, strain (with pressure), and after repose decant the clear portion. By wine-glassfuls, 3 or 4 times daily; in scurvy, &c.

APOZEM (Diuretic). Syn. *Apozema Diureticum*,—Lat. *Prep.* 1. Take of *dried roots of asparagus, butcher's broom, fennel, parsley*, and *smallage*, of each 96 grs.; (or *aperitive species*, 1 oz.;) *water* 32 oz.; boil to 19 oz.; and add *oxymel of squills*, 3 oz. By wineglassfuls; in dropsies.

2. *Five diuretic roots*, (aperitive species,) 1 oz,; *boiling water*, 16 oz.; infuse half an hour, strain, and add, *powdered nitre*, ½ dr.; *syrup of the* 5 *roots*, 1 oz. *Dose.* A wine-glassful, as last. See *Swiss Apozem.*

APOZEM (Emetic). Syn. *Apozema Emeticum*,—Lat. *Prep. Emetic tartar*, 2 grs.; *ipecacuanha wine*, 1 dr.; *veal broth* or *weak barley-water*, 1 pint. By wine-glassfuls till it operates.

APOZEM (Emeto-cathartic). Syn. *Apozema Emeto-catharticum. Prep.* 1. (*Eau de Trèvez.*) *Tartar emetic*, 1 gr.; *Epsom salts*, 1 oz.; *water*, 1 quart; dissolve. A wine-glassful occasionally, until it operates.

2. *Emetic tartar*, 1 gr.; *Glauber salts*, 1 oz,; *veal broth*, 1 pint; as last.

3. For the *salts* in the above forms use an equal weight of *phosphate of soda*, and *sherry*, 1 tablespoonful.

4. *Emetic tartar*, 1 gr.; *bitartrate of potassa*, 1 oz.; *barley-water*, (boiling,) 1 pint; *syrup of orange peel*, 2 oz.; as last. The above are excellent diaphoretic purges; the last one is pleasant tasted, and the third far from disagreeable.

APOZEM (Febrifuge.) Syn. *Apozema Febrifugum*,—Lat. *Prep.* 1. From *cinchona bark*, 1 oz.; *water*, 1 pint; boil 15 minutes, and strain.

2. *Cinchona bark*, 1 oz.; *vinegar*, (good,) ¾ oz.; *water*, 1 pint; boil 10 minutes, and add *syrup of orange peel*, 2 oz.

3. *Willow bark*, ¾ oz.; *horse-chesnut bark*, ½ oz.; *calamus root*, ¼ oz.; *cloves*, 1 dr.; *water*, 1 pint; boil to 15 oz.; adding the *cloves*, (bruised,) towards the end. *Dose.* Of each, a wine-glassful, in agues and fevers.

APOZEM (of Feltz.) Syn. *Tisane of Feltz; Apozema dictum de Feltz. Prep.* (P.C.) *Sarsaparilla*, 64 parts; *tersulphuret of antimony*, (in powder,) 80 parts; *isinglass*, 10 parts; *water*, 2000 parts; boil to one half, and strain. A wine-glassful, 3 or 4 times daily, in skin diseases. The common practice is to tie up the antimony in a small muslin bag.

APOZEM (Purgative). Syn. *Apozema Purgans*,—Lat. *Prep.* 1. *Broth made of herbs*, 6 oz.; *sulphate of soda* or of *magnesia*, ½ oz. to 1 oz.; dissolve. To be taken at once, or twice, or by wine-glassfuls till it operates.

2. *Veal broth*, ½ pint; *phosphate of soda*, ½ oz. to 1¼ oz.; as last. Taste, resembles broth containing common salt. By glassfuls till it operates.

3. (*Apozem Dictum Ptisana Regalis*,—P.C.) *Aniseed* and *cinnamon*, of each, 1 dr.; *senna, fresh chervil*, and *sulphate of soda*, of each 4 dr.; *one lemon*, sliced; *water*, 1¾ pint; macerate 24 hours, stirring occasionally, strain, press, and filter. As last. (See above.)

APOZEM (Sudorific). Syn. *Apozema Sudorificum*,—Lat. Compound decoction of Guaicum.

APOZEM (Tænifuge). Syn. *Apozema Tænifugum*,—Lat. Fresh *bark of the root of wild pomegranate*, 2 oz.; *water*, 32 oz.; boil for 1 hour, and add, *compound syrup of wormwood*, 3 oz. In tapeworm. *Dose.* One or two wine-glassfuls every half hour; the patient having taken only a broth dinner the day before, and a cup of chamomile or germander tea on going to bed. Three hours after the last dose of the apozem, "he must swallow, at one draught, 2 oz. of *syrup of ether*, and an hour afterwards, a *white looch*, containing 3 drops of *croton oil.* This plan must be followed three times in 9 days." (Trousseau and Reveille.)

APOZEM (Swiss). Syn. *Apozema Diureticum*,—Lat. *Prep.* Fresh *cow's urine*, 22 oz.; warm it in a water bath, to redissolve the deposit which forms on cooling, add *fennel water*, 1½ oz., and filter. To be taken by glassfuls in the course of the day, sweetened with *syrup of gum*, of *orange peel*, or of *strawberries.* In dropsies and chronic diseases of the liver.

APOZEM (Vermifuge). Syn. *Worm Tea; Apozema Vermifugum*,—Lat. *Prep. Senna*, and *Indian pink-root*, of each, ½ oz.; *manna*, 1 oz.; *boiling water*, 16 oz.; infuse 1 hour in a covered vessel, frequently stirring, and strain. As a vermifuge for children. *Dose.* For a child 2 or 3 years old, 1 to 2 tablespoonfuls; for an adult, 2 wine-glassfuls to a ½ pint or more; repeated morning and evening, for several days. Sometimes a mercurial or calomel pill is taken over-night, and the infusion in the morning.

APPENSA. Substances suspended from the neck as charms or amulets. Their action, if any, depends on their exciting the imagination and keeping up the courage and spirits of the wearer.

1. *Root of vervain* hung round the neck, by *a guard of white riband,* for *scrofula;* but the usual medicines must be exhibited during the same period.

2. A *root of peony* suspended to the neck in *epilepsy;* its use being accompanied with that of active cathartics.

3. Some *magnes arsenicalis,* or *camphire* (camphor), hung to the neck so as to reach the pit of the stomach, to guard against *contagion.*

4. A little *argentum vivum,* (quicksilver,) placed in a small leathern bag, and suspended from the neck so as to hang on the breast, as a prophylactic for *itch* and *vermin.* See *Amulets, &c.*

APPETITE. The sensations of hunger and thirst are seated in the stomach, and are necessary to the existence of the body in a state of vigour and health. They are, however, frequently disordered and altered from their normal condition, by diseased action of the stomach or nervous system, or from vicious habits. A healthy appetite for food, may usually be regarded as a most certain indication that nature requires a supply; but in the indulgence of this appetite, certain regulations should be observed, and a boundary put to mere animal gratification. By slowly eating and thoroughly masticating or chewing the food, the stomach becomes gradually distended, and the individual feels himself satisfied only after he has taken a quantity sufficient for the nourishment of his body; but, on the contrary, if the food is swallowed too rapidly, and without proper mastication, it presses heavily and roughly against the sides of the stomach, and induces a sensation of fulness, before a sufficient meal to meet the continual demands of life has been made: the consequence is that hunger soon returns, and the party must either have recourse to frequent feeding, or suffer the consequences of imperfect nutrition. Labour and exercise, within certain limits, promote the healthy functions of the stomach and bowels, through the action of the muscles of the abdomen increasing the peristaltic motion of those viscera. An enormous appetite in persons leading a sedentary life, is generally indicative of the food passing off imperfectly digested, or of the coats of the stomach being in an unhealthy state. More food is required in winter than in summer, in consequence of the greater radiation of the heat of the body; and hence the increase of appetite which is usually an accompaniment of that season. In persons who lead a more sedentary life in winter than in summer, the reverse is, however, frequently the case; the want of exercise producing a corresponding loss of appetite.

Deficiency or *loss of appetite,* generally arises from disordered stomach, but is sometimes symptomatic of other diseases. In most cases it may be improved by *exercise* and the occasional use of *mild aperients,* and especially of *saline purgatives. Chalybeates* and *bitter tonics* will also prove advantageous. A *piece of rhubarb,* chewed an hour before dinner, is employed by some persons to create an appetite; others suck 2 or 3 *ginger lozenges,* or take a small glass of *bitters,* for the same purpose. One or two 4-grain *compound aloes pills* (Ph. L.) taken in the middle of the morning, have been strongly recommended, under the name of *dinner pills.* Among "heavy drinkers," a gradual reduction of the quantity of the strong liquors which they consume, is generally followed by a restoration of the appetite and digestive powers. The excessive use of liquors, (especially of spirituous, fermented, or warm ones,) is always prejudicial. Drunkards are particularly subject to defective appetite, and "teetotallers" and water drinkers to voracity, from this cause.

Depraved appetite, or a desire for unnatural food, as chalk, cinders, dirt, soap, tallow, &c., when an idiopathic affection or depending on vicious taste or habits, (as in childhood,) may be treated by admixing *very small doses* of tartar emetic or ipecacuanha with the objectionable food or articles. When symptomatic of *pregnancy,* a plentiful supply of nutritious food, including the "red meats," with a little good malt liquor, may be adopted with advantage; when symptomatic of *chlorosis,* to this diet may be added, the use of chalybeate tonics, and sea or tepid bathing; when of *dyspepsia,* a light diet, bitter tonics, free exercise, fresh air, and cold bathing, will generally effect a cure.

Insatiable appetite, (canine appetite, voracity; bulimia;) is generally symptomatic of pregnancy, or worms, or diseases of the stomach and other viscera, but sometimes exists as a separate disease. When it occurs in childhood, worms may be suspected, and vermifuges administered. In adults, the common cause is imperfect digestion, arising from stomach complaints or gluttony, when the languor and gnawing pains of disease are mistaken for hunger. In this case, the diet must be regulated and the bowels kept gently relaxed with mild aperients, and tonics, (bark and steel,) or bitters, (orange peel and gentian,) may be administered. When *pregnancy* or vicious habits are the cause, the treatment indicated under "*depraved appetite*" may be adopted.

APPLE. Syn. *Pomum*,—Lat. This well known fruit is the product of the cultivated varieties of the *pyrus malus*, (Linn.) or *crab apple* of our hedges; a tree of the *nat. ord.*, Rosaceæ. The *rennet apple* (*poma renettia*,—P.C.) is the one ordered to be used in pharmacy.

In a *dietetic* point of view, the apple, when perfectly ripe, is a wholesome and pleasant fruit, and may be eaten either raw, roasted, or boiled. The *skin* and *pips*, being indigestible, should be rejected. The more aromatic and flavoured varieties are well adapted for dessert fruit, and are especially useful to persons of a full or confined habit of body.

APPLES (à la Cremona). The best *dressing apples* are cut into small squares, strewed over with about ½ their weight of *powdered lump* or *good moist sugar*, and a few strips of *lemonpeel*, and after remaining covered up until the next day, lightly dropped into a small stew-pan, with three or four tablespoonfuls of *cider* or *perry*, and simmered very gently until they become clear. They are then taken out, and when cold, built in a wall-like form round a small china or glass dish, and the syrup being poured into the middle, the strips of lemon are placed on the top.

APPLES (Dried). *Prep.* 1. (*Baked Apples of the Confectioners.*) The *apples* are placed in a cool oven, 6 or 7 times in succession, and flattened each time by gentle pressure, gradually applied, as soon as they are soft enough to bear it; after which they are taken out, and as soon as cold put on clean dishes or glass plates. The sour or tart variety of apples is the best for baking. If the process is well managed, the appearance of the prepared fruit is very rich, and the flavour delicious.

2. (*American Dried Apples of Commerce.*) The *apples* (or pears), after being peeled, are cut into eighths, the cores extracted, and then placed in the sun or in a kiln or oven until they are quite dry and hard. In this state they may be kept for two or three years. For *use*, the fruit is washed in water, and after being drained, boiling water is poured on it; after standing for a few minutes, it may be used as fresh fruit. The water it has soaked in is an excellent substitute for the fresh juice, and should be poured into the pie-dish with the apples. In this way a cheap and constant supply of apples or pears may be had *all the year round*, which we can assert from experience is almost equal for pies, puddings, tarts, &c., to the fresh gathered fruit.

APRICOT. Syn. *Apricock; Armeniacum Malum, Præcocia*,—Lat. The fruit of the prunus armeniaca, (Linn.;) a tree of the *nat. ord.*, Rosaceæ. Apricots are principally eaten as gathered, but are also *dried* and *candied*, and made into a jam. See *Fruit, &c.*

AQUATINTA. Syn. *Aquatint.* A species of *etching* on copper, producing an effect resembling a drawing in Indian ink. It is performed by sifting powdered asphaltum or lac resin on the plate, previously slightly greased, and after shaking off the loose powder, gently heating it over a chaffing dish; on cooling, the lights are covered with turpentine varnish coloured with lamp black, by means of a hair pencil, and a rim of wax being placed round the plate, a mixture of aquafortis and water is poured on it, and allowed to remain for 5 or 6 minutes, when it is poured off, the plate dried, and recourse had to the pencil as before. The process of stopping and etching is repeated again and again, until the darkest shades are produced. Sometimes, instead of asphaltum or resin, the plate is covered with a solution of gum lac in spirit of wine, which on drying, leaves innumerable cracks or minute fissures through which the acid acts on the plate.

ARABESQUE. Syn. *Moresque.* The ornamental designs of this class, now so much employed in cloth and leather binding, are produced by the pressure of hot plates or rollers having the pattern engraved on them.

ARABINE. Syn. *Soluble Gum.* The pure soluble principle of gum acacia. *Prep.* Dissolve *white gum arabic* in pure water, filter, and add *alcohol* as long as it produces curdiness; collect the precipitated matter, and dry it by a gentle heat. Very soluble in water; basic acetate of lead, alcohol, and ether, precipitate it from its solutions. It possesses little advantage over the best gum arabic.

ARCHIL. Syn. *Archel, Orchil, Archilla, Orchilla.* The archil of commerce is met with in three different states—in *lumps* or *powder*,—as a *liquid paste*,—and as a thin *liquid dye* or *stain* of more or less intensity. The *archil* or *orchil* of the shops (*orchil liquor*) is under the last form, and is distinguished as either *blue* or *red archil.* The *blue variety* is prepared by steeping for some time the bruised or coarsely ground lichen, (*rocella tinctoria*, or *r. fuciformis*,) in a mixture of *stale urine* or *bone spirit*, and *lime* or *milk of lime*, or in any similar *ammoniacal solution*, placed in covered wooden vessels in the *cold;* the process being repeated until all the colour is extracted. The *red variety* is prepared with a similar solution, but the steep is made in earthen jars placed in a *room heated by steam*, technically called a "*stove.*" Both kinds have a disagreeable putrid ammoniacal smell, and merely differ in the degree of their red or violet tint; the addition of a small quantity of lime or alkali to the one, or of an acid to the other, immediately bringing them both to the same shade of colour.

Prop. The colouring matter of archil is soluble in water, alcohol, urine, ammoniaeal and alkaline lyes, and weak acid liquors; alkalies turn it blue, acids red; alum gives with it a brownish-red precipitate, and solution of tin a red one; the alcoholic solution gradually loses its colour when excluded from the air.

Uses, &c. It has been employed to tinge the spirit used to fill the tubes of thermometers, and to stain paper, wood, &c. The aqueous solution stains marble, in the cold, of a beautiful violet colour, of considerable permanence when not exposed to a vivid light. "Marble thus tinged preserved its colour unchanged at the end of two years." (Dufay.) Its principal use is, however, in dyeing. By proper management it may be made to produce every shade of *pink* and *crimson* to *blue* and *purple.* Unfortunately, although the hues it imparts to silk and wool possess an exquisite bloom or lustre, they are far from permanent, and unless well managed, soon decay. It is hence, generally, only employed combined with other dye-stuffs, or as a finishing bath to impart a bloom to silk or woollens already dyed of permanent colours. In employing it, it is added to *hot water* in the required quantity, and the bath being raised to nearly the boiling point, the materials are put in and passed through, until the desired shade is produced. A mordant of *alum* and *tartar* is sometimes used, but does not add to the permanence of the colour. *Solution of tin* added to the bath, increases the durability, but turns the colour more to the scarlet. (Hellot.) *Milk of lime* or *salt of tartar* is added to darken it; *acids* or *solution of tin* to redden it. *A beautiful crimson red* is obtained by first passing the stuff through a *mordant of tin and tartar*, and then through a *bath of archil* mixed with a little *solution of tin.* By proper management of this dye, lilacs, violets, mallows, rosemary-flowers, soupes au vin, agates, and other shades may be produced, on silk or cloth, either alone or in conjunction with other dyes to modify it. ½ *lb.* of solid archil or its equivalent in a liquid form will dye 1 to 2 *lb.* of cloth. *Herb-archil*, it is asserted, will bear boiling, and gives a more durable tint than the other lichens, especially with solution of tin. (Hellot.) Recently Mr. Lightfoot has patented a process for dyeing with archil with the aid of *oil*, after the manner followed for producing Turkey red on cottons; but the advantages of this plan have not yet been developed.

ARCHIL (Factitious). 1. A colouring matter resembling archil is prepared by fermenting together a mixture of *onions* (in a state of incipient putrefaction,) with about 1-3d or 1-4th their weight of *carbonate of potash* and some *ammonia*, and adding, after some days, a fourth of the weight of the *potash* used in *sugar of lead.* The details of the process essential to its success, are, however, kept a secret.

2. *Extract of logwood* dissolved in *juice of elderberries* and *putrid urine*, with the addition of a little *pearlash.* Used to stain wood.

ARICINE. Syn. *Aricina; Cusconine, Cusconina; Cuscocinchonia.* An alkaloid discovered by Pelletier and Coriol in *arica* or *cusco bark.*

Prep. Boil the *bruised* or *coarsely powdered bark* in *water acidulated with sulphuric acid;* repeat the process a second and a third time; concentrate the mixed liquors, and precipitate with *ammonia.* Collect the powder on a filter, agitate it repeatedly with ether, decant the resulting solutions, and gently evaporate. The residuum may be further purified by re-solution and crystallization from hot alcohol.

Prop., &c. Crystallizable; soluble in ether; non-volatile; nitric acid turns it green; its basic sulphate or disulphate is a non-crystallizable, tremulous jelly; in other respects it resembles cinchonine; with the acids it forms salts. (Journ. de Pharm., 1829.) Guibourt doubts its existence as a distinct principle. (*Hist. Nat. des Drogues*, 1850.) Aricine has not been applied to any useful purpose.

ARNICINE. This name has been applied to two substances.

Arnicine (of Pfaff). The resinous matter extracted by *alcohol* from the *roots* and *flowers* of *mountain arnica*, and in which their acridity appears to reside.

Arnicine (of Bastick). Syn. *Arnicina*, *Arnicia*. *Prep.* 1. (Bastick.) From the *flowers* by a similar process to that by which he obtains lobelina.

2. From the *flowers* (or root) *of arnica*, as directed under *Aricina*. *Prop.* Bitter; acrid; crystallizable; scarcely soluble in water; soluble in alcohol and ether; forms salts with the acids. Its hydrochlorate is crystallizable. (Pharm. Journ., x, 386.) Its physiological properties and dose, have not as yet been determined.

ARRACK. Syn. *Arac*, *Arack*, *Rack; Spiritus Oryzæ*, *Sp. Succi Palmæ*,—Lat. A spirituous liquor distilled from the fermented juice (*toddy*, *palm wine*,) of the cocoa-nut, palmyra, and other palms, and the fermented infusion of rice in husk, (*rice beer*.) Some varieties are pleasant flavoured and as wholesome as the other spirits of commerce, whilst some have a strong and somewhat nauseous flavour and odour, depending on the presence of a portion of a volatile oil corresponding to that of corn spirit. The inferior qualities are regarded as more heating and apt to disagree with the stomach than either gin, brandy, rum, or hollands. Arrack is imported from the East Indies, and in this country is chiefly used to make punch. When sliced pine apples are put into good arrack, and the spirit kept for some time, it mellows down and acquires a most delicious flavour, and is thought by many to be then unrivalled for making nectarial punch.

ARRACK (Factitious). Syn. *Mock Arrack*, *British do.*, *Vauxhall Nectar*. *Prep.* 1. Good pale *Jamaica rum*, 1 pint; *flowers of benzoin*, 12 grs.; dissolve.

2. *Pale rum*, 6 galls.; *flowers of benzoin*, 1 *oz.*; *tincture of balsam of tolu*, (good,) ¾ *oz.*; *sliced pine apple*, ½ *oz.*; digest with occasional agitation, for a month; then add *raw milk*, ¼ pint; agitate well for 15 minutes, and rack in a week. Both sold for arrack.

ARROW-ROOT. Syn. *Maranta*,—Ph. L. E. & D. The commercial name of the starch or fecula obtained from the tubers of the *maranta arundinacea*, (Linn.;) "commonly, but improperly called arrow-root." (Ure.) It is imported in tins, barrels, and boxes, from all the West India Islands; and from Calcutta and Sierra Leone.

Prep. The fecula is extracted from the tubers when they are about 10 or 12 months old, by a process very similar to that by which the farina is obtained from potatoes.

Pur. A large portion of the arrow-root of the shops consists either wholly or in part of the fecula or farina obtained from potatoes, or is more or less mixed with sago-meal or rice-meal. Potato starch is known in commerce as "*farina*" or "*British arrow-root*," or simply "*arrow-root*," whereas, the genuine kind is always described as "*Bermuda*," "*St. Vincent*," "*St. Kitts*," or at least as "*West Indian arrow-root*." As the mere addition of an adjective is no proof of quality, no sample should be bought without a proper examination. Arrow-root "is reckoned more nourishing than the starch of wheat or potatoes, and is generally also freer from peculiar taste or flavour." (Ure.) The substitution of the inferior farinas for genuine arrow-root, is therefore not only fraudulent on account of their inferior value, but is reprehensible in a hygienic point of view. Genuine arrow-root is—1. Of a dull dead-white colour, free from glistening particles.—2. Tasteless and odourless, and preserves these properties when mixed with boiling water.—3. Triturated with twice its weight of concentrated hydrochloric acid, it yields an *opaque* paste, and no odour is evolved; if a transparent paste is immediately formed, or an earthy odour or one resembling beans or rushes is perceived, it contains either wheat or potato starch. (Scharling.)—4. Boiled with water and sulphuric acid similar results occur. (Lampadius.)—5. Triturated with double its weight of a mixture of equal parts of aquafortis and water, it does not become gelatinous and viscid in *less* than 15 minutes. The other starches (except *rice-starch*,) thus treated, rapidly form a stiff and tenacious jelly. 5% of adulteration may be thus detected. (Scharling.)—6. Under the microscope it exhibits glistening irregular ovoid particles, smooth on the surface and free from streaks and furrows. Rice-meal acts like arrow-root with aquafortis, but its sharp, spicular, horn-like particles are instantly detected by the microscope.

Uses, &c. It forms an agreeable, non-irritable article of diet for invalids and children, in the form of cakes, biscuits, or puddings, or boiled with milk or water and flavoured with sugar, spices, lemon juice, or wine, at pleasure. For young children a little caraway or cinnamon water is to be preferred. It is especially useful in irritation or debility of the stomach, bowels, or urinary organs, and in all cases in which a demulcent or emollient is indicated. It must not, however, be employed to the entire exclusion of other food, as, being destitute of the nitrogenous elements of nutrition, it is incapable alone of supporting life. *Arrow-root jelly* is prepared by first rubbing the powder up with a very small quantity of cold water, and then gradually adding the remainder *boiling*, stirring well all the time. Beef-tea, veal broth, or milk, may be used instead of water. Some persons boil it for a few minutes. This jelly, flavoured with a little genuine port wine and nutmeg, is almost a specific in cases of simple diarrhœa arising from habit or debility.

ARROW-ROOT (Brazilian). Cassava starch or tapioca meal.

ARROW-ROOT (East Indian). Curcuma starch; from the tubers of the *curcuma angustifolia*, or narrow-leaved turmeric.

ARROW-ROOT (English). Potato starch.

ARROW-ROOT (Portland). From the *arum maculatum* or wake-robin.

ARROW-ROOT (Tahiti). Tacca starch or Otaheite salep; from the *tacca oceanica.*

ARSENIATE. Syn. *Arsenias*,—Lat. The arseniates are all poisonous. Most of the *metallic arseniates* may be formed by adding a solution of a soluble salt of the metal to another of an alkaline arseniate, as long as a precipitate falls; which must be collected, washed, and dried. The *alkaline arseniates* may be prepared by adding the base or its carbonate to a solution of the acid, to alkaline reaction, and then evaporating and crystallizing. The *arseniates of the alkalies* are soluble in water; those of the *earths* and *metals* insoluble, except in acids.

ARSENIC. Syn. *Arsenick; Arsenicum*, —Lat. The brittle, gray-coloured metal forming the base of the white arsenic of commerce. Arsenic is peculiar to the mineral kingdom. The statements of Orfila, Couerbe, and Devergie, that the bones and muscles of healthy men, horses, oxen, and sheep, contain arsenic, has been satisfactorily disproved by the more recent researches of Danger and Flandin, Chevalier, Dr. G. O. Rees, the Commissioners of the French Academy, and several others. The *metallic arsenic of commerce* is obtained by roasting *arsenical pyrites*, (*mispickel*,) in earthen tubes, or tubular earthen retorts; the arsenic sublimes, and sulphuret of iron remains behind. On the small scale it is prepared by sublimation from a mixture of *arsenious acid* and *charcoal* or *black flux*.

Prep. 1. (*Arsenicum Purum*,—Ph. D.) *White oxide of arsenic* (of commerce), 2 dr.; place it at the sealed end of a hard German-glass tube (½ × 18 inches), cover it with about 8 inches of *dry* and *coarsely powdered charcoal*, and raise the portion of the tube containing the latter to a red heat, whilst a few ignited coals are placed beneath the oxide to effect its slow sublimation. The sublimed metal will gradually attach itself to the inside of the tube at its cool extremity.

2. Mix *arsenious acid*, 1 part; with *black flux*, 2 parts; and expose the mixture to a red heat in a *Hessian crucible*, over which is luted a deep empty crucible or earthen tube to receive the metal; the upper one being kept cold.

Prop. Very brittle; lustre highly metallic; colour, steel-gray; texture, crystalline; crystals, rhombohedrons; sublimes at 356° Fahr. without fusion, with an alliaceous odour, (and slowly at lower temperatures;) in close vessels unaltered, but when exposed to the air yielding fumes of arsenious acid; slowly oxidized and dissolved by boiling water, but "may be preserved unchanged in pure water," (Fownes;) rapidly tarnishes in the air; with oxygen it forms acids, but no basic oxide. *Sp. gr.* 5·6 to 5·9. It combines with the metals in a similar manner to sulphur and phosphorus, which it resembles (especially the latter) in many respects. These compounds (*alloys*,) are termed *arseniurets* or *arsenides.*

Uses. With copper, arsenic forms a white alloy, (*Packfong*,) and it is added to some other metals and alloys to increase their whiteness, hardness, and fusibility. In the metallic state it is inert; but from its great affinity for oxygen, it rapidly becomes oxygenized and poisonous; and acts as a powerful poison when swallowed. See *Arsenious Acid.*

ARSENIC (Bromide of). Syn. *Sesquibromide of Arsenic; Arsenici Bromidum*,—Lat. *Prep.* (Serullas.) Add *dry arsenic*, (in powder,) cautiously, and in small quantities at a time, to *pure bromine*, as long as light continues to be emitted; then distil into a well-cooled receiver. *Prop.*, *&c.* Solid below 68° Fahr.; boils at 428°; when liquid it is yellowish.

ARSENIC (Chlorides of). *Prep.* 1. (*Protochloride*,—Dumas.) *Arsenious acid*, 1 part; *concentrated sulphuric acid*, 10 parts; mix in a tubulated retort, heat to 212°, and project in, gradually, small quantities of *chloride of sodium;* collect the newly-formed chloride in a well-cooled receiver. It may be rendered anhydrous by distillation from concentrated sulphuric acid.

2. (*Terchloride of Arsenic, Chloride of do.; Sesquichloride of do., Butter of do.; Arsenici Terchloridum, Arsenici Chloridum*,

—Lat.) *Prep. a.* (Fownes.) From a mixture of *arsenic*, 1 part, and *bichloride of mercury*, 2 parts, distilled together.

b. Boil *arsenic* for some time in *hydrochloric acid*, to which a little *nitric acid* has been added; then concentrate cautiously, and distil.

Prop., &c. Terchloride of arsenic is a colourless, volatile, highly poisonous liquid, decomposed by water into arsenious acid and hydrochloric acid. It has been employed as a caustic in cancer and venereal warts.

ARSENIC (Teriodide of). Syn. *Iodide of Arsenic, Ioduret of do., Hydriodate of do.; Arsenici Iodidum, &c*,—Lat. *Prep.* 1. (Biett.) *Finely pulverized metallic arsenic*, 16 parts; *iodine*, 100 parts; mix, and heat them in a glass tube or retort until the iodide sublimes, when it must be collected and preserved in a well-stopped phial.

2. (W. Procter.) *Arsenic*, in fine powder, 1 part; *iodine*, 5 parts; triturate together, place the mixture in a small flask or retort just large enough to contain it, and apply a gentle heat until liquefaction is produced, avoiding the formation of iodine vapour; when no odour of iodine is perceptible, and the mass assumes a reddish-yellow colour, and crystallizes on the sides of the vessel, the operation is complete, without having recourse to sublimation.

3. (Wackenroder.) *Arsenic*, in powder, 1 part; *iodine*, 6 parts; *water*, 120 parts; digest together in a flask, evaporate by a gentle heat, (but as quickly as possible,) and as soon as the mass begins to solidify, the temperature must not exceed 86° Fahr.

4. (Plisson.) *Arsenious acid*, 3 parts; *iodine*, 10 parts; *water*, 110 parts; digest together until no odour of iodine is perceptible, then decant, evaporate to dryness, and sublime as before.

Prop., &c. An orange-red, crystallizable solid, soluble in water, and highly volatile and poisonous; its aqueous solution yields the iodide unchanged by rapid evaporation. As a *medicine* it combines the properties of both arsenious acid and iodine. It has been employed in obstinate skin diseases (lepra, impetigo, herpes, lupus, psoriasis, &c.), and in real or simulated cancer.—*Dose.* $\frac{1}{12}$th of a grain (in pills) gradually increased to $\frac{1}{4}$th or even $\frac{1}{3}$d of a grain. (A. T. Thomson.) *Externally*, $2\frac{1}{2}$ grs., to lard, 1 oz.; of which 1 dr. may be used at a time. (Biett.)

ARSENIC (Oxides of). The only definite compounds of arsenic with oxygen, are *arsenious acid*, and *arsenic acid*.

ARSENIC (Sulphurets of). Seven combinations of sulphur and arsenic are noticed by Gmelin; but only three of these deserve notice here—

ARSENIC (Bisulphuret of). Syn. *Sulphide of Arsenic, Bisulphide of do., Red Sulphuret of do., Proto-sulphuret of do., Red Arsenic, Realgar; Arsenici Bisulphuretum, A. Sulphuretum Rubrum, Arsenicum Rubrum, &c.*,—Lat. This substance is found native in some volcanic districts; but that of *commerce*, is prepared by distilling (*in an earthen retort*,) arsenical pyrites, or a mixture of sulphur and arsenic, of orpiment and sulphur, or of arsenious acid, sulphur, and charcoal, in the proper proportions.

Prop., &c. A fusible, volatile substance; scarlet or ruby red in mass, but orange-red in powder, by which it is distinguished from cinnabar; *sp. gr.*, 3·3 to 3·6. (Ure.) Its chief use is as a pigment and a component of fireworks. The factitious sulphuret has not the rich colour of the native mineral, whilst it is much more poisonous. It is improved by resublimation.

ARSENIC (Tersulphuret of). Syn. *Tersulphide of Arsenic, Yellow Sulphuret of do., Sesquisulphuret of do., Yellow Arsenic, King's Yellow, Sulpharsenious Acid; Arsenici Tersulphuretum, A. Sesquisulphuretum, Arsenicum Flavum, &c.*,—Lat. This sulphuret, like the last, is found ready formed in nature, and is prepared artificially, by sublimation, from a mixture of arsenious acid and sulphur.

Prop., &c. Form, yellow crystalline lumps or fine golden yellow powder; volatile; fusible; very soluble in pure alkalies. It is distinguished by the last property from sulphuret of cadmium; and from tersulphuret of antimony by being insoluble in hydrochloric acid. The factitious sulphuret (*king's yellow*,) of the shops often contains 80% to 90% of white arsenic. *Sp. gr.* (native,) 3·44 to 3·60. It is extensively used as a dye, as a yellow pigment, an ingredient in fireworks, and in some depilatories. Silk, woollen, or cotton goods soaked in a solution of pure orpiment in ammonia, and then suspended in a warm apartment or stove-room, rapidly lose their ammonia, and become permanently dyed of a superb yellow colour. The native sulphurets (both red and yellow) are much less soluble, and hence, less poisonous, than those prepared artificially. They also possess the richest colour, and are, therefore, preferred by artists.

ARSENIC (Pentasulphuret of). Syn. *Persulphide of Arsenic, Sulpharsenic Acid.* When a stream of *sulphuretted hydrogen* is transmitted for some time through a solution of *arsenic acid*, a precipitate of the pentasulphuret is deposited after some hours' repose. Its formation is accelerated by boiling. It greatly resembles the tersulphuret in its appearance and general properties.

ARSENIC ACID. Syn. *Acidum Arsenicum*,—Lat. This is arsenic in its highest state of oxygenation.

Prep. 1. (Brande.) *Arsenious acid*, (in fine powder,) 2 parts; *nitric acid*, 6 parts; *hydrochloric acid*, 1 part; mix in a tubulated retort, and distil until the liquid acquires the consistence of a thick syrup, then transfer it to a platinum crucible, and cautiously expose it for some time to a dull red heat, to expel the nitric acid.

2. (Liebig.) *Arsenious acid*, 1 part; *concentrated nitric acid*, 6 parts; *hydrochloric acid*, 1 part; as before.

3. Dissolve *arsenious acid* in hot *hydrochloric acid*, and add *strong nitric acid*, until red vapours cease to be evolved, then proceed as before.

Prop., &c. When solid, white, granular, and anhydrous, (that of the shops is commonly of a syrupy consistence, owing to the presence of water;) soluble in 6 parts of cold water, and less of boiling water; solution, sour, and powerfully acid; in both its conditions it absorbs moisture from the atmosphere, and at a high temperature is resolved into oxygen, and arsenious acid which volatilizes. It is distinguished from arsenious acid by—1. Nitrate of silver added to the solution of an arseniate gives a highly characteristic *reddish-brown* precipitate.—2. Nitrate of lead gives a *white* precipitate, and the salts of copper *greenish-blue* ones.—3. Pure lump sugar dissolved in an aqueous solution of this acid, becomes in a few hours of a *reddish* colour and afterwards of a *magnificent purple*.—4. If the suspected liquid is treated with sulphurous acid and boiled for a short time, the arsenic acid loses oxygen and is converted into arsenious acid, which may then be tested for as such. (Wöhler.)

Uses. It has not been employed in an uncombined state either in the arts or medicine; but some of its preparations have been used in both. It is a powerful poison.

ARSENIOUS ACID. Syn. *Teroxide of Arsenic*, *White Arsenic*, *White Oxide of Arsenic*, *Sesquioxide of Arsenic*, *Commercial Arsenic; Acidum Arseniosum*,—Ph. L. *Arsenicum Album*,—Ph. E. *Arsenici Oxydum Album Venale*,—Ph. D. This is the *arsenic* or *white arsenic* of the shops. It is principally imported from Germany, where it is obtained in the process of roasting the arseniuretted cobalt ores for making zaffre. At Altenburgh it is procured from arsenical iron pyrites, (*mispickel*,) and at Riechenstein from native arsenide of iron. About 900 to 1000 tons are also annually collected in Cornwall, being, principally, a secondary product of the process of roasting the gray copper ores and white mundic. The "*British arsenic works*" in that county, are perhaps the finest in the world. The crude article obtained in this way has to be purified by re-sublimation in suitable iron vessels, before it is fit for sale. It then forms a semi-transparent vitreous cake, which gradually becomes opaque and of snowy whiteness by exposure to the air, and at length acquires a more or less pulverulent state on the surface.

Prep. 1. (*Acidum Arseniosum Purum*,—Ph. D.) Take of *commercial white arsenic*, any quantity; place it in a Florence flask, the neck of which is made to pass into that of a second flask of larger size inverted over it, and apply to the former a regulated heat, by suspending it beneath a semicircular hood of sheet iron, a few inches above a small charcoal fire until the sublimation is complete. This process is unnecessary, as the white arsenic of commerce, in semi-vitreous lumps, having been *twice sublimed*, is necessarily as pure as mere sublimation can make it.

2. (*Prepared White Arsenic; Acidum Arseniosum Præparatum.*) By levigation and elutriation as directed for tersulphuret of antimony.

Prop. Crystals, (obtained by careful sublimation or by cooling a boiling aqueous solution,) transparent, regular octahedrons; when prepared on the large scale, it forms large, glassy, colourless, or yellowish-white, transparent, or semi-transparent cakes or porcelain-like masses, which soon become *opaque* on their exterior, owing to the absorption of a minute quantity of water from the atmosphere, and often friable and pulverulent; odourless; volatilizes at 380° Fahr.; fumes, odourless, unless carbonaceous organic matter be present, when they smell strongly of garlic; *sp. gr.*, 3·5 to 3·8; taste, faintly sweetish, with a slight acidity and astringency, not perceived until some minutes after being swallowed; (hence its dangerous character as a poison;) soluble, (*opaque variety*,) in 80 parts of water at 59° Fahr., (Guibourt;) and in 7·72 parts of boiling water, (Guibourt;) but on cooling to 60°, only about ⅓d of this quantity continues in solution,—(*transparent variety*,) soluble in 103 parts of water at 59°, and 9·3 parts of boiling water, (Guibourt;) soluble in alcohol, syrups, oils, and spirits, and freely so in alkaline lyes and hydrochloric acid; organic matter generally impedes its solution; reddens litmus; heated with organic matter it is reduced to the metallic state. Its salts are called *arsenites.*

Pur. It is "entirely sublimed by heat." (Ph. E.) Five grains boiled in 1 oz. of pure water should dissolve without leaving *any* residue. "If 100 grs. be digested in dilute hydrochloric acid, and, when the liquid has cooled, hydrosulphuric acid be added, 124 grains of tersulphuret of arsenic are precipitated." (Ph. L.) The arsenious acid of the shops is frequently adulterated with plaster of Paris, sulphate of baryta, ground bone-ash, or white sand, and is then totally unfit for the purposes to which it is generally applied. To avoid this fraud, it should be purchased in the lump, in which state it is generally nearly pure.

Tests. (When not otherwise stated, it is to be understood that they are to be applied to pure, or nearly pure and colourless solutions.)

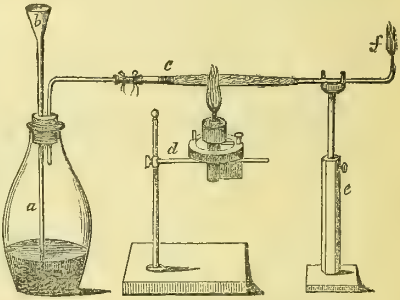
1. *Ammonio-acetate of Copper.* A weak solution of this test gives a very characteristic grass-green, or yellowish-green, precipitate of arsenite of copper (*Scheele's green,*) in solutions of arsenious acid, or of arsenites containing free acid, which, after being washed, is soluble both in nitric acid and ammonia, and is turned *brownish-red* by sulphuretted hydrogen water, *blood-red* by ferrocyanide of potassium, and *yellow* by nitrate of silver.

2. *Ammonio-sulphate of Copper.* Acts under the same circumstances in the same manner as the ammonio-acetate, but is less delicate. Sulphate of copper acts in the same way with neutral solutions of the arsenites.

3. *Ammonio-nitrate of Silver; Hume's Test.* Added, in solution, to a solution of arsenious acid, or an arsenite containing free acid, a well-marked *yellow* precipitate of arsenite of silver is formed, which is soluble in liquid ammonia, in dilute nitric acid, and in solution of nitrate of ammonia. Nitrate of silver produces a similar precipitate in a neutral solution of an arsenite.

4. *Crystallization Test.—a.* A very minute quantity of arsenious acid placed in a small tube (*arsenic tube*) and heated in the flame of a spirit lamp, gives a crystalline sublimate, which collects on the cooler portion of the tube, and which, when examined by a pocket lens, is found to consist of sparkling octahedral crystals.—*b.* By evaporating a small quantity of a clear aqueous solution of arsenious acid on a glass plate or watch-glass, similar crystals will also be obtained. In both cases they may be submitted to other tests. A little *boracic acid* may be added before applying this test.

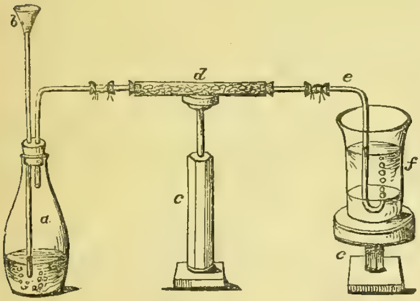
5. *Ellis's Test.* This consists in passing *arseniuretted hydrogen* (obtained in the usual way from the suspected liquid,) through a tube containing *slips of copper-leaf* or *riband,* or still better, *pure oxide of copper,* gently heated, and having the one end drawn to a capillary size, at which the gas may be enflamed and tested. (See Engraving.) If arsenic is abundant in the gas, the copper will be almost instantly frosted over with a coating of metallic arsenic, and after continuing the heat for a few minutes it will present a beautiful silvery surface, and may then be submitted to further examination. (See *Rensch's Test.*) The slips of copper for this purpose are directed to be prepared by exposure in a clear fire to a dull red heat, and are then to be suddenly thrown into cold water; after which they are to be wiped dry for testing.



a, Flask containing the suspected fluid, dilute sulphuric acid, and zinc.
b, Funnel.
c, Tube containing the copper-leaf or riband, and heated by the lamp *d.*
e, Support.
f, Capillary end of tube *c,* with the gas enflamed.

6. *Lassaigne's Test.* (Adopted by the *French Academy.*) This consists in passing the *arseniuretted hydrogen* generated in the suspected liquid, through a solution of *nitrate of silver.* (See Engraving.) Black flocculi of metallic silver are deposited, and arsenious acid remains in solution mixed with nitric acid and some arsenide of silver. The filtered liquor, treated with ammonia, will now give a characteristic yellow precipitate of arsenite of silver, or a little dilute hydrochloric acid may be cautiously added to precipitate any remaining nitrate of silver, and the liquid, after filtration,

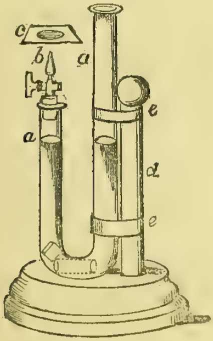
tested for arsenic either in a Marsh's apparatus, or with liquid tests; or it may be evaporated to dryness, when its arsenious acid will be converted into arsenic acid by the nitric acid present, and will then be found to give the usual brick-red precipitate of arseniate of silver with a solution of the nitrate of that metal.



7. *Marsh's Test.* This test depends on the property possessed by nascent hydrogen, of taking the metal from a solution of arsenious acid. Some of the *suspected liquid* is mixed with *dilute sulphuric acid* until strongly acid, and poured upon some *pieces of zinc* previously placed in the apparatus; hydrogen gas is immediately evolved, and if arsenic is present unites with it, forming arseniuretted hydrogen gas, which escapes by the aperture *b*, (see Engraving,) and may be recognised as follows:

a. It possesses a garlic-like smell.

b. It burns with a bluish-white flame, and emits a whitish smoke.



a a, Bent glass tube containing dilute sulphuric acid, zinc, and suspected fluid.
b, Stopcock and jet.
c, Plate of glass to receive the stain.
d, Support.
e e, Bands to keep the tube upright.

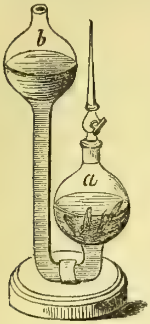
c. When a piece of window-glass, or a white porcelain plate or saucer, is held a short distance *above* the flame, arsenious acid, under the form of a fine pulverulent film is deposited thereon.

d. When the cold plate is held *in* the flame, a blackish deposit of metallic arsenic is obtained, more or less deep, brilliant and glistening. Both these deposits may be obtained simultaneously by holding nearly vertically over the flame a glass tube 8 or 10 inches long, and ⅜ths of an inch in diameter.

e. A solution of arsenious acid may be obtained by letting the flame play upon 3 or 4 drops of water, placed on the under side of the piece of glass or china, to which the liquid tests may be then applied. Another plan is to apply drops of the liquid tests to the plate as above, and to let the flame play on them successively.

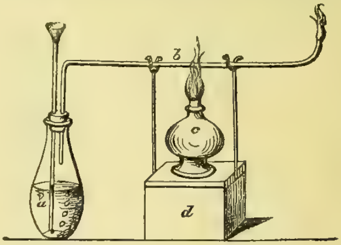
f. The true arsenical spot is of a blackish-brown colour; that of antimony is of a deep black colour, and but feebly lustrous. It is further distinguished from others by—*α*. Treated with *concentrated nitric acid* it instantly disappears, leaving upon the surface of the liquid traces of the metal, which only dissolve on the application of heat. This solution gently and carefully heated, leaves a white residuum, which, when cold, gives, with a *concentrated solution of nitrate of silver*, a dull red precipitate of arseniate of silver.—*β*. The nitric solution (*see* above), treated with a few drops of *sulphurous acid*, and subsequently with *sulphuretted hydrogen*, gives a canary-yellow sulphuret of arsenic, which forms a colourless solution with *ammonia*.—*γ*. The spot when heated is turned orange-red or reddish-brown by *sulphuretted hydrogen*, and is dissolved, as before, by *ammonia*.—*δ*. It is soluble in and removed by *hypochlorite of soda*.—*ε*. Heated by a flame of *pure hydrogen*, an arsenical stain rapidly disappears. A *mixed* stain of *antimony* and *arsenic* does not disappear by the action of the last two reagents, and is shown to contain arsenic by the tests *α* and *β* (above). When hydrochloric acid is present, zinc stains are sometimes formed, but they do not resemble those from arsenic.

Obs. This test admits of application to all liquids, whether colourless or coloured, provided they are not so glutinous as to occasion much frothing during the escape of the hydrogen. Various modifications of the original apparatus have been proposed to obviate this inconvenience; among which, the only one deserving notice consists of a bent tube having two large bulbs blown upon it, and fitted with a stop-cock and jet in the usual manner. (See Engr.) In this case the slips or fragments of zinc are put into the lower bulb (*a*). With ordinary care and skill, a simple wide-mouthed bottle, furnished with a tube and cock, will often be found to answer quite as well, or better than more costly apparatus; as the fluid is less liable to froth than in a narrow tube. Even a common quinine or 6 oz. medicine-phial, fitted with a small piece of glass tube or tobacco-pipe for a burner, may be used when no more convenient instrument is at hand. The only precaution necessary to success, is to set the apparatus with simple zinc, acid, and water, and after it has worked a short time to test the evolved gas for arsenic; when, if *no trace* of that substance is detected, the suspected fluid, in which the organic matter (if necessary) has been destroyed by any one of the methods hereinafter pointed out, may be added, and the operation continued. Care should also be taken not to light the jet of gas before *all* the atmospheric air is expelled from the apparatus, as without this precaution an explosion may take place. A film of oil placed on the surface of the liquid tends considerably to lessen the frothing. Lassaigne's and Ellis's tests are mere modifications of Marsh's.



8. *Morton's Test.* This consists in immersing in the suspected fluid two *platinum plates* connected with the *poles of a good galvanic battery.* The hydrogen liberated at the negative electrode must be collected and examined in the same way as described in the last article. The advantage of this apparatus is, that it obviates the use of zinc and sulphuric acid, and thus prevents the introduction of arsenic by either of those substances. This advantage is, however, rather *apparent* than *real,* as with proper care, such need never be the case. *Susc.* $\frac{1}{70,000}$. (Morton.)

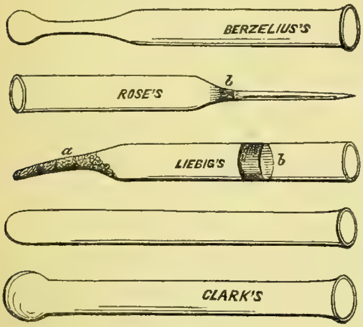
9. *Nascent Hydrogen Test.* This includes *Marsh's, Ellis's, Lassaigne's, Morton's,* and *all* other tests which depend on the property possessed by *nascent hydrogen* of taking *arsenic* from its *aqueous solutions.* When this gas is subjected to a red heat, it deposits its arsenic in the metallic state, whilst its hydrogen escapes. The chemist avails himself of this property, by heating a small tube through which the gas is slowly passed, by means of the flame of a spirit lamp with a large wick, when a characteristic ring or mirror of metallic arsenic is deposited a little beyond the flame, in the cooler portion of the tube. The apparatus used in this experiment may be similar to that figured in the engraving.



The plan followed in the laboratory of Giessen, is to remove the tube from the hydrogen apparatus and to transmit a very feeble stream of dry *sulphuretted hydrogen* through it, the metallic mirror being at the same time heated by means of a spirit lamp, from its outer towards its inner extremity. "If *arsenic, alone,* be present, *yellow sulphuret of arsenic* will be formed within the tube; if *antimony, alone,* be present, an *orange* or *black sulphuret of antimony* will be produced; but if the mirror consists of *both metals jointly,* the *two sulphurets* will appear *side by side,* the sulphuret of arsenic as the more volatile, lying invariably before the sulphuret of antimony." "If *dry hydrochloric acid gas* be now transmitted, without application of heat, through the tube, *no* alteration whatever will take place if *sulphuret of arsenic alone* is present, even though the gas be transmitted through the tube for a considerable time. *If sulphuret of antimony alone* be present, this will *entirely disappear;* and if both sulphurets are present, the *sulphuret of antimony* will immediately volatilize, whilst the *yellow sulphuret of arsenic* will *remain.* If a small quantity of *ammonia* be then introduced into the tube, the *sulphuret of arsenic* will be dissolved, and may thus be readily distinguished from sulphur which perhaps may have separated. My personal experience has convinced me of the infallibility of these combined tests for arsenic." (Fresenius.)

10. *Reduction Test.* A small quantity of the suspected sample is mixed with an equal weight or more of some reducing agent or flux (see below), and the mixture, in a state of perfect dryness, is placed at the bottom of a small glass tube, and heated in the flame of a small spirit lamp for some time,

when the arsenic gradually sublimes, and condenses in the cooler portion of the tube, under the form of a metallic crust, mirror, or ring. A common test-tube, if of very small diameter, may be employed; but those known as the reduction tubes of Liebig, Rose, or Berzelius, are undoubtedly the most convenient and efficient. (See Engraving.)



a, The arsenical mixture.
b, Arsenical ring.

The metallic ring is proved to be arsenical by—

α. The volatility of the deposit when heated, shown by its escaping from the hotter portion of the tube and resting on the cooler part further on.

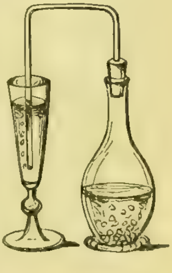
β. Its conversion into minute octahedral crystals of arsenious acid, when repeatedly chased up and down the tube, by the cautious application of the flame of a spirit-lamp first to one part and then to another. The character of these crystals, with respect to volatility, lustre, transparency, and form, is so exceedingly well marked, that a practised eye may safely identify them, though their weight should not exceed the $\frac{1}{100}$th part of a grain. (Liebig and Gregory.) A pocket lens may be advantageously employed.

Obs. In employing this test, care must be taken to avoid soiling the sides of the tube in the operation of inserting the mixture; as, unless the tube is quite clean and dry, the experiment does not succeed. The common plan is to introduce the mixture through a small paper funnel or tube. In exposing the mixture to heat, the upper portion of it alone should be *first* heated, and then the bulb or bottom of the tube exposed to the full flame. *Black flux*, or a mixture of *ignited carbonate of soda* and *charcoal*, or better still, *recently ignited charcoal*, are employed as reducing agents for *arsenious acid;* but if the substance contains an *arsenite*, a mixture of *charcoal and boracic acid* should be used; if it contains a *sulphuret*, a mixture of 2 parts of *ignited carbonate of soda* with 1 part of *charcoal* may be advantageously employed. Liebig uses a *mixture* of equal parts of *dry carbonate of soda* and *cyanide of potassium.* The arsenical compound is first introduced into the tube, and then covered with 6 times the quantity of this mixture; the whole not to more than half fill the bulb of a Berzelius's tube. This may be used for either *arsenious acid* or its *compounds*, or for the *sulphurets of arsenic.* This test is usually regarded as *decisive*, as we here actually obtain the arsenic in a *solid form*, which may be recognised by the *most unequivocal characters.*

11. *Rensch's Test; Cupro-arsenical Test.* The suspected solution of arsenious acid is strongly acidulated with *hydrochloric acid*, (1 to 5, to 1 to 9,) and boiled in a porcelain or glass vessel, with bright and clean *metallic copper* in the form of *sheet*, *foil*, *gauze*, *leaf*, or *wire.* The time, required for the ebullition varies according to the strength of the solution; when weak it should be continued for at least a quarter of an hour. The coated copper is then taken from the liquid, carefully washed, dried, cut into small pieces, and heated in a glass tube over a spirit lamp, when the metallic arsenic is volatilized, and yields either a metallic ring, or a sublimate of minute octahedral crystals of arsenious acid. When the coating on the copper is sufficiently thick, it may be scraped off with a knife, and heated separately in an arsenic or reduction tube.

Obs. This test is very susceptible, and is invaluable as affording a certain and ready means of abstracting arsenic from its solution when mixed with organic matter. The contents of the stomach or other viscera, may thus be examined without any tedious preliminary preparation.

12. *Sulphuretted Hydrogen Test.* The liquid should be acidulated with *hydrochloric* or *acetic acid* before applying this test, unless it is already sour, when it is better *first* to neutralize it with an *alkali* and then to add the *acid.* The transmission of the gas (see Engraving) through the liquid should be continued for at *least* half an hour, when the end of the conducting tube



after being well rinsed in the liquid, may be removed, and the glass lightly covered with a piece of *porous paper*, set aside in a temperature of about 100° Fahr., until the odour of sulphuretted hydrogen is completely lost. The precipitate may now be collected on a small filter, washed with pure water, and submitted to confirmatory tests. It is shown to contain arsenic by its *ready* and *perfect solubility* in solutions of the *pure alkalies*, their *carbonates* and *bicarbonates*, and in *alkaline sulphurets;* by being nearly *insoluble* in *hydrochloric acid;* and by yielding metallic arsenic when mixed with *black flux* and submitted to the reduction test. *Sulphuretted hydrogen water* and *hydrosulphuret of ammonia* act in a similar way to gaseous sulphuretted hydrogen; but less effectively.

13. *Wollaston's Method.* This consists in concentrating by heat, in a capsule, a little of the suspected liquid, previously decoloured and filtered, (if necessary,) and placing it in the middle of a bit of window glass, and drawing lines with the fluid in different directions, so as to form a star-like figure. To one of these rays a particle of weak solution of *ammonio-nitrate of silver* is applied; to another, *ammonio-acetate of copper;* to a third, the *deuto-acetate of iron;* to a fourth, *ammonio-acetate of cobalt; sulphuretted hydrogen* to a fifth, and *lime water* to a sixth; a drop of *syrup of violets* to a seventh; and the two wires of a galvanic battery to the opposite edges of the whole. In this way several very exact experiments may be performed with a very small quantity of a suspected fluid.

14. *Detection of Arsenic in Organic mixtures.* Most of the previous tests are only applicable, with any degree of *certainty*, to pure or nearly pure solutions of arsenious acid or the arsenites, and fail to yield *reliable results* with coloured liquids, or with those which are contaminated with much organic matter. Indeed, with those depending on the production of coloured precipitates, the sine quâ non of success, is "operating on a liquid in as limpid and colourless a state as can possibly be obtained." The tests depending on the extrication of *arseniuretted hydrogen* are partial exceptions to this rule; but even in their application, if the suspected liquid is more than slightly charged with organic matter, so much frothing ensues, as to render the process unmanageable. In this respect *Rensch's test* possesses advantages over *all* others; as it may be employed to abstract the arsenic from liquids containing organic matter, without these being subjected to any preliminary process. In some cases, also, as with liquids only slightly contaminated with organic matter, or not possessing much consistency or colour, the arsenic may be separated from them, after simple straining or filtration and acidulation with hydrochloric acid, by passing a stream of *sulphuretted hydrogen* through them, in the usual manner. The *reduction test* is only applicable to solid arsenious acid, or to some of the compounds of arsenic obtained by means of other tests. In toxicological examinations the poison is almost always to be sought for in mixtures loaded with organic matter, and under the several conditions above referred to.

In a suspected case of poisoning by arsenic, resulting in death, the stomach must, therefore, be laid open, and an examination made for any particles of the poison, which it may contain in an undissolved state; a pocket lens being employed, if necessary, in the search. If any particles, however minute, are found, they should be carefully collected and submitted to the *reduction test.* Should the reverse be the case, the stomach (cut into small pieces), together with its contents, must be submitted to some further process for the abstraction of their arsenic in a form in which its presence may be demonstrated by tests. Various plans have been proposed for this purpose; among which are the following:

a. (Christison.) The suspected matters are boiled in a glass vessel with *distilled water* for half-an-hour, a little *potassa* or *ammonia* being added; the liquid is then strained or filtered, first through a hair sieve, and then through muslin or coarse paper, again boiled with a little *acetic* (or hydrochloric) *acid*, and filtered a second time. In this state the liquid is usually clear enough to be tested with the *ammonio-nitrate of silver* (or in Marsh's apparatus,) when if this test acts *freely*, the process of testing with other reagents may be proceeded with; but, if on the contrary, the indication is *feeble*, the liquid is evaporated to dryness, and the residuum redissolved by boiling it in repeated portions of distilled water, when after being once more filtered, it is generally sufficiently limpid for the perfect application of tests.

b. (Danger and Flandin.) To the organic matter or concentrated solution contained in a porcelain capsule, one sixth of its weight of the *strongest pure sulphuric acid* is added, and the mixture constantly stirred with a glass rod until vapours of the acid begin to appear; the heat is then continued until the charcoal thus formed becomes friable and almost dry, when it is cooled a little, and a small quantity of *concentrated nitric acid* added by means of a pipette. The evaporation is then continued to dryness, the residuum boiled with *distilled water*, and the solution filtered, when it is ready for testing.

c. (Devergie.) The organic matter is first treated with *potassa* (and water), and then with *nitrate of lime;* after which the arsenious acid is again taken up by *hydrochloric acid.*

d. (Orfila.) The suspected matter (reduced to nearly the dry state) is mixed with twice its weight of pure *powdered nitre*, and cautiously dried in a porcelain capsule at a gentle heat, constantly stirring; after which it is powdered and deflagrated, by throwing it in small portions at a time, into an earthen crucible heated to dull redness. After a short interval the crucible is allowed to cool, and the grayish-white mass thoroughly washed with distilled water, the solution evaporated to the consistence of a syrup, and *concentrated sulphuric acid* added gradually, until it ceases to produce effervescence, when it is boiled until fumes of nitric or nitrous acid are no longer evolved. The saline residuum, taken up by *distilled water*, furnishes a perfectly limpid and colourless solution. The only precaution necessary is to expel the *whole* of the *nitric* and *nitrous acids*, as before indicated; as otherwise an explosion would inevitably occur, if the mixture should be tested in a Marsh's apparatus. If the solution is too acid, it is directed to be partly neutralized by *potassa dissolved in alcohol.*

e. (Rensch.) Solids, (as the stomach, liver, &c.,) are cut into small fragments, and boiled in a glass vessel with water acidulated with about 1-10th of its volume of *hydrochloric acid*, until the tissues or fragments are entirely broken down into flakes or grains, when the whole must be filtered through a hair sieve or coarse calico, again heated to the boiling point, and tested as described under *Rensch's test.*

f. Many organic liquids (as *vomited matter, &c.*) lose much of their glutinosity and colour by dilution with *water*, *boiling*, and *straining.* The albumen is coagulated by the heat, and removed in the solid form by filtration. By evaporating the filtered liquor to ⅙th its bulk, re-diluting with water, and again boiling, the effect is more marked. The addition of a little *absolute alcohol* to the cold solution will now generally complete the separation; but some colour will still be left.

Before concluding our notice of testing for arsenic, it may be useful to caution the reader, of the absolute necessity of employing tests and reagents which are themselves *perfectly pure*, and in which the operator has, by *personal examination*, failed to detect the slightest trace of arsenic. Commercial sulphuric, nitric, and hydrochloric acids, *frequently* contain arsenic; so also do potash, nitre, iron, and zinc, from which, however, they may be easily freed by chemical processes; or they may be purchased in the pure state from the dealers in chemicals. But *no assurance of the vendor* should be regarded as a *proof of* their purity. In all judicial investigations the absence of arsenic in the several tests and reagents, and apparatus employed, must be demonstrated and sworn to. We may further add, that the results afforded by *no* SINGLE test can be depended on. In matters of such vast importance, confirmatory evidence of the most ample character must be sought.

Estim. It may be reduced to the *metallic state* by one of the processes already given, and then weighed;—every grain of pure arsenic represents 1⅓ gr., or more correctly, 1·32 gr. of arsenious acid. *Or*, it may be weighed in the form of *sulphuret.* For this purpose the latter should be purified by solution in *pure ammonia water*, and evaporation of the resulting solution in a weighed watch-glass or capsule, by the heat of a water bath. It must then be dried by exposure to a temperature not above 212° Fahr., when it may be finally weighed. Each grain of sulphuret corresponds to 0·804 gr. of *arsenious acid*, or 0·61 gr. of *metallic acid.*

Pois., &c.—Symp. These sometimes begin to appear within half-an-hour after the poison has been taken, but generally do not show themselves until after the lapse of some hours. They are at first, nausea and distress at the stomach, soon followed by thirst and a sense of burning heat in the bowels; then come on constriction of the œsophagus, violent vomiting, severe colic pains, and excessive and painful purging. The pulse is generally hard, the heart's action tumultuous; the respiration difficult and panting; faintings and cold sweats, with other signs of debility intervene; itching and eruptions of the skin, painful cramps and contractions of the extremities, and violent convulsions, often follow, and after these, a greater or less prostration of strength, which induces a deceitful calm. At length the heart's action abates, the skin becomes suffused with a cold clammy sweat, and the sufferer dies from exhaustion." The progress, succession, and precise character of the symptoms are modified by the idiosyncracy of the individual, the quantity of the poison, and the manner in which it has been taken.—*Treat.* If vomiting has commenced it must be promoted by tickling the throat, and administering a large quantity of *gelatinous hydrated peroxide of iron,* or other appropriate antidote, (see below,) mixed with a large quantity of *sugar* and *warm* or *tepid water.* If vomiting has not commenced, which is rare, it must be excited by administering from 8 to 15 grains of *sulphate of zinc,* or *ipecacuanha,* and tickling the throat as before. If these means fail in rapidly inducing copious vomiting, the stomach pump may be had recourse to. We may give altogether as much as 16 oz. of the hydrated peroxide of iron. If the poison has been swallowed several hours previously, and hence may have passed the pylorus, a purgative clyster may be administered, and after its action another containing the antidote; after the stomach and bowels have been cleared, *diuretics* and *sudorifics* may be given in abundance, (*white wine* and *nitrate of potash* mixed with *seidlitz water.*) The best purgative (per mouth) to expel arsenic from the intestines is *castor oil.* Lastly, irritation which has been produced by the treatment, must be relieved by general or local bleeding, which cannot be earlier practised without danger; and opium, camphor, and ether may be had recourse to, to recruit the system.—*Ant.* (In the order of their efficiency.)—1. Hydrated or gelatinous sesquioxide or peroxide of iron, (for an adult—a tablespoonful in water every 8 or 10 minutes, until 12 to 16 oz. have been taken.)—2. Hydrated persulphuret of iron, (as the last.)—3. Hydrated protosulphuret of iron, (as the last.)—4. Gelatinous hydrate of magnesia, (as the last.)—5. Albumen, (white of egg,) or liquids containing it, (in cold water, ad libitum.)—6. Calcined magnesia, (as 1.)—7. Milk, wheat flour, oatmeal, gruel, (with water, ad libitum.)—8. Oils and fats, (as the last.)—9. Lime water, with milk, (as the last.)—10. Chalk, with milk and water, (as the last.)—11. Sugar.

Uses, &c. Arsenious acid and its compounds are extensively employed in the arts and in medicine. It is used by the *dyer*, it furnishes the *artist* with several of his most beautiful pigments, and the *glass-maker* and *enameller* with a flux or material to whiten and decolour their wares. In *small* (therapeutical) *doses* it is a valuable remedy in intermittent fevers, chronic skin diseases (especially lepra and psoriasis), and in some nervous diseases (as neuralgia, epilepsy, chorea, tetanus, &c.) It is the active ingredient of the "*tasteless ague drop,*" and the *Tanjore pills. Externally* it has been employed in the form of powder, lotion, and ointment for the cure of cancer. *Plunkett's ointment, pâte arsenicale, Davidson's remedy for cancer,* and several other like preparations, owe their activity to this *poison. Dose.* Made into pills with crumb of bread and lump sugar, $\frac{1}{16}$th to $\frac{1}{8}$th of a grain; or in solution (liq. of arsenite of potassa, Ph. L.) 4 to 5 drops, two or three times daily, gradually and cautiously increased to 10 or 15 drops.

Concluding Remarks. By Act of Parliament, (Vict. 14, cap. xiii, 1851,) it is enacted—1. That every vender of arsenic, shall, before the delivery of the same to the customer, enter in a book or books kept for the purpose, "the date of sale," "name," and "residence of the purchaser" in full, his or her "condition" or "occupation," the "quantity" so sold, and the "purpose for which it is required," in a form set forth in the schedule to the act, which form or schedule shall be signed by the vendor, and by the said purchaser, unless he is unable to write, when such fact shall be recorded in the said schedule by the vendor; which, when a witness is required to the sale, shall also be signed by him, together with his place of abode.—2. Arsenic is not to be sold to a stranger unless in the presence of a witness acquainted with both vendor and purchaser.—3. No person to sell arsenic unless it be previously mixed with *at least* 1 *oz.* of *soot*, or $\frac{1}{2}$ *oz.* of *indigo*, to the pound, unless such admixture would be injurious, when not less than 10*lb.* is to be sold at any one time.—4. Penalty for evading the act, either as vendor, or purchaser, or witness, £20.—5. Act not to extend to arsenic used in compounding prescriptions, or to the wholesale trade.—6. The word "*arsenic*" to include "arsenious acid, and the arsenites, arsenic acid, and the arseniates, and all other colourless poisonous preparations of arsenic."

ARSENIOUS ACID (Self-detecting). *Prep.* (Dr. Cattell.)—1. To ordinary *white arsenic* add a small quantity of a mixture of *dry calomel* and *quicklime;* or of *dried sulphate of iron* and powdered *gall-nuts.* The product is white, but immediately turns *black* when mixed with liquids.—2. As the last, but employing a mixture of *thoroughly* *dried sulphate of iron* and *ferrocyanide of potassium.* Strikes a *blue.*—3. As last, using *dried phosphate of soda* and *dried sulphate of iron.* Strikes a *green.* Proposed as a method of preventing arsenic being used as a poison.

ARSENIURETTED HYDROGEN. Syn. *Arsenetted Hydrogen, Arsenuretted do., Arsenide of do.* A compound of hydrogen and arsenic discovered by Scheele.

Prep. (Soubeiran.) Take *grain zinc* and *arsenic*, equal parts; melt together; reduce the resulting alloy to coarse powder, place it in a gas-evolution bottle, pour over it strong hydrochloric acid, and collect the gas in the pneumatic trough.

Prop., &c. Colourless; fetid; inflammable; burning with a bluish flame and generating arsenious acid; slightly soluble in water; odour, resembles garlic; precipitates several metallic solutions; extinguishes combustion; and destroys life. *Sp. gr.* 2·695.

ARTHANITINE. Syn. *Artanitine, Arthanitina.* A peculiar substance obtained by the action of *alcohol* on the tuberous stems of the herb *arthranita* or sowbread. It is acrid, colourless, and crystalline.

ASARABACCA. As an *errhine*, (leaves,) 3 to 5 grs., (root,) 1 to 3 grs., snuffed up the nose for several successive evenings, at bedtime. It excites irritation and a copious watery discharge, more or less muculent, which frequently continues to flow for several days, and has occasionally proved highly useful in certain affections of the brain, eyes, mouth, nose, ear, and throat, on the principle of counter-irritation. It has been found "particularly serviceable in cephalalagia, (headache,) obstinate toothache, chronic ophthalmia, (inflammation of the eyes,) and lethargic affections." (Thomson.) In dimness of sight, deafness, and paralytic affections, not of a serious organic character, it has also proved beneficial. It constitutes the basis of *Cephalic snuff, Asarabacca snuff, Baron's McKinsey's Medicinal powder*, and several other like nostrums.

ASARINE. A species of stearoptène, found in the *asarum europæum* or asarabacca. It has an aromatic taste and an odour resembling camphor, and is said to be emetic.

ASARINE (of Gräger). Syn. *Asarina.* The crystallizable bitter principle of asarabacca. It greatly resembles *cytisine.*

ASBESTUS. Syn. *Asbestos, Amianthus.* A soft, fibrous substance, composed of flexible or elastic filaments, which in their most perfect form greatly resemble flax or silk, and which are capable of bearing exposure to a considerable degree of heat without suffering decomposition. From this property has originated the popular belief of its being indestructible by fire. It is sometimes spun into thread and woven into cloth.

ASBOLINE. A yellow, acrid, bitter, oleo-resinous matter, obtained by Braconnot from soot.

ASCITES. Dropsy of the belly. It is recognised by the unnatural enlargement of the abdomen, the sense of fluctuation, and the tense and elastic character of the tumour. It is generally accompanied by dropsy of the lower extremities, difficulty of breathing, and emaciation. Its causes, prevention, and treatment, for the most part, resemble those of other forms of dropsy.

ASH-BALLS. The ashes of various plants, especially *ferns*, damped and made into balls. *Used* as a substitute for soap in washing, and to clean painting.

ASPARAGIN. Syn. *Agedoile, Althein, Asparamide; Asparaginum,*—Lat. A peculiar neutral azotised principle, in asparagus, the potato, marsh-mallow, liquorice, climbing vetch, and several other plants.

Prep. 1. From the *expressed juice*, evaporated by a gentle heat to a syrupy consistence, and then abandoned to spontaneous evaporation in a warm dry atmosphere for several days; the resulting crystals being purified by cautious washing with very cold water or strong alcohol, re-solution and crystallization.

2. *Mallow root*, (chopped small,) is macerated several days in *milk of lime*, in the cold, the filtered liquid precipitated with *carbonate of ammonia*, and the clear solution evaporated in a water-bath, and set aside as before.

Prop., &c. Brilliant, transparent, colourless, rhomboidal prisms; neutral; nonbasic; having a faint, cooling, and scarcely nauseous taste; freely soluble in water; insoluble in strong alcohol or ether; heated with water under pressure in a closed vessel, or boiled along with an acid or an alkali, or dissolved in a saccharine liquid and then submitted to fermentation, it is converted into ammonia and *aspartic acid;* when aqueous solutions of both asparagin and aspartic acid, are treated with a current of nitrous acid, pure nitrogen is evolved and *malic acid* formed, which remains in solution. *Dose.* 1 to 6 grs.; as a sedative and diuretic, in dropsies, heart affections, &c.

ASPARAGUS. The most delicate of

our culinary vegetables. The *young shoots*, from the underground eyes, of the *asparagus officinalis*, (Linn.) They are diuretic, and communicate a peculiar fetid odour to the urine; and are said, when eaten in excess, to occasion bloody urine, and accelerate fits of gout. Neither the tops nor roots are now officinal in the British Pharmacopœias; but they are both occasionally employed as popular remedies in dropsy and stone—the first being eaten in the usual way at table, and the roots made into an infusion or decoction, (½ *oz.* to the *pint*,) taken *ad libitum.* As an article of food, asparagus, in moderation, is both wholesome and nutritious. It is *cooked* by simply boiling it as quickly as possible in water to which a little salt has been added; and it is either served up plain, or on toast, with *melted butter* or *sauce Hollandaise* in a boat. (Soyer; Rundell.) "The large grass is generally preferred, although the smallest has the fullest flavour for a dish." (Soyer.)

ASPARTIC ACID. Syn. *Malamic Acid.* An acid obtained from asparagin, by boiling it along with *hydrate of magnesia.* Its compounds with the bases are termed *aspartates.* See *Asparagin.*

ASPHALTENE. A peculiar substance, which, according to M. Boussingault, forms the principal portion of asphaltum.

ASPHALTUM. Syn. *Asphalt*, *Asphaltos*, *Jew's Pitch*, *Mummy; Asphaltus*, *Asphaltum*, *Bitumen Vitreum*, *B. Judaicum*, *B. Solidum*,—Lat. A black, hard, brittle, and glossy variety of bitumen found swimming on the surface of the Dead Sea, (hence called *Lacus Asphaltites*,) and as a mineral product in various parts of the world. It is distinguished from other varieties of bitumen by its more difficult fusibility, and by its fracture being clean, conchoidal, and vitreous. Its average density is 1·2. By friction it affords negative electricity. It is soluble in oil of turpentine, benzole, mineral and coal-tar naphtha, the fixed oils, and in solutions of the caustic alkalies, and several other liquids by the aid of heat.

The asphaltum of commerce is chiefly obtained from the shores of the Dead Sea, where it is cast up and gathered; but a large portion of that of the shops is a factitious article of the most worthless character, manufactured in England. A short time since a specimen of the purest and most beautiful description, from the great Bitumen Lake of Trinidad, was placed in the hands of the Editor of this work by Earl Dundonald, by whom he was informed, that the supply of both liquid and indurated bitumen, of every grade of quality, was unlimited from that source; but that owing to some injudicious importations of the impurer and more worthless kinds, (those most easily shipped,) a prejudice had been created against these bitumens in the London market.

Uses. The finer varieties of asphaltum are chiefly used as a "glazing colour" by artists, and in the manufacture of black varnishes and japans. The inferior kinds are applied to the same purposes as ordinary solid bitumen.

ASPHALTUM (Factitious). The spurious asphaltum of the shops is commonly made from the bottoms of *Barbadoes tar*, and other mineral bitumens, by heating them until quite hard; sometimes a little *Scio turpentine* or *balsam of copaiba* is added. The colour and hardness of the products are inferior to those of pure natural asphaltum.

ASPHALTUM (Liquid). Syn. *Prepared Asphaltum. Prep.* 1. *Scio turpentine*, 2 *oz.*; melt; add *asphaltum*, (in powder,) 1 *oz.*; mix, cool a little, and reduce with hot *oil of turpentine.*

2. (Wilson's). *Asphaltum*, ½ *lb.*; melt, add hot *balsam of copaiba*, 1 *lb.*, and thin with hot *oil of turpentine*, as last. Both are used as a black japan or varnish, and as a "glazing colour," by artists.

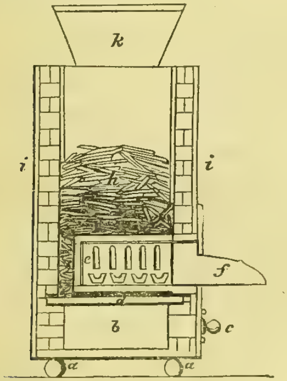
ASSAFŒTIDA (Prepared). Syn. *Strained Assafœtida; Assafœtida Præparata*,—Ph. L. As *ammoniacum præparatum*,—Ph. L.

ASSAY. See *Assaying.*

ASSAYING. Syn. *Docimacy.* The *art of assay*, or of determining the quantity of gold and silver in ores and alloys of those metals, by cupellation. It differs from *chemical analysis* in merely furnishing the quantity of the precious metal contained in the sample examined, instead of the nature and proportions of all the ingredients in the compound.

Process of assaying. The muffle, with the cupels properly arranged, is placed in the furnace, and the charcoal added and lighted at the top, by placing a few pieces, heated to whiteness, on last. After the cupels have been exposed for half an hour, and have become white hot, the lead is put into them by means of the tongs, and as soon as this becomes bright red and "*circulating*," as it is called, the specimen for assay, wrapped in a small piece of paper, is added, and the fire kept up strongly until the metal enters the lead and "*circulates*" well, when the heat, slightly diminished, is so regulated that the assay appears convex, and more glowing than the cupel itself, whilst the "*undulations*" circulate in all directions, and the middle of the metal appears smooth, with a margin of litharge, which is freely absorbed by the cupel. When the metal becomes bright and shining, or, in technical language, begins to "*lighten*," and prismatic hues suddenly flash across the globules, and undulate and cross each other, followed by the metal becoming very brilliant and clear, and at length fixed and solid, (called the "*brightening*,") the separation is ended and the process complete. The *difference* between the *weight of the alloy before cupellation*, and that of the resulting *button of pure metal* represents the quantity of alloy in the sample examined.

The *furnace* employed at the Royal Mint and Goldsmiths' Hall, London, is figured in section in the margin.



a a, Rollers on which the furnace rests.
b, Ash pit.
c, One of the ash pit dampers.
d, Grate supporting the muffle plate.
e, Muffle containing the cupels.
f, The mouth-plate for the ignited charcoal.
h, Interior of furnace containing charcoal.
i i, Walls of the furnace.
k, Moveable chimney for regulating draught.

The *muffle* is a vessel made of clay, and furnished with an opening to admit of the introduction of the cupels, and inspection of the process. It is placed on the muffle-plate (*see* above), by which it is introduced into the furnace.

The *cupel* is a small porous shallow crucible, usually made of bone ashes or burnt horn. The powder (slightly moistened with water) is placed in a circular steel mould, and after being pressed down tight, is finished off with a rammer, having a convex face of polished steel, which is struck forcibly with a mallet, until the mass becomes sufficiently hard and adherent. The cupel is then carefully removed and exposed in the air for a fortnight or three weeks to dry.

Assayer's weights, &c. The materials used in assaying are accurately weighed in a balance of the most susceptible description, and the weights taken in terms of the notation employed by assayers. The "*fineness*," "*richness*," or "*purity*" of *gold* is expressed in *carats*. Pure gold is spoken of as 24 *carats fine;* and any other sample containing in 24 parts, only 12, 18, or 22 parts of pure gold, is said to be of as many *carats fine*. Every *carat* is nominally divided into 4 *assay-grains*, and each assay-grain into *quarters*, giving 384 "reports" for gold. The nominal *assayer's gold carat* is 12 grs.

The "*fineness*," "*richness*," or "*purity*" of *silver* was formerly expressed in pennyweights, but is now generally reckoned in 1000ths, which admits of greater accuracy. Pure silver was said to be "silver of 12 pennyweights." If it contained 1, 2, or 3 parts of alloy it was termed "silver of 11, 10, or 9 pennyweights," as the case might be. Every *assayer's pennyweight* was nominally divided into 24 grs., and hence gave "288 fine grains" or "reports" for silver. The fineness of specimens containing odd grains, was given in *pennyweights* and *fine grains*.

Obs. An assay is not thought to be good, unless the "bead" separates readily from the cupel, has a round form, with a brilliant upper surface, and a lower one granular and of a dead metallic lustre. When the surface is dead and flat, *too much heat* has been employed; and in the case of silver, some of the metal may have been lost by fuming or absorption. When the bead adheres to the cupel, or is spongy, variegated, or has scales of litharge still adhering to it, *too little heat* has been used, or the process has been stopped before the assay was complete. The remedy is re-exposure to heat in the cupel, adding a little powdered charcoal or a few small pieces of paper, and continuing the heat until the metal "brightens" and "circulates" freely. The lead employed must be absolutely pure, and is best prepared by the reduction of refined litharge, mixed with some carbonaceous matter, by heat. These remarks apply exclusively to "cupellation," which is the most important, and indeed the distinctive operation of the art of assaying; and, as far as they extend, refer equally to gold and silver. The process of assaying by the cupel, however skilfully conducted, gives much less accurate results, especially with silver, than the "estimation" by the ordinary operation of chemical analysis, sometimes termed "*hu-*

mid," or "*volumetrical assay;*" whilst it is much more troublesome and expensive, and furnishes very inaccurate results with compounds containing only small quantities of the precious metals.

ASSAY OF GOLD. Before proceeding to the assay, it is necessary to form some estimate of the quantity of other metals, (copper or silver, or both,) in the specimen to be examined, in order to employ the proper proportion of lead in the cupellation. The experienced assayer commonly does this by the "assay of the touch," and, in certain cases, by a rough preliminary assay. The quantity of lead employed may be about 16 times the weight of the copper present in the sample, and when the alloy contains silver, an additional allowance of lead equal to $\frac{1}{10}$th of its weight, is made on that account. When no silver is present, or it is not required to be estimated, a much larger proportion of lead may be employed. The weight taken for the assay, (*assay-pound,*) is usually 12 or 6 grs. The alloy and dose of lead being accurately weighed and separately wrapped in small pieces of paper, the assay may be at once proceeded with.

1.—*a. Cupellation.* This operation, the important of the whole, has been already described. Unlike silver, gold will bear the highest heat of the furnace, without "vegetating," "fuming," or being absorbed by the cupel. The *loss of weight* gives the amount of *copper* in the alloy.

β. Quartation. The cupelled sample is fused with three times its weight of pure silver, (called the "*witness,*") by which the gold is reduced to one fourth of the mass, or less, and in this state may be easily removed.

γ. Parting. The alloy, after quartation, is hammered or rolled out into a thin strip or leaf, curled into a spiral form, and boiled for a quarter of an hour, in a small flask, with about $2\frac{1}{2}$ to 3 oz. of nitric acid, (sp. gr., 1·3); and the fluid being poured off, it is again boiled in a similar manner with $1\frac{1}{2}$ to 2 oz. more of nitric acid (sp. gr., 1·2), after which the gold is carefully collected, washed in pure water, and dried. When the operation of parting is skilfully conducted, and the acid not too strong, the metal preserves its spiral form; otherwise, it falls into the state of flakes or powder. The second boiling or digestion is technically termed the "*reprise.*" The *loss of weight* by parting after deducting that of the "witness," corresponds to the quantity of *silver* originally in the specimen.

δ. Annealing. This consists in putting the pure gold obtained by the last process, into a small porous crucible or cupel, and heating it to redness in the muffle.

ε. Weighing. This must be done with the utmost accuracy. The *weight,* in grains troy, doubled or quadrupled, as the case may be, gives the number of *carats fine* of the alloy examined, without calculation.

2. (*Old French method.*) For the *assay-pound,* 12 grs.; *fine silver,* 30 grs.; *lead,* 108 grs.; cupelled together; the (perfect) button rolled into a leaf ($1\frac{1}{2} \times 5$ inches,) twisted on a quill, and submitted to parting with $2\frac{1}{2}$ oz. and $1\frac{1}{2}$ oz. of *nitric acid,* sp. gr. 1·16, (20° Baumé.) The remainder of the process is similar to that above described. Two assays are made in the same manner, with a third on *pure gold* or *gold of a known fineness;* and no conclusion is drawn, unless the assay of the latter comes out accurately, and that of the first two correspond to each other.

3. (M. Chaudet.) Of the *sample for assay,* 0·500, (1 part); *pure lead,* 1·000, (2 parts); *pure silver,* 1·500, (3 parts); cupelled together; the riband rolled into a cornet, boiled for 4, 10, and 15 minutes in separate portions of *nitric acid* of the respective sp. gr., 1·17, 1·27, and 1·27, (22° and 32° Baumé.) This method gives very perfect results with *fine gold.*

4. (*For alloys containing platinum.*) These alloys generally contain copper, silver, platinum, and gold. Cupelled in the usual way, the loss of weight expresses the amount of *copper;* and the button, made into a riband and treated with sulphuric acid, indicates, by the portion dissolved, that also of the *silver* present. By submitting the residuum to quartation, the *platina* becomes soluble in nitric acid. The loss after digestion in this menstruum expresses the weight of that metal; and the weight of the portion now remaining is that of the *pure gold.* Gold containing *palladium* may be assayed in the same manner.

5. (*Assay of the touch.*) The fineness of jewellery and small quantities of gold which it is either impossible or inconvenient to assay according to the usual method, is generally determined by means of *touch needles* and *touch stones.* The former are made in sets, containing gold of different degrees of fineness, and differently alloyed with copper and silver. Pieces of black pottery form excellent touch stones. The mode of using them is to mark the stone with the sample under examination, and to compare its appearance, hardness, colour, &c., with that produced by one or more of the needles. When the two are similar, the quality is considered to be the same. They are then further examined by heating, the "touchstone" to redness, and moistening the strokes with aquafortis, when the

appearances resulting from oxidation, &c., differ according to the nature and quantity of the alloy.

ASSAY OF SILVER. The "assay pound" may be 12, 24, or 20 grs., for silver. The quantity of *lead* employed depends upon the nature of the alloy. Assayers differ on this subject; but not less than about 16 times the weight of the copper presumed to be present in the alloy, will always be required; the fineness of the sample being approximately determined in the way described under *gold.* Some authorities order a much larger quantity of lead; but it must be remembered, that *an excess of lead,* leads to some of the silver being absorbed by the cupel, and the resulting button comes out too *small.* On the other hand, when *too little lead* is employed, the alloy, after cupellation, contains some copper, and the button comes out too *large.* The following table exhibits the proportions of lead adapted to silver alloys of different degrees of fineness:

Assay Table for Silver. By M. D'ARCET.

Fineness of the Silver.	Copper in 1000 parts of the Alloy.	Weight of lead required: that of the sample for assay being = 1.	Ratio of the Lead to the Copper.
1000	(*pure silver*)	$\frac{3}{10}$	....
950	50	3	70 to 1
900	100	7	60 to 1
800	200	10	50 to 1
700	300	12	40 to 1
600	400	14	35 to 1
500	500	16 to 17	32 to 1
400	600	do.	26½ to 1
300	700	do.	22¾ to 1
200	800	do.	20 to 1
100	900	do.	17¾ to 1
(*pure copper*)	1000	do.	16 to 1

Obs. It is found, that however carefully the cupellation of silver may be made, a small portion of this metal is carried off by the lead into the cupel, and the assay comes out too low. When an excess of lead is employed this deficiency is so excessive as to render the assay valueless. According to M. D'Arcet this loss varies with the fineness of the silver, as shown below:

Fineness of Alloy.	Loss in Thousandths.
Fine Silver	1·
900	4·3
800	4·9
500	4·2
100	·4

ASSES' MILK (Factitious). Syn. *Lac. Asininum Factitium, Lac A. Artificiale,*—Lat. *Prep.* 1. *Cow's milk,* 1 quart; *ground rice,* 1 *oz.; eringo root,* (bruised,) 1 dr.; boil, strain, and add *sugar candy* (or white sugar), 1 *oz.*

2. *Whites of* 2 *eggs; lump sugar,* 1 *oz.; cow's milk* (new), ¾ pint; mix, then add *syrup of tolu,* ¾ *oz.*

3. *Water,* 1 pint; *hartshorn shavings,* 1 *oz.;* boil to a jelly; then add *lump sugar,* 2 *oz.;* cool, add *new milk,* 1 pint; *syrup of tolu* ½ *oz. Used* as substitutes for asses' milk, taken freely as a beverage. A cupful, with or without *a spoonful of rum,* 3 or 4 times daily, is a popular remedy in consumption and debility.

ASTHMA. This well-known disease is principally confined to the later periods of life, and appears in many cases to be hereditary. The *exciting causes* are exposure to sudden changes of temperature from heat to cold, unwholesome effluvia, hard drinking, full meals, violent exercise, and cold, damp, and foggy weather.

Treat. The bowels should be kept regular by mild aperients, and the stomach preserved in order by the adoption of a light and wholesome diet; particularly avoiding excess in either eating or drinking. The *severity of the paroxysm* may be generally lessened by adopting the sitting posture, and inhaling the *vapour of hot water* or of an *infusion of chamomile. Emetics* and *diaphoretics,* followed by *mild purgatives,* may also be administered with advantage. Various other remedies have been recommended; among which are *tobacco* and *stramonium* smoking. In using the latter herb, the root and lower parts of the stem are chopped up and placed in the bowl of a common tobacco-pipe, and a few whiffs are occasionally taken. Drinking at the same time should be avoided. Lately *lobelia inflata* or *Indian tobacco,* has been highly extolled in asthma. The dose of the tincture is from 20 drops to 2 tea-spoonfuls, taken at the commencement or before the accession of the fit, and repeated after the interval of an hour, if nausea or expectoration does not intervene. A change of diet and habits will often produce a marked improvement and effect a cure when medicines have failed. The use of bark or bitters tends to improve the general tone of the system, and may be adopted with perfect safety. Sir John Floyer is said to have been cured of an asthma of 60 years' standing, at the age of 80, by the constant use of *strong coffee.* Sir John Pringle adopted the same remedy with great success.

ASTHMA (Grinder's). *See Dyspnœa.*

ASTRINGENTS. Substances which constrict animal fibre and coagulate albuminous fluids, and thus obviate relaxation and check excessive secretion. Those employed to suppress hemorrhage or bleeding, are generally termed *styptics;* and those used merely to check excessive secretion and evacuation, and which exercise little astrictive power over the solids, are called *desiccants.* The principal astringents are—*alcohol, alum, chalybeates* (generally), *sulphate of copper, sulphate* and *sesquichloride of iron, acetate* and *diacetate of lead, lime, bichloride of mercury, nitrate of silver, tannic acid, tannin, vegetable astringents* (those containing tannic acid and its modifications), *acetate, carbonate, chloride, oxide,* and *sulphate of zinc.*

ASTRINGENTS (Vegetable). Of these the principal are—*Alkanet, bistort, catechu, dragon's blood, French rose, galls, kino, logwood, mastiche, oak bark, red sander's wood,* and *tormentil.* See above, and *Tonics.*

ATCHAR. Syn. *Achar.* An Indian condiment made of *green fruits,* pickled in vinegar, and seasoned with *mustard, ginger, garlic,* and *pimento.*

ATHAMANTINE. A crystallizable substance found in the root of the *athamanta oreoselinum.*

ATMOSPHERE. The mass of aeriform respirable matter surrounding the earth, and in which we live; atmospheric air.

Atmospheric air is transparent, colourless, inodorous, tasteless, respirable, neutral to re-agents, and a supporter of combustion. It is 816 times lighter than an equal bulk of water; 1000 cubic inches at mean temperature and pressure, weigh about 305 grs. Its power of conveying electricity, odours, effluvia, contagion, &c., is in direct proportion to the quantity of aqueous vapour which it contains; hence the superior perfume of growing flowers, the more noisome stink of drains, and the accession and increase of pestilential diseases during damp weather.

The most common *impurities* of the atmosphere affecting the healthfulness of our homes, are—*carbonic acid,* (in excess,) *smoke, carburetted hydrogen, sulphuretted hydrogen,* the *noxious effluvia from sewers, privies,* and other *accumulations of decomposing organic matter,* and *excessive moisture* from bad drainage, which are only to be met by the prompt removal of the causes, and by thorough cleansing or ventilation, as the case may demand. The purity of the air of a house or district, as well as its comparative salubrity, may generally be discovered by reference to the state of health of the residents, and the registrar's quarterly returns of the number of deaths which occur within its limits. In many cases, the complexions and features of the inhabitants betray the character of the spot or neighbourhood in which they live. The following tests may interest the popular experimentalist:

1. A glass tumbler nearly filled with *lime water* may be placed in any convenient position, as on the mantel-piece of a room. The rapidity with which a pellicle forms on its surface, and the quantity of the resulting precipitate, corresponds to the amount of the *carbonic acid,* in the atmosphere surrounding it.

2. A little *moist carbonate of lead,* placed on a plate or saucer, and exposed as last, will become discoloured or blackened, if any *sulphuretted hydrogen* is present in the air.

3. A colourless *solution of nitrate of silver,* exposed under like circumstances in the shade, or in a dull light, and afterwards in the sun or full daylight, reddens or darkens more rapidly, and to a greater extent, in air loaded with *decomposing organic matter, miasma, &c.,* than a *similar freshly prepared solution of nitrate of silver,* which has not been exposed to foul air.

4. A simple but excellent criterion of the comparative salubrity of a place, is the length of time that butcher's meat and poultry may be preserved before the accession of the putrefactive process. In some of the worst drained, confined, and most unhealthy parts of London, butcher's meat can scarcely be preserved from day to day, in warm weather, in a state fit for human food; whilst in those which are the most salubrious, the same articles may be safely preserved for several days. In his extensive surveys and researches in connexion with *sanitation* and the *health of towns,* the Editor of this work has made this fact a frequent subject of remark.

ATMOSPHERE (In Engineering). The common pressure of the atmosphere, (14·6 *lb.* to the sq. inch,) is taken as a standard of that exerted by other elastic fluids. Thus, steam or air condensed so as to exert a pressure of 30 *lb.* per sq. inch, is said, in round numbers, to be of *two atmospheres;* at 45 *lb.* to the inch, of *three atmospheres,* &c.

ATROPHY. A wasting away of the flesh and strength without any sensible cause. *General atrophy* appears to depend on deficient nutrition, arising from a want of due balance between the functions of assimilation and absorption, or from profuse evacuations draining off the materials necessary for the support of the body. The first, only, may be regarded as an independent disease. *Local atrophy* commonly arises from some cause which lessens the normal circulation of blood in the part; or from a diminution of the nervous influence, as in paralysis. *General atrophy* is most frequent in infancy, childhood, and old age. In the first two it may be often traced to bad nursing, worms, or a scrofulous taint; and not unfrequently, to continually inhaling impure air. In adults, the causes are impaired digestion and imperfect action of the chyliferous organs, and sometimes, diseased action of the liver. The treatment consists in a close attention to diet, exercise, clothing, ventilation, warmth, &c., with gentle stimulants, tonics, and chalybeates where not contra-indicated; (and, in the case of adults,) the judicious use of pure, generous wine or malt liquor. When this affection is symptomatic of any other disease, as worms, stomach complaints, &c., the removal of the latter must of course be first attempted. See *Anœmia.*

ATROPIA. Syn. *Atropine, Atropina, Atropium,; Belladonnine, Belladonnia; Atropia,*—Ph. L. An alkaloid discovered by Brandes in the *atropia belladonna*, or deadly nightshade.

Prep. 1. (Mein & Liebig). *Belladonna root,* (fresh dried and coarsely powdered,) is exhausted by *alcohol,* (sp. gr. 0·822); *slaked lime,* (1 part for every 24 of the dried root employed,) is then added to the tincture, and the whole digested with agitation for 24 hours; *sulphuric acid* is next added *drop* by *drop* to slight excess, and after filtration, rather more than half the spirit is distilled off, a little water added to the residue, and the remainder of the alcohol evaporated as quickly as possible by a gentle heat; after again filtering, the liquid is reduced by further evaporation to the $\frac{1}{12}$th part of the weight of the root employed, and a *concentrated solution* of *carbonate* of *potassa, dropped* into the cold liquid, avoiding excess; in a few hours it is again filtered, and *carbonate of potassa* added as long as a precipitate forms: in from 12 to 24 hours more, the *atropia* is collected in a filter, pressed between the folds of blotting paper, and dried by a very gentle heat. It is purified by making it into a paste with water, again squeezing it between the folds of blotting paper, dissolving it in 5 times its weight of *alcohol,* decolouring it with *pure animal charcoal,* and evaporation and crystallization by a very gentle heat.

2. (Bouchardat & Cooper.) The *filtered tincture* is precipitated with *iodine dissolved in an aqueous solution of iodide of potassium,* the resulting *ioduretted hydriodate of atropia* decomposed by *zinc* and *water,* the metallic oxide separated by means of *carbonate of potassa,* and the alkaloid dissolved in *alcohol* and crystallized.

3. (Rabourdin.) To the *expressed juice,* (coagulated by heat and filtered,) 1 quart; is added *caustic potassa,* 1 dr.; and afterwards, *chloroform,* 1 oz.; the whole is then agitated well, and after half an hour's repose, the supernatant liquor is poured from the discoloured chloroform, which, after being washed with water as long as it gives any colour to that liquid, is placed in a small retort, and the chloroform distilled off by the heat of a water bath; the residuum is dissolved in a little *water acidulated with sulphuric acid,* and precipitated with *carbonate of potassa,* in slight excess; the precipitate is redissolved in *alcohol;* the solution abandoned to spontaneous evaporation, yields crystals of atropine.

4. (Ure.) From the *expressed juice of the fresh,* or the *watery extract of the dry plant,* by treating it with *caustic soda,* in slight excess, and then agitating the mixture with 1½ times its volume of *ether;* the atropia taken up by the ether is again deposited after repose for some time, and it is purified by repeating the treatment with *ether* as often as necessary.

Prop. Pure atropia crystallizes in colourless silky prisms, or in silky needles like those of disulphate of quinine; it is odourless; tastes bitter, acrid and metallic; dissolves in 200 parts of cold and 54 parts of hot water, in 1½ parts of cold alcohol, and in 25 parts of cold, and 6 parts of boiling ether; it has an alkaline reaction, fuses at 194° Fahr., is volatile at common temperatures, and rises in vapour at 212° Fahr.; with the acids it forms salts, several of which are crystallizable. It is a powerful narcotico-acrid poison. Its effects are similar to those of belladonna but considebly greater. "A very minute (*imponderable*) quantity applied to the eye is sufficient to dilate the pupil." (Pereira.) The $\frac{1}{12}$ to $\frac{1}{10}$ gr. causes very serious effects in the human subject,

Ant., &c. See *Aconite.*

Pur. "Alkali prepared from the *root* of *atropa belladonna.* Crystals." "White; has the form of a prism; is soluble in water and rectified spirit. No certain tests have as yet been discovered to show the purity of this substance." (Ph. L.)

Uses. Atropia is chiefly employed as an external agent, as a substitute for belladonna, to cause dilation of the pupil; and as a local anæsthetic or anodyne, especially in facial neuralgia. *Internally*, it has been occasionally given in hooping cough, chorea, and a few other nervous diseases. *Dose.* $\frac{1}{30}$ to $\frac{1}{20}$ gr., in solution, or made into a pill with liquorice powder and honey, or used *endermically;* for a *collyrium*, 1 gr. to *water* 1 oz., a few drops only being applied to the eye at a time; the greatest caution in each case being observed. It is also employed to make the sulphate. 1 oz. of the root yields 1 gr. of pure atropia. (Thomson.) In dispensing, a drop or two of *acetic* or *dilute sulphuric acid* will be found to facilitate its solution.

ATROPIA (Sulphate of). Syn. *Atropiæ Sulphas,*—Ph. L. *Prep.* (Ph. L.) *Dilute sulphuric acid*, 2 fl. dr..; *atropia*, 150 grs., or q. s.; *water* $\frac{1}{2}$ fl. oz.; add the atropia gradually to the acid (previously diluted with the water) to saturation; strain, gently evaporate, and crystallize. "We intend this salt only for external use."—Ph. L.

Uses, &c. It is employed in the same cases as the pure alkaloid. *Dose.* $\frac{1}{25}$ to $\frac{1}{20}$ gr., either in solution or pills; 1 to 3 grs., to *water*, 1 oz., as a collyrium, of which a few drops seldom fail to produce full dilation of the pupil in about a quarter of an hour; 1 to 2 grs., to *lard*, 1 dr., forms an excellent ointment in neuralgic affections.

ATROPIC ACID. Syn. *Acidum Atropicum,*—Lat. The name given by Richter to a volatile crystallizable substance, possessing acid properties, extracted from *atropa belladonna* or deadly nightshade. In many respects it resembles benzoic acid.

AURANTIINE. *Prep.* The *exterior peel of the orange* (Seville) is carefully separated from the white matter, and exposed to warm dry air until it has nearly lost its fragrance; when it is steeped in *hot water*, and the filtered liquor gently evaporated to dryness. It possesses the bitter properties of the peel without any of its glutinosity or fragrance, and is said to be better suited to delicate stomachs.

AURIC ACID. Syn. *Acidum Auricum,*—Lat. A term frequently applied to teroxide of gold, from its manifesting acid properties. Its compounds or salts are called *aurates.*

AURO-CYANIDES. Compounds of cyanide of gold with bases. The *auro-cyanide of potassium* is much used in electro-gilding.

AURO-TERCHLORIDES. Syn. *Auro-chlorides.* Compounds of terchloride of gold with bases. They may be prepared by mixing the *terchloride of gold* with the *chloride of the base*, in atomic proportions, and setting aside the solution to crystallize. Most of the auro-chlorides are soluble in both alcohol and water, have an orange or yellow colour, and are decomposed at a red heat. *Auro-chloride of hydrogen* is formed by cautiously evaporating an acid solution of terchloride of gold.

AUTOGENOUS. This term has been applied to a method of joining metals by fusing the parts in contact, without the intervention of a fusible alloy or solder.

AVENINE. A proteine compound analogous to caseine obtained from oats. The *grain*, reduced to the state of powder or meal, is washed on a sieve, and the milky liquid, after being allowed to deposit its starch, is heated to about 200° Fahr., to coagulate the albumen; and after again becoming cold, *acetic acid* is added as long as a white powder falls, which is *avenine.*

AVIARY. A place for keeping birds; generally applied to an enclosed space or building wherein birds are kept or bred on account of their rarity, plumage, or song; and not for food. For exotic birds a place should be selected for the aviary where the temperature can be maintained at a proper degree throughout the year, and which is well protected from the weather. This is commonly done by choosing a space attached to the summerhouse or hothouse. When the aviary is only intended for birds of climates similar to our own, any part of the open garden may be chosen, and a portion closed in, either with trellis-work, or wire-work, or netting; care being taken to provide, in some easily accessible portion of it, full protection from the vicissitudes of weather and season. Nor must due ventilation, and protection from foul air or noxious fumes be left unattended to.

AZOBENZIDE. Syn. *Azobenzol, Azobenzole.* A peculiar substance discovered by Mitzcherlitz, and obtained when *nitrobenzole*, heated with a *strong alcoholic solution of pure potassa*, is submitted to distillation. The first portion which distils over is alcohol; the next, an oily liquid, consisting chiefly of *aniline* and *azobenzole*, from which the latter is deposited under the form of large red crystals on cooling. Azobenzole is nearly insoluble in water; dissolves readily in alcohol and ether; melts at 149° Fahr.; boils at 379° Fahr.

AZOBENZOIDE and *Azobenzoyle*, "products of the action of pure *water of ammonia* upon *oil of bitter almonds*, by making the ammonia pass down through a wide tube filled with the almond pap. The operation must be continued for weeks." (Ure.)

AZOBENZULE. A white crystalline powder, obtained by boiling the *residuum of the preparation of benzhydramide* in 100 parts of *alcohol;* the crystals are deposited as the liquid cools.

AZOERYTHRINE. A substance obtained by Kane from *archil.* It is insoluble in alcohol, ether, and water; but is very soluble in alkaline lyes, to which it imparts a port-wine colour.

AZOLITMINE. A dark-red substance obtained by Kane from litmus, of which it forms a large portion of the colouring matter. It is insoluble in alcohol, and in water unless alkalized.

AZOMARIC ACID. A compound formed when *pimaric acid* is submitted to the action of *nitric acid.*

AZOTE. See *Nitrogen.*

AZULMIC ACID. Syn. *Azulmine.* A name given by M. Boullay to the black matter deposited during the spontaneous decomposition of hydrocyanic acid.

BACON. When bacon has been properly prepared from young and well-fed animals, and is neither "stale" nor "rusty," it forms a very wholesome and excellent article of food, especially adapted for a light or hasty meal, or as a relish for bread or vegetables. It has hence been always a favorite at the breakfast table, and, as an ingredient of the morning repast, has frequently received the favorable notice of the Faculty. For persons with weak stomachs and for invalids, great care should be taken to cook it without injuring its flavour or rendering it indigestible. This is best effected by cutting it into slices of moderate thickness, and carefully broiling or toasting it; avoiding dressing it too hastily or too much. The common practice of cooking it in almost wafer-like slices, until it becomes brown and crisp, renders it a fertile source of heartburn and dyspepsia. Fried bacon is remarkably strong and indigestible. Bacon has always been a popular article of food in these realms, and in some portions of them, has, perhaps, obtained a preference and more extensive use, than, from it being salted, is either economical or conducive to health. A vast number of the agricultural poor of the western counties scarcely taste any other kind of flesh. The curing and packing of bacon forms the chief trade of the populous city of Cincinnati, where it has proved a source of wealth to both the factor and adventurer.

Good bacon has a thin rind, and an agreeable odour; the fat has a firm consistence and a slightly reddish tinge; the lean is of a pleasing red colour, is tender, and adheres, whilst raw, strongly to the bone. When the fat is yellow, it is either rusty or becoming so, and should be avoided. The streaky parts are not only those which are most esteemed, but are the most wholesome.

BADIGEON. A cement used by operatives and artists to fill up holes and to cover defects in their work. Among *statuaries,* a mixture of *plaster* and *free-stone* is commonly used for this purpose; among *joiners* and *carpenters,* a mixture of *sawdust* and *glue,* or of *whiting* and *glue;* and among *coopers,* one of *tallow* and *chalk.* The same name is given to a stone-coloured mixture used for the fronts of houses, and said to be composed of *wood-dust* and *lime,* slaked together, *stone powder,* and a little *umber* or *sienna,* mixed up with *alum water* to the consistence of paint.

BAKER'S ITCH. See *Psoriasis.*

BAKER'S SALT. Carbonate of ammonia.

BAKING. In *cookery,* one of the cheapest and most convenient ways of dressing dinners for small families, when a good domestic oven is at hand. Though the flavour of baked meat is generally considered barely equal to that of the same parts roasted, there are some joints and dishes to which it appears particularly suitable. Among these may be mentioned *legs* and *loins of pork, legs* and *shoulders of mutton, fillets of veal,* &c. A *baked pig,* if it has been occasionally basted, and the heat has not been too great, will eat equal to a roast one. *Geese* and *ducks* treated in the same way are also excellent. A *baked hare* which has been basted with *raw milk* and *butter,* also eats well; so do various pieces of beef, especially the buttock. Cooks tell us that the latter should be sprinkled with a little salt for a few days before dressing it, and after being washed, is preferably baked, along with about a *pint of water,* in a glazed earthen pan tied over with writing paper "three or four times thick." A *baked ham* is said to be preferable to a boiled one; to be tenderer, fuller of gravy, and finer flavoured. It should be soaked in water for about an hour, wiped dry, and covered with a thin paste or batter. Ordinary dishes require similar treatment in baking to that given them when roasted.

Much of the prejudice that exists against "baking" may be referred to the imperfect manner in which it is usually performed, arising either from the carelessness of the cook, or the defective formation of the kitchen oven; and also from so many different dishes, possessing or evolving such various flavours and odours, being assembled together at the baker's.

BAKING POWDER. See *Powders.*

BALDNESS. Syn. *Calvitas*, *Calvities*, —Lat. Gray hair and baldness dependent on old age are natural consequences of man's infirmity, and must be regarded as evidence of failing vigour rather than in the light of a disease. Premature loss of hair may be induced by various causes. It is common after severe fevers, and is frequently produced by external pressure, friction, or violence, and by such other local actions and conditions which, when long continued, interrupt the normal functions of the skin. Persons with a consumptive, scorbutic, scrofulous, or syphilitic taint, or of a general bad habit of body, frequently lose their hair early. In these cases it probably arises from debility or paralysis of the cutaneous vessels, and the consequent insufficient nutrition of the bulbs of the hair. When it occurs in persons under the middle age, and apparently enjoying good health, it may be often traced to the pernicious practice of constantly wearing a hard non-ventilating hat, to disordered stomach, habitual smoking or hard drinking, irregular habits, or late hours. Excessive anxiety or grief, and intense study and thoughtfulness, also tend to promote the early decay of the hair. The natural baldness of the aged appears to arise from the gradual attenuation of the scalp, which ultimately becomes too thin to afford room for the performance of the functions of the hair-producing organs, and too scantily supplied with blood for their due nutrition and support. It is remarkable, that though consumptive patients, as noticed above, frequently suffer from premature baldness, those who are marked as early victims of this disease still more frequently possess the crinal ornament in great luxuriance and beauty. Since the introduction of waterproof clothing and silk hats, and the common adoption of tobacco by the juvenile portion of the population, baldness has become so common among our young men, as to cease to attract notice. These articles act as prejudicially on the hair, as *white* bread and alum do on the teeth.

The baldness of senility and that arising from the permanent injury or destruction of the hair-bulbs admit of no cure, notwithstanding the daily assurances to the contrary made by advertising impostors. When a disposition to baldness exists, shewn by the hair falling off in large quantities, or ceasing to grow with its usual vigour, the constant, but gentle use of the hair brush, and of any bland, emollient and stimulating oil, pommade, or wash, if adopted in time, will generally prove sufficient. The head may be advantageously washed in cold water at least once a day; or what is better, a shower bath may be taken. Should this plan not succeed the head may be shaved, and a wig or scalp adopted for a time. The effect of keeping the hair closely cropped or shaved is to make it grow thicker, stiffer, and stronger, often when all other means fail. The celebrated John Wesley recommends rubbing the part morning and night with a raw onion, until it becomes red, and then applying a little honey. (*Primitive Phys.*) The following formulæ for strengthening the hair and keeping the head clean are invaluable in their way. At the same time the reader must be cautioned against placing any reliance on external applications, unless he assists their action by due attention to diet, exercise, ventilation, and such other matters as tend to promote the general health and vigour of the body. See *Hair*, *Pommades*, *Oils*, *Washes*, *&c.*

BALDNESS (Oil for). *Prep.* 1. Pure *olive* or *salad oil*, 1 *oz.; oil of origanum*, 12 drops; *oil of rosemary*, 10 drops; *oil of lavender*, 6 drops; *oil of cloves* or *cassia*, 3 drops; mix by shaking them well together.

2. *Oil of almonds*, 1 *oz.; etherial extract of cantharides*, 1 gr.; dissolve by placing the phial in a cup of hot water; then add, *oil of rosemary*, 10 drops; *oil of verbena*, 6 drops; and *oil of cloves*, 5 drops.

3. *Oil of almonds* or *olives*, 1 *oz.; oil of nutmeg*, 15 drops; *neroli*, 8 drops; mix. *Oil of ben*, or *castor oil*, may be substituted for that of almonds and olives in the above formulæ. To tinge them red, a shred or two of alkanet root may be digested in the oil for a few days before scenting it.

4. *Oil of almonds* (hot), 1¾ *oz.;* true *Peruvian balsam*, 1 dr.; *oil of nutmeg*, 30 drops; mix in a phial, cork it, agitate until nearly cold, allow it to repose until the next day, and then pour off the clear portion for use.

5. *Pure cod-liver oil*, ¼ pint; *oil of origanum*, 2 dr.; *essences of musk* and *ambergris*, of each, 15 drops. Very effective.

BALDNESS (Pommade for). As above, but substituting for the oil an equal weight of *washed lard*, *beef marrow*, *suet*, *spermaceti cerate*, or any *mixture* of them, according to the consistence it is desired the pommade should have. The solid articles are melted in a small pot, the *perfume*, *&c.*, added, and the whole stirred until cold. The above are employed in the usual manner.

BALDNESS (Wash for). *Prep.* 1. *Distilled* or *soft water*, 1 pint; *sesquicarbonate of ammonia*, 3 dr.; *oil of rosemary*, 10 drops; agitate together in a bottle until mixed or dissolved.

2. To the last add *rum* or *spirit of wine*, 2½ fl. oz., (*or* a London ½ quartern.)

3. *Water*, 1 pint; *vinegar of cantharides*, 2 dr.; *oil of nutmeg*, 20 drops; *rum*, 2½ fl. oz.; mix.

4. *Rosemary water*, 1 pint; *sal volatile*, 1 fl. oz.; mix.

5. *Rosemary water*, 1 pint; *iodide of potassium*, 1 dr.; dissolve.

6. *Pure water*, 1 pint; *iodide of potassium*, ½ dr.; *iodine*, 20 gr.; occasionally agitate together until the iodine is dissolved. The above are applied to the head once or twice daily with a small piece of sponge, the part being previously washed clean, and wiped dry. The object is to well moisten the skin with the solution, after which the hair should be adjusted whilst still wet. The two last are very effective.

BALDWIN'S PHOSPHORUS. *Prep.* Heat *nitrate of lime* until it fuses; keep it in that state for 8 or 10 minutes, then pour it out into a warmed iron pot, allow it to cool slowly in a dry situation, and as soon as cold, break it into pieces, and keep it in a well-stoppered phial. After exposure to the sun for some time, it emits a white light in the dark.

BALENIC ACID. A fatty acid of little interest. Its salts are termed *balenates.*

BALL. This term is applied to various substances made up into a globular, spheroidal, or cylindrical form; as *ash balls*, *horse balls*, *sand balls*, &c. *Bounce balls*, are commonly made of *list* twisted round a *piece of cork* or *Indian rubber;* those for temporary purposes are made of *size;*—*crickat balls*, of *hard leather* firmly sewn together and weighted, or of *vulcanized Indian rubber;*—*toy balls*, of *soft leather* stuffed with *bran* or *cotton.* Gutta percha is also made into balls, but is not sufficiently tough to bear the blows of the cricket bat.

BALLOON. A bag or hollow pear-shaped vessel, made of varnished silk or other light material, and inflated with hydrogen gas, carburetted hydrogen, or heated air, so as to rise and float in the atmosphere. When filled with gas, it is called, by way of distinction, an *air-balloon;* when with heated air, a *fire-balloon.*

In the early days of aerostation, and indeed for some years afterwards, balloons were inflated with hydrogen gas, obtained by the action of sulphuric acid and water on iron-filings or small fragments of iron; but this method of filling them ultimately gave place to the cheaper and more convenient supply afforded by the gas-light companies. Of late years, the coal-gas furnished by the gas-works, has been generally, if not solely used for the inflation of balloons.

The aerostatic or ascensional power of balloons is proportional to their dimensions, in the *ratio* of the *cubes of their diameters.* It has been computed that a balloon of 60 feet diameter, filled with common hydrogen, would ascend with a weight of nearly 7000 *lb.* besides the gas case, whilst one of only 1½ feet in diameter, would barely float, owing to the less proportionate volume of gas to the weight of the case containing it. In round numbers, the buoyancy of a balloon may be reckoned as equal to 1 oz. for every cubic foot of hydrogen it contains, less the weight of the case and appendages. The carburetted hydrogen supplied by the gas works is much heavier than hydrogen gas, and consequently much less buoyant, for which due allowance must be made. That which possesses the least illuminating power, is the lightest, and consequently the best adapted for the purposes of aerostation.

The *fabric* of which *air-balloon cases* are made is strong thin silk, covered with an elastic varnish of oil or Indian rubber; the *netting* is of strong light silk or flaxen cord, and the car of basket-work. *Fire balloons* (on the small scale,) are generally made of silver paper, and are inflated by burning spirits of wine by means of a sponge dipped in it, and suspended just within the mouth of the balloon. Owing to the increasing rarity of the atmosphere as we ascend from the earth's surface, balloon cases are made much larger than is required to contain the necessary quantity of gas, to allow for its expansion as it rises into a rarer medium. A cubic foot of gas measured at the level of the sea, occupies a space of two feet at an elevation of 3½ miles. The following table will probably prove useful to the amateur aeronaut:—

TABLE *showing the relations between the diameters, surfaces, and capacities of spheres.* By Dr. URE.

Diameters.	Surfaces.	Capacities.
1	3·141	0·523
2	12·567	4·188
3	28·274	14·137
4	50·265	33·51
5	78·54	65·45
10	314·159	523·6
15	706·9	1767·1
20	1256·6	4189·
25	1963·5	8181·
30	2827·	14137·
40	5026·	33510·

BALLS (Barèges). *Prep.* 1. *Extract of soap-wort*, 3 oz.; *good glue* or *gelatine*, 1½ oz.; *water*, 4 oz.; dissolve with heat, and add, *sulphuret of lime*, 6 oz.; *common salt*, 1 oz.; (both in powder); mix thoroughly and form into balls weighing 2¼ oz. each, adding a little *powdered gum*, if required, to thicken the mass.

2. *Gelatine*, 8 oz.; *sulphuret of lime*, 12 oz.; *common salt*, 2 oz.; *water*, q. s.; dissolve, and add, *carbonate of soda* and *Castile soap*, of each, (in powder,) 2½ oz. One ball is sufficient to medicate the water of a bath for an adult.

BALLS (Bitter). *Prep.* 1. *Powdered gentian*, 2 *lb.; extract of gentian*, 1 *lb.; treacle*, q. s.; mix, and divide into half-pound rolls. For ale.

2. *Crude picric acid*, 1 *lb.; ground chamomiles*, 3½ *lb.; grains of paradise*, ½ *lb.;* "*foots*" or *syrup*, q. s. For pale ale.

3. To either of the above add *Spanish juice*, 1½ *lb.;* previously softened with a little boiling water. For porter and stout. The above are used by fraudulent brewers, as a substitute for hops; and by publicans in reducing their beer.

BALLS (Blacking). *Prep.* 1. (Bailey's.) *Gum tragacanth*, 1 *oz.*; *water*, 4 *oz.;* dissolve, add *sugar candy*, 4 *oz.*; and afterwards of *ivory black* and *Prussian blue*, (both in fine powder), of each, 2 *oz.*; *neat's foot oil*, 2 *oz.;* thoroughly incorporate, and evaporate by a gentle heat, constantly stirring, until of a proper consistence, then pour it into oiled moulds.

2. *Gum tragacanth*, 2 *oz.; sugar candy*, 4 *oz.; ivory black*, 1 *lb.; sweet oil*, 3 *oz.;* as last.

3. *Gum arabic, moist sugar, ivory black*, and *lamp black*, of each ½ *lb.; glue* (melted with a little water), 2 *oz ; water*, 1 quart, or q. s.; *neat's foot oil*, ¼ pint; as before. *Used* by the shoemakers to blacken and polish leather.

BALLS (Camphor). Syn. *Chap Balls, Chilblain Balls. Prep.* 1. *Spermaceti* and *white wax*, of each, 2 *oz.; almond* or *olive oil*, 4 *oz.;* melt together by a gentle heat, add *powdered camphor*, 1 *oz.*; and when dissolved and partly cold, pour the mixture into small gallipots (*slightly* warmed,) so as to form hemispherical cakes.

2. To the last add of *balsam of Peru*, ¼ *oz.;* and either strain through muslin or decant the clear portion.

3. *Spermaceti cerate*, 1 *lb.; spermaceti*, 2 *oz.; camphor*, 1½ *oz.;* as before.

4. *Suet*, 14 *oz.; white wax, spermaceti*, and *camphor*, of each ¾ *oz.*

Obs. A rich *pink* or *reddish tinge* may be given by a little *alkanet root* or *dragon's blood;* a *yellow*, by *palm oil* or *annotta;* a *blue*, by a little *finely powdered indigo;* and a *green*, with *spinage* or a few grains of *verdigris*. Perfumes may be added according to taste; but are seldom required. The best for this purpose, are, *musk, civet, ambergris, vanilla, cinnamon, cassia, neroli, violet*, and *nutmeg*.

BALLS (Copying). *Prep.* 1. *Bees' wax*, 6 *oz.; mutton suet*, 2 *oz.; gum arabic*, 1 *oz.; indigo* and *lamp black*, of each ½ *oz.;* (the last three in *very fine* powder;) melt together, and when thoroughly incorporated, and partly cold, pour the mixture into small cylindrical moulds.

2. Substituting *bronze powder* for the *indigo* and *lamp black* above.

3. As last, but using *burnt terra di Sienna* for colouring.

Used by artists and amateurs to copy inscriptions, monumental brasses, and other raised or sunken patterns; the ball being rubbed over the paper previously laid flat on the design, and held securely in its place.

BALLS (Cream). *Prep.* 1. *White curd soap*, (grated), 1 *lb.; powdered starch*, 5 *oz.;* beat well together with *gum water*, q. s., and form into spheroidal or egg-shaped cakes, weighing about 1½ or 2 *oz.* each.

2. To the last add *powdered spermaceti*, 4 *oz. Used* to whiten and soften the hands.

BALLS (Heel). *Prep.* 1. (Ullathorne's.) *Bees' wax*, 1 *lb.; suet*, 3 *oz.;* melt together, and stir in *lamp black*, 4 *oz.; gum arabic*, 2 *oz.; sugar candy*, 1 *oz.*, previously reduced to an *impalpable* powder; and when thoroughly mixed and partly cold, pour the composition into tin or leaden moulds.

2. To the last add, *rosin*, 3 *oz.; oil of turpentine*, 2 *oz.*

3. *Suet* and *bees' wax*, of each, 4 *oz.; powdered gum, sugar candy*, and *Venice turpentine*, of each, 1 *oz.: lamp black*, 4 *oz.;* as before.

4. *Suet*, 4 *oz.; bees' wax*, 2 *oz.; lamp black* and *brown sugar*, of each, 8 *oz.; common size*, 5 *oz.;* melt together, and stir until incorporated.

Used by shoemakers to black leather, also by artists to copy inscriptions, &c. To produce a good article, the gum, colouring matter, and sugar, must be in the state of *very fine* powder, and the mixture carefully made; no lumps being left. Some persons dissolve the gum in a little water, and then stir the mixture over the fire until it acquires the proper consistence for moulding; but the first is the best method.

BALLS (Scouring). Syn. *Breeches Balls, Clothes Balls, Carpet Balls. Prep.* 1. *Curd soap*, (sliced), 1 *lb.; water*, 2 *oz.;* melt in a water bath or glue pot, and when cooled a little, add *ox-gall* and *oil of turpentine*, of each, 2½ *oz.;* mix well, and roll or mould the mass into balls or cakes.

2. *Fuller's earth*, 2 *lb.; curd soap*, 1 *lb.;* beat to a paste with *ox-gall*, q. s.

3. *Soft soap* and *fuller's earth*, equal parts, beat up either with or without a little *oil of turpentine* or *essence of lemons*. The above are used to remove paint, grease, and dirt from cloth. The spot, first moistened with hot water, is rubbed with the cake, and allowed to soak a few minutes, or to become nearly dry, when it is well rubbed with a little warm water and a brush or piece of woollen cloth, and afterwards rinsed in clean water, and finally rubbed dry and smoothed off with a piece of dry cloth or a brush. This is the composition so commonly vended about the streets of London in penny cakes.

4. *Whiting* and *pipeclay*, equal parts; *water*, q. s. Used for soldier's belts, trousers, &c.

5. *Pipeclay*, 2 *lb.; fuller's earth*, 1 *lb.; whiting*, ½ *lb.*; *water*, q. s.

6. *Bath brick*, 1 *lb.; pipeclay*, 2 *lb.; ox-gall*, ½ pint.

7. To the last add of *powdered pumice-stone*, 6 *oz.* The last four are used for cloth and leather, especially for drab and light coloured coats, trousers, breeches, belts, and gloves. *Rose pink, yellow ochre, umber, Irish slate*, or other like colouring matters may be added to produce any desired tint. *White pepper, cloves*, &c., are also occasionally added to drive away moths and insects; and *orris root* or *essence of bergamot* or of *lemon grass*, as perfume.

BALM OF GILEAD. Syn. *Balm of Mecca, Balsam of Mecca, Opobalsam; Balsamum Gileadense, B. Judaicum, B. è Mecca, Opobalsamum*,—Lat. A fragrant oleo-resinous substance obtained from the *amyris Gileadensis*, (Linn.) a middle-sized tree growing in Arabia Felix, Asia Minor, and Egypt, belonging to the *nat. ord.*, Terebinthaceæ. The *best balm of Gilead* is a spontaneous exudation from the tree; a *second quality* is obtained by cutting the bark with an axe, and receiving the juice which exudes in a small earthen bottle. Both of these varieties are extremely costly and scarce, and are held in such high estimation by the Turks and Egyptians, that none of them are exported as an article of commerce. "There are only two shops in Constantinople at which the genuine balsam can be obtained. Its price is exorbitant, *one grain* being charged 5 Turkish piastres, or 1*s.* 0½*d.* English." That which is sent to England is obtained by boiling the leaves and young twigs of the *balsam tree* in water, and is rejected by the Orientals as worthless. The genuine balsam of Mecca is of a clear golden colour, and possesses a penetrating and delicate fragrance, and a sharp, bitter, astringent taste. A drop let fall on hot water, spreads itself over the whole surface, like a film of oil, and again contracts on the water cooling. It is *not* entirely soluble in hot rectified spirit, but dissolves *completely* in both the fixed and volatile oils, which then assume the peculiar odour and flavour of the balsam. The inferior qualities, or those of commerce, are generally opaque and thick, rapidly resinifying and turning yellow by age. When applied to the skin it causes redness and swelling. It was formerly regarded as possessing the most exalted virtues as an antiseptic, stimulant, vulnerary and nervine, and its fumes were supposed to prevent barrenness. It is still employed in the East as a cosmetic and perfume, and is said to be unequalled for giving a healthy glow to the complexion and promoting the growth of the hair. Its medicinal qualities appear to be intermediate between those of the turpentines and balsam of tolu. *Dose.* From 6 to 12 drops. The cosmetics recently so much advertised as *balm of Mecca*, do not contain even a trace of that article; nor do we believe that there is a single drop of the genuine balm to be purchased in London.

BALM OF GILEAD (Factitious). *Prep.* 1. *Gum benzoin*, (bright, coarsely powdered,) 4 *oz.; liquid styrax*, (best,) 3 *oz.*; *balsam of tolu*, 2 *oz.; Canadian balsam*, 1 pint; mix in a flask, and expose it (closed) to the heat of a water bath (frequently stirring) until the liquid is saturated; when the whole has become cold and clear, decant the upper portion, and add of the *oils of lemon* and *cassia*, of each, 1 *oz.; oils of rosemary* and *nutmeg*, of each, ½ *oz.* It may be thinned down with *rectified spirit of wine.*

2. *Gum benzoin*, 4 *oz.; liquid styrax*, 3 *oz.; balsam of tolu*, 2½ *oz.; strongest rectified spirit*, ¾ pint; *oils of lemon, cassia, rosemary*, and *nutmeg*, of each, 1 *oz.;* make a tincture, decant, and add *Canadian balsam*, 12 *oz.*

3. *Yellow rosin*, 10 *oz.;* melt, and after 15 minutes, remove the vessel from the heat, and add of *tincture of benzoin* and *oil of lemon*, of each, 3 *oz.; oils of caraway* and *rosemary*, of each, 2 *oz.*

BALM OF GILEAD (Dr. Solomon's). *Prep. Compound mixture of cardamoms* (made with brandy instead of proof spirit,) ¾ pint; *syrup of saffron*, 6 *oz.; tincture of cantharides* (Ph. L.) 1½ *oz.;* mix. The smallest bottle of Dr. Solomon's "*balm of Gilead*" is 11*s.*

BALM OF SYRIACUM (Perry and Co's). *Prep.* Take of *English gin*, 1 pint; *moist sugar*, ½ *lb.;* (dissolved in) *water*, 4 *oz.;* mix, and add of *paregoric* (Tinct. Camph. Co., Ph. L. 1836), 1 *oz.; tincture of tolu*, ½ *oz.; tincture of cantharides*, q. s.; together with a few drops each of the *oils of aniseed* and *spearmint;* agitate well together, and the next day filter, or decant the clear portion.

BALSAM (Anodyne.) Syn. *Balsamum Anodynum, B. Tranquillans*,—Lat. *Prep.* 1. (Bate's.)—*a.* Take of *Castile soap*, (in shavings,) 12 oz.; *camphor*, 7 oz.; *powdered opium*, 2 oz.; *hay saffron* and *oil of rosemary*, of each, 1 oz.; *rectified spirit*, 4 pints; digest for 10 days and filter or decant.—*b.* To *opodeldoc*, 3 oz., add *laudanum*, 1 oz. *Used* as an anodyne, and as a rubefacient for sprains, sore throats, rheumatism, &c. *Dose.* 20 to 60 drops. The liniment of opium, (*Lin. Opii*,—Ph. L.) is commonly sold for it.

BALSAM (Apoplexy). Syn. *Balsamum Apoplecticum, B. ad Apoplecticos*,—Lat. *Prep.* 1. *Amber, civet, musk, Peruvian balsam*, and *volatile oils*, made into a balsam.

2. (Ph. E. 1744.) *Expressed oil of nutmeg*, 1 oz.; liquefy by a gentle heat, and stir in of the *oil of cloves, lavender*, and *rosemary*, of each, ½ dr.; *oil of amber*, 10 drops; *balsam of Peru*, 1 dr. Formerly used to anoint the head and nostrils of apoplectic patients, and believed to be of great efficacy.

BALSAM (Camphorated). Syn. *Balsamum Aceticum Camphoratum*,—Lat. *Prep.* (Pelletier.) *Curd soap* and *camphor*, of each, 5 dr.; *oil of thyme*, 40 drops; *acetic ether*, 5 oz.; digest together in a stoppered bottle until the solids are dissolved. An efficacious liniment in certain forms of rheumatism and gout.

BALSAM (Chilblain). Syn. *Balsamum ad Perniones*,—Lat. *Prep.* (Lejeune.) *Camphor*, 1 dr.; *tincture of benzoin* and *iodide of potassium*, of each, 5 dr.; *solution of diacetate of lead*, 10 dr.; *proof spirit* (made with rose-water), 2½ oz.; mix, and add a warm solution of *curd soap*, 10 dr., made with a second 2½ oz. of the same spirit.

BALSAM (Godbold's Vegetable). *Prep.* Of *lump sugar*, 1 ℔; *vinegar*, ½ pint: *garlic* ½ oz.; *tincture of tolu*, 1 teaspoonful; *rectified spirit*, 3 oz. Steep the garlic in the vinegar for 3 or 4 days, strain, dissolve the sugar, and add the other ingredients. Simple oxymel is now generally substituted for it.

BALSAM (Goulard's). Syn. *Balsamum Goulardii, B. Saturni*,—Lat. *Prep.* (Van Mons.) Triturate *powdered acetate of lead* with *hot oil of turpentine*, in a heated mortar, until no more will dissolve; and after repose, whilst still hot, decant the clear portion. Recommended as a useful application to foul and painful ulcers.

BALSAM (Green). Syn. *Balsamum Viride*,—Lat. *Prep.* 1. *Linseed oil*, 6 ℔; *gum elemi*, 1 ℔; heat together; add *powdered verdigris*, 3 oz. or q. s. to colour; and decant the clear portion.

2. *Linseed oil* coloured with *verdigris.* Both were formerly much used by surgeons as detergents.

BALSAM (Locatelle's). Syn. *Locatelli's Balsam; Balsamum Locatelli, B. Lucatelli, B. Italicum*,—Lat. *Prep.* 1. (Original Formula.) *Olive oil*, 6 oz.; *yellow wax*, 4 oz.; *sherry wine*, 5 fl. oz.; *red sanders*, (in very fine powder,) 4 dr.; simmer together until the moisture is nearly evaporated, then add of *Strasburg turpentine*, 6 oz.; *balsam of Peru*, 2 dr.; and strain through linen.

2. (Ph. E. 1744.) *Olive oil*, 24 fl. oz.; *yellow wax*, 1 ℔; melt and add of *Venice turpentine*, 1½ ℔; and, when cooled a little, further add, *powdered dragon's blood*, 1 oz.; *balsam of Peru*, 2 oz.; and stir until cold.

3. (Ph. L. 1746.) *Olive oil*, 16 fl. oz.; *Venice turpentine* and *yellow wax*, of each, ½ ℔; *red sanders*, 6 dr.

Uses. The above was once highly esteemed in phthisis and chronic coughs, in doses of ½ dr., or more, mixed with an equal weight of *conserve of roses;* and as a mild stimulating ointment. It is still a common pectoral amongst the lower classes.

BALSAM (Metz's). Syn. *Balsamum Viride Metensium,*—Lat. *Prep.* (Guibourt.) *Linseed oil* and *olive oil,* of each, 6 oz.; *oil of laurel berries,* 1 oz.; *common turpentine,* 2 oz.; melt by a gentle heat, and add, of *verdigris,* 3 dr.; *aloes,* 2 dr.; *sulphate of zinc,* 1½ dr.; (all in powder;) mix well, pour the liquid into a bottle, and add of *oil of juniper,* 4 dr.; *oil of cloves,* 1 dr. *Used* on the continent as a common detergent dressing to wounds and ulcers.

BALSAM (Odontalgic). Syn. *Toothache Balsam; Balsamum Odontalgicum,*—Lat. *Prep.* 1. *Rectified oil of turpentine* and *balsam of Peru,* of each, 1 oz.; *oils of cloves* and *cajeput,* of each, 2 dr.; *opium* (in fine powder), 1½ dr.; digest with frequent agitation for a fortnight.

2. For *oil of turpentine,* in the last, substitute *highly rectified spirit of wine.*

3. (Van Mons.) *Opium* and *camphor,* of each, 40 gr.; dissolve in a little *alcohol,* and add *oil of cloves,* 1 dr.; *oil of guaiacum,* 2 dr.; *oil of nutmeg,* 6 dr. A drop or two to be applied to the tooth or gum by means of a camel's hair pencil, or a piece of lint.

BALSAM (Pectoral). *Prep. Tincture of tolu* and *compound tincture of benzoin,* of each, 2 oz.; *rectified spirit,* 4 oz. Mix. *Used* as a pectoral in coughs, hoarseness, &c.

BALSAM (Riga). Syn. *Carpathian Balsam; Balsamum Carpathicum, B. Libani,*—Lat. A pellucid white fluid obtained by careful distillation from the young shoots of the *pinus cembra* (Linn.) or Siberian stone pine. It much resembles oil of juniper, and is diuretic and vulnerary. It is much esteemed by some for sprains and bruises. The bottoms of oil of juniper are commonly sold for it in the shops. The spirit distilled from pine-tops (*spiritus turionum pini,*) is also frequently, though incorrectly, called *Riga Balsam.*

BALSAM (Sanchez's Gout). The same as the *camphorated balsam* of M. Pelletier.

BALSAM (Stomachic). Syn. *Balsamum Stomachicum,*—Lat. *Prep.* (Ph. Slesv.-Hols., 1831.) *Oils of cloves, mace, wormwood,* and *peppermint,* of each, 1 dr.; *balsam of Peru,* 2 dr.; *oil of nutmeg,* 2 oz.; mix. 1 to 5 drops on sugar, or dissolved in spirit.

BALSAM (Thibaut's). *Prep.* Take of *myrrh, aloes,* and *dragon's blood,* of each, 1 dr.; *flowers of St. John's wort,* 1 handful; *spirit of wine,* ½ a pint; *Canada balsam,* ½ oz.; digest the flowers in the spirit for 3 days, express the liquor, and dissolve the other ingredients in it. *Dose.* 1 to 2 teaspoonfuls; in gonorrhœa, &c. Also used to heal cuts and wounds, and to stop bleeding.

BALSAM OF AMBER. Syn. *Balsamum Succini,*—Lat. The article to which this term is usually applied, has been already noticed. Oil of amber formerly was also so called, and the same name has been given to the following preparations by their inventors:

1. (Radius.) *Oil of amber,* 4 fl. oz.; *oil of myrrh,* 2 fl. oz.; *oil of turpentine,* 1 fl. oz.; mix with a gentle heat.

2. (Bate.) *Powdered amber,* 1 oz.; *oil of turpentine,* 3 oz.; digest with heat in a closed vessel until dissolved. Both are stimulant and antispasmodic, and may be used either internally or as a friction, in the same way as oil of amber.

BALSAM OF ARCÆUS. Syn. *Balsamum Arcæi,*—Lat. A digestive ointment formerly in great repute and still employed on the Continent. *Prep.* (Soubeiran.) *Mutton suet,* 4 parts; *turpentine* and *elemi-resin,* of each, 3 parts; *hog's lard,* 2 parts; melt together, strain, and stir until nearly cold. In the original formula, *boiling water,* 4 parts, were ordered to be stirred in. This preparation is now superseded in England by the *unguentum elemi* of the Pharmacopœia.

BALSAM OF CLOVES. Syn. *Aromatic Balsam of Cloves; Balsamum Caryophylli,*—Lat. *Prep.* (Bories.) *Oil of cloves* and *oil of nutmeg,* of each, ½ dr.; *spirit of juniper berries,* 3 oz.; mix. Rubefacient and diuretic.

BALSAM OF FIOVARENTI. Syn. *Balsamum Fiovarenti,*—Lat. *Prep.* (P.C.) *Venice turpentine,* 16 oz.; *amber, elemi, galbanum, myrrh, styrax,* and *tacamahaca,* of each, 3 oz.; *aloes,* 1 oz.; *bay-berries,* 4 oz.; *cinnamon, cloves, galangal, ginger, nutmegs,* and *zedoary,* of each, 1½ oz.; *dittany of Crete,* 1 oz.; *rectified spirits,* 8 lb.; macerate a week and distil off 7 lb. The distilled spirit constitutes this notable preparation of, professedly, many virtues.

BALSAM OF GUAIACUM. Syn. *Balsamum Guaiaci, B. Guaiacinum,*—Lat. *Prep.* (Ph. L. 1745.) *Gum guaiacum,* 1 ℔; *balsam of Peru,* 3 dr.; *rectified spirit,* 1 quart; digest 10 days, and filter. Diaphoretic and arthrodynic. *Dose.* 30 to 60 drops, in milk or water; in agues, rheumatism, &c.

BALSAM OF HONEY. Syn. *Pectoral Balsam of Honey; Balsamum Mellis, B. Pectorale,*—Lat. *Prep.* 1. *Balsam of tolu,* 1 ℔; *honey,* 2 ℔; *rectified spirit,* 1 gall.; make a tincture.

2. To the last add *turmeric,* 1 oz.; *powdered opium,* 3 oz.

3. (Hill's.) *Balsam of tolu,* 4 oz.; *styrax* and *powdered opium,* of each, 1 oz.; *honey,* 1 ℔; *rectified spirit,* 1 quart. A good pectoral in tickling coughs, hoarseness, &c., without fever. *Dose.* For an adult, ½ to 1½ teaspoonful; accompanied by a dose or two of aperient medicine. Tincture of *balsam of tolu,* or of *benzoin,* or a *mixture of the two,* is frequently sold in the shops under the name of "*balsam of honey.*"

BALSAM OF HOREHOUND. Syn. *Balsamum Marrubii,*—Lat. *Prep.* 1. *Extracts of horehound* and *liquorice,* of each, 2 oz.; *hot water,* ½ pint; dissolve, and when cold, add of *paregoric,* ¾ pint; *oxymel of squills,* 6 oz.; *tincture of benzoin,* 2 oz.; *honey,* 10 oz.; mix well, and strain through flannel.

2. (Ford's.) *Horehound herb* and *liquorice root,* of each 3½ ℔; *water,* 1 gall,; infuse 12 hours, strain off 6 pints, and add of *camphor,* 10 dr.; *powdered opium* and *benzoin,* and *oil of aniseed,* of each, 1 oz.; *powdered squills,* 2 oz.; *proof spirit,* 1½ gall.; macerate a week, add *honey,* 3½ ℔; and strain. Both are pectoral, but the first is the best formula in practice. The *dose* and *uses* are the same as those of *balsam of honey.*

BALSAM OF LIFE. Syn. *Balsamum Vitæ,*—Lat. *Baume de Vie, Elixir de Vie,*—Fr. Several compound medicines have been so called.

1. (Hoffman's.)—*a.* Of the *oils* of *cinnamon, cloves, lemon, lavender,* and *nutmegs,* and *balsam of Peru,* of each, 2 dr.; *essence of ambergris, oil of amber,* and *oil of rue,* of each, 1 dr.; *cochineal,* 12 gr.; *strongest rectified spirit,* 3½ pints; mix.

b. (Ph. Dan. 1840.) *Oils of cinnamon, cloves, lavender,* and *nutmegs,* of each, 20 gr.; *purified oil of amber,* 10 drops; *balsam of Peru,* 30 gr.; *rectified spirit,* (tinged with alkanet root,) 10 oz.

2. (Gabius's.) Nearly similar to Hoffman's.

3. (Turlington's.) *Benzoin* and *liquid styrax,* of each, 12 oz.; *balsam* of *tolu* and *extract of liquorice,* of each, 4 oz.; *balsam of Peru,* 2 oz.; *aloes, myrrh,* and *angelica root,* of each, 1 oz.; *highly rectified spirit of wine,* 7 pints; digest, with frequent agitation for 10 days, and filter. *Externally,* the above are rubefacient, and corroborant; *internally,* stimulant, cordial, and pectoral.

4. (*Baume de vie externe.*) *Soap liniment,* 2 parts; *oil of turpentine,* 1 part; mix. Stimulant and rubefacient. *Used* as a friction.

5. (*Baume de vie purgatif; Elixir de vie.*)—*a.* (Briett.) *Socotrine aloes* and *saffron,* of each, 2 dr.; *rhubarb,* 6 dr.; *liquorice root,* 1 oz.; *proof spirit* or *brandy,* ½ pint; digest a week, and filter.

b. (*Original Swedish Formula.*) *Aloes,* 9 dr.; *agaric, gentian, rhubarb, saffron, theriaca,* and *zedoary,* of each, 1 dr.; *proof spirit* or *brandy,* 1 quart. A mild stomachic purge. *Dose.* 1 to 6 dr. *Tincture of rhubarb and aloes* (Ph. E.) is commonly substituted for it.

BALSAM OF LIQUORICE. Syn. *Balsamum Glycyrrhizæ,*—Lat. *Prep.* 1. *Extract of liquorice* and *honey,* of each 3 oz.; melt together, and add of *paregoric* and *oxymel of squills,* of each, 2 oz.; *tincture of tolu,* 1 oz.

2. The nostrum sold under this name, according to Dr. Paris, consists of *paregoric elixir,* strongly impregnated with *oil of aniseed,* (and sweetened with *honey.*) *Dose* and *properties,* similar to those of *Balsam of Honey.*

BALSAM OF NUTMEG. Syn. *Balsamum Myristicæ, B. Nucistæ,*—Lat. *Prep.* (Ph. Bor. 1847.) *Expressed oil of nutmeg* (mace ?), 3 oz.; *olive oil,* 1 oz.; *yellow wax,* ½ oz.; melt together by a gentle heat, pour the mixture into paper moulds, and when cold, cut the mass up into cakes.

BALSAM OF RACKASIRI. A species of balsamic turpentine, said to be obtained from the *bursera balsamifera,* (Pers.) an Indian tree of the *natural order* Terebinthaceæ. The nostrum vended under the name by certain quacks, simply consists of *English gin, coloured, sweetened,* and *aromatised.*

BALSAM OF SAFFRON. Syn. *Balsamum Croci,*—Lat. *Prep.* Steep *hay saffron,* 1 oz., in *French brandy,* ¾ pint, for a week; press out the liquor, and add, *syrup of orange peel,* and *honey,* of each, 3 oz.; *orange-flower water,* 2 oz.; *compound tincture of cardamoms,* 1 oz.; *tincture of tolu,* 4 dr.; *essence of musk,* 12 drops; *oil of nutmeg,* 8 drops; agitate well together, and in a week decant the clear. Stimulant, stomachic, and antispasmodic. A favorite remedy for low spirits, flatulence, &c. *Dose.* 1 or 2 teaspoonfuls, or more, in a glass of wine, or with a spoonful of weak spirit or Cologne water, when required. Chiefly taken by ladies.

BALSAM OF SOAP (Ethereal). *Prep.* (Cottereau.) *Castile soap* (powdered) and *camphor*, of each, 1 dr.; *oil of thyme*, 10 drops; *acetic ether*, 1 oz.; dissolve in a close vessel with the aid of a gentle heat, and decant the clear. *Used* as an embrocation or liniment in gout, rheumatism, &c.

BALSAM OF SULPHUR. Syn. *Oil of Sulphur, Sulphurated Oil; Oleum Sulphuratum, Balsamum Sulphuris,* — Lat. *Prep.* 1. (Ph. L. 1746.) *Flowers of sulphur*, 1 part; *olive oil*, 4 parts; boil together in a vessel lightly covered, until they assume the consistence of a thick balsam.

2. (Ph. L. 1824). *Olive oil*, 16 fl. oz.; heat it in a sand bath, and gradually add of *washed sulphur*, 2 oz.; stirring until they combine.

Prop., &c. Balsam of sulphur is a dark, reddish-brown viscid fluid, having an extremely disagreeable and penetrating odour, and a strong, nauseous taste. The *local action* of balsam of sulphur is that of an acrid and irritant; its *remote effects*, those of a stimulant, expectorant, and diaphoretic. *Externally*, it is occasionally used as an application to foul ulcers; and was formerly commonly employed *internally*, in chronic pulmonary affections, in *doses* of 20 to 50 drops. It is now seldom given internally, except in veterinary practice.

BALSAM OF SULPHUR (Anisated). Syn. *Balsamum Sulphuris Anisatum*,—Lat. *Prep.* 1. *Balsam of sulphur*, 4 parts; *oil of aniseed*, 1 part; mix.

2. (Ph. E. 1722). *Sulphur*, 2 oz.; *oil of aniseed*, 4 fl. oz.; *oil of turpentine*, 6 fl. oz.; mix, digest in a sand heat until the oils are saturated, and decant the clear.

BALSAM OF SULPHUR (Bituminated). Syn. *Balsamum Sulphuris Barbadense, Petroleum Sulphuratum*,—Lat. *Prep.* 1. (Ph. L. 1746). *Sulphur*, 1 part; *Barbadoes tar*, 4 parts; as last.

BALSAM OF SULPHUR (Ethereal). Syn. *Balsamum Sulphuris Æthereum*,—Lat. *Prep.* (Augustin.) *Sulphuric ether* and *terebinthinated balsam* of *sulphur*, of each, 1 dr.; *Dippel's animal oil*, 12 dr.; mix. In chronic pulmonary affections, flatulent colic, &c. *Dose.* 7 to 12 drops.

BALSAM OF SULPHUR (Terebinthinated). Syn. *Balsamum Sulphuris Terebinthinatum*,—Lat. *Prep.* 1. (Ph. E. 1722). *Sulphur*, 2 oz.; *oil of turpentine*, 6 fl. oz.; digest, to saturation, over a sand bath, and decant the clear portion.

2. (Vans Mons.) *Sulphur*, 1 part; *oil of turpentine*, 2 parts. All the above, for the most part, resemble the simple balsam of sulphur in their general properties, and are used in similar cases.

BALSAM OF TURPENTINE. Syn. *Balsamum Terebinthinæ*,—Lat. This name has been given to Strasburgh, Venice, and other like turpentines, as also to the following compounds—

1. *Black rosin*, 1 ℔; melt by a gentle heat, and after a short time pour off the clear portion, and when cooled a little, add to it, of *oil of turpentine* (warm), 1 pint.

2. To the last add of the *oils of nutmeg* and *cassia*, of each, 1 dr.

BALSAM OF TURPENTINE (Emollient). Syn. *Balsamum Terebinthinatum*,—Lat. *Prep.* (Beasley.) *Olive oil*, 6 oz.; *oil of turpentine*, 2 oz.; *yellow wax*, 1 oz.; *balsam of Peru*, 2 dr.; *camphor*, 1½ dr. A stimulant emollient, useful in contusions, ulcerations, engorgements, nephritic pains, &c.

BAMBOO HABIT. A species of life preserver used in China, consisting of four pieces of bamboo formed into a square frame by tying their corners together. When slipped over the head and shoulders, and fixed under the armpits, a person, though unable to swim, may easily support his head above water.

BANDAGE. Pieces of linen, flannel, or other material, used to support parts, to exert pressure on them, or to retain dressings in their proper places. The application of bandages, as in the dressing of wounds, ulcers, &c., though of frequent occurrence, is often carelessly or badly performed. The nature of the part and the object in view, should always receive due consideration. Ordinary ingenuity will supply the rest. The safest, simplest, and most effective means of fastening them on, is, in most cases, furnished by a common needle and thread or cotton. The full consideration of the subject belongs to *surgery*.

BANDAGE (Mustard). A *woollen roller* soaked in a thin soup made with the best *flour of mustard* and *warm water*, and the excess of moisture expelled by gentle pressure. *Used* to envelope the body or limb, by repeatedly folding it round the part; in the cold stages of cholera, and in other cases requiring an energetic stimulant.

BARBADOES LEG. Syn. *Elephantiasis Arabum*,—Lat. A disease indigenous to Barbadoes, and frequent in other hot climates, in which the limb becomes tumid, hard, and misshapen. The *treatment* consists in diminishing febrile and inflammatory action, by bleeding, purgatives, and low diet. Mercury may be advantageously administered, and leeches, and warm fomentations and poultices, had recourse to. Sometimes amputation is necessary.

BARILLA. The ashes left from the combustion of *salsola, salicornia, chenopodium,* and other species of the order *chenopodiaceæ.* These plants, which are cultivated on the sea coast for the purpose, are cut down when ripe, dried, and burned in heaps. The resulting hard gray or bluish porous mass (*barilla,*) consists of carbonate and sulphate of soda, chloride and sulphuret of sodium, carbonate and sulphate of lime, alumina, silica, oxide of iron, and imperfectly consumed carbonaceous matter, with a little iodine and bromine. The proportion of soda varies in different varieties.

Alicant barilla; (*soda alicantina;*) obtained chiefly from several species of *salsola,* and from *chenopodium setigerum, &c.,* contains from 25% to 40% of carbonate of soda. (Guibourt.)

Narbonne barilla; from *salicornia annua* or *herbacea;* contains 14% to 15% of carbonate of soda.

Barilla of Aiguemortes, (*blanquette;*) from mixed plants; contains 3% to 8% of carbonate of soda. (Guibourt.)

Sicily barilla. Principally from *salsola sativa;* furnishes 55% of carbonate of soda. (Fée.)

Uses, &c. Barilla is chiefly used in the manufacture of soap and glass. *Good barilla* contains, on the average, about 20% of real alkali. It is chiefly imported from Spain, Sicily, Teneriffe, and the Levant; but since the introduction of Le Blanc's process for obtaining soda from common salt, its importance and value has considerably lessened. See *Soda* and *Alkalimetry.*

BARIUM. Syn. *Barium,*—Lat. The metal of which the earth baryta is an oxide.

Prep. 1. A paste is made with *pure baryta* or *carbonate of baryta,* and *water,* which is laid on a small *tray of platinum,* and a little hollow being made on its surface, a *globule of mercury* is placed therein. The *positive pole* of a powerful galvanic battery (say, of 100 double plates;) is then connected with the *platinum,* whilst the *negative pole* is inserted into the *globule of mercury.* In a short time an *amalgam of barium* is formed, which, on being heated *in vacuo,* or in a small sealed bent tube of glass, (free from lead,) filled with the vapour of *mineral naphtha,* parts with its mercury, and *pure barium* remains behind.

2. From *baryta,* by strongly heating it in an *iron tube,* through which the vapour of *potassium* is conveyed. The reduced barium is extracted by quicksilver, which is afterwards driven off in a small green-glass retort, as above.

Prop., &c. A gray-coloured metal, possessing little lustre, rapidly decomposed by both air and water, with the absorption of oxygen and the production of oxide of baryta, (*barytes.*) It is fusible at a red heat; burns, in contact with air with a deep red light; and has more than twice the sp. gr. of water.

BARIUM (Bromide of). Syn. *Barii Bromidum,*—Lat. *Prep.* (Magendie.) Boil a solution of *protobromide of iron* with *moist carbonate of baryta,* in slight excess; filter, evaporate to dryness, and heat the residuum to redness. By careful evaporation of its aqueous solution it may be obtained in crystals. Its physiological properties resemble those of iodide of barium.

BARIUM (Chloride of). Syn. *Hydrochlorate of Baryta, Muriate of Baryta; Barii Chloridum,*—Ph. L. & D.; *Barytæ Murias,*—Ph. E. *Barytæ Hydrochloras,*—Lat. *Prep.* 1. (Ph. L. 1836.) *Carbonate of baryta,* (in small pieces,) 10 oz.; *hydrochloric acid,* ½ pint; diluted with *distilled water,* 1 quart; mix gradually, strain, evaporate until a skin forms on the surface, and set it aside to crystallize.

2. (Ph. L. 1851.) Included in "appendix" of Tests and Reagents; no form given, the crystals, "*Barii Chloridi* (crystalli)" being ordered.

3. (Ph. E.)—*a.* Similar to that of the Ph. L. 1836.

b. By adding *hydrochloric acid* to a hot solution of *sulphuret of barium,* as long as it occasions effervescence; and evaporating and crystallizing the resulting solution.

4. (Ph. D.)—*a.* Similar to No. 1, but directing the filtered solution to be evaporated to dryness, exposed to a low red heat, for 20 minutes, in a Hessian crucible, and the residuum to be powdered, redissolved in water, evaporated and crystallized.

b. Similar to 3, *b,* (above.)

Prop. Flat, four-sided, colourless, crystals; slightly efflorescent in dry warm air, but otherwise suffer no change; decrepitate when heated and lose their water of crystallization; insoluble in alcohol; 100 parts of water, at 60° dissolve 43·5 parts of the crystals, and when boiling, 75 parts. If the crystals become moist or deliquesce by exposure to air, they contain either chloride of calcium or of strontium, or perhaps chloride of magnesium. "100 grains, in solution, are not entirely precipitated by

100 gr. of (crystallized) sulphate of magnesia." (Ph. E.)

Uses, &c. It is principally employed as a test for sulphuric acid, its solution causing a white precipitate in another solution, containing oil of vitriol or a sulphate. It has been given in scrofula, scirrhous cancer, skin diseases, &c. It is poisonous. Its antidotes are the same as those for baryta.

BARIUM (Ferrocyanide of). Syn. *Barii Ferrocyanidum,*—Lat. From *pure ferrocyanide of iron,* digested in *baryta water.* By careful evaporation, efflorescent prismatic crystals may be obtained, soluble in 4½ parts of water.

BARIUM (Iodide of). Syn. *Hydriodate of Baryta; Barii Iodidum, Barytæ Hydriodas,*—Lat. *Prep.* 1. (Phillips.) Dissolve *sulphuret of barium* in *water,* and add *iodine* (gradually) in excess; filter and evaporate to dryness or crystallize.

2. (Magendie.) Digest *freshly-precipitated carbonate of baryta,* in excess, in a *hot solution* of *iodide of iron;* filter, evaporate, and crystallize.

Prop., &c. A white or grayish white mass, or acicular crystals, (according to the mode of its preparation;) very soluble in both water and alcohol; and decomposed by exposure to the air. It has been highly recommended in scrofula. *Dose.* ⅛ gr. (gradually increased to 1 gr.) two or three times a day. *Externally,* as an ointment (4 gr. to *lard* 1 oz.) as an application to scrofulous swellings. (Biett.) It possesses all the *irritant, corrosive,* and *poisonous properties* of the chloride, but in a more violent degree.

BARIUM (Oxides of). Barium forms two compounds with oxygen—an *oxide* and a *binoxide.*

BARIUM (Protoxide of). Syn. *Oxide of Barium, Baryta, Barytes; Barii Oxydum, Baryta,*—Lat. *Prep.* 1. From pure *crystallized nitrate* of *baryta,* strongly ignited in a capacious porcelain crucible, until red vapours cease to be evolved.

2. From a mixture *of carbonate of baryta* and *charcoal* strongly ignited in a black lead crucible.

3. (*Hydrated*). From a solution of either *nitrate of baryta* or of *chloride of barium,* precipitated with a solution of *pure potassa* or *soda.*

4. (*Crystals*). A *strong solution of sulphuret of barium,* is boiled with successive portions of *black oxide of copper,* until it ceases to give a black precipitate with a salt of lead; the liquid, after filtration, yields crystals of the hydrate on cooling.

Prop. Obtained by the first two processes it forms a grayish white mass or powder, having a very caustic and alkaline taste, and slaking, on the addition of water, like quicklime, but with the evolution of more heat. It then forms a bulky white powder, (*hydrate,*) resembling that prepared by the third formula. In this form it is soluble in 20 parts of cold and 2 parts of boiling water. Like lime it rapidly passes into the state of carbonate on exposure to air, and in taste, causticity, and alkalinity, resembles that substance. Of all the bases it has the strongest affinity for both sulphuric and carbonic acid, and hence, its solution, (*baryta water,*) and that of one of its neutral salts (*nitrate* or *hydrochlorate*) form our most sensitive tests for those substances.

BARIUM (Binoxide of). Syn. *Peroxide of Barium, Deutoxide of do. Prep.* 1. From *pure baryta,* heated to full redness in a porcelain tube, and exposed to a *stream of pure* dry *oxygen gas.*

2. From *baryta,* 4 parts, heated as above, in a platinum crucible, and *chlorate of potassa,* 1 part, gradually added; the chloride of potassium formed being afterwards washed away with cold water.

3. From *nitrate of baryta* heated in a porcelain tube or retort, until nitrous fumes cease to be evolved, and then expose to a stream of oxygen until the latter ceases to be absorbed. The process for about 4 *lb.* occupies from 3 to 4 hours.

Prop., &c. Gray or grayish white: with water it forms a hydrate, which is slightly soluble in water, and undecomposed by it in the cold. See *Oxygenized Acids.*

BARIUM (Sulphuret of). Syn. *Sulphide of Barium; Barii Sulphuretum, Barytæ Sulphuretum,*—Lat. *Prep.* 1. (Van Mons.) *Sulphate of Baryta,* 11 parts; *charcoal,* 1 part; *oil of turpentine,* q. s. to form a stiff paste; heat the whole in a crucible to redness, cool, and bottle.

2. (Ph. E.) *Sulphate of baryta* (previously calcined and reduced to fine powder), 2 ℔; *charcoal* (in fine powder), 4 oz.; submit the mixture, in a covered crucible, to a low white heat for 3 hours, cool, powder, boil for 5 minutes in *water,* 5 pints; decant the clear, and repeat the operation with 3 pints more of *water,* and unite the mixed liquors, (which may then be either neutralized with acids to form barytic salts, or allowed to deposit crystals by cooling).

3. (Ph. D.) *Sulphate of baryta,* 1½ *lb.*; *lamp black,* 4 oz.; as last (nearly).

Prop., &c. Soluble in water; rapidly decomposed by exposure to the air. It is principally used to form the barytic salts, and in organic analysis.

BARK. The *uses* of different species of bark in medicine and the arts are well known. *Cinchona bark* is invaluable in fevers; *oak bark* furnishes the tanner with one of the most important materials of his trade; and the tenacious fibres of other varieties are manufactured into cordage and textile fabrics.

"*Barks* are to be *collected* at that season in which they can be most easily separated from the wood." (Ph. L.) This, with few exceptions, is late in the spring, at which time the active principles deposited in the cells of the bark are most abundant. Oak bark, collected in spring, contains *four times* as much astringent matter as that collected in winter.

BARK (Essential Salt of). Disulphate of quinine. The nostrum vended under this name is merely an *infusion of cinchona bark* evaporated to dryness.

BARLEY. Syn. *Hordeum,*—Lat. A well-known grain, the produce of several species of the genus *hordeum.*

The leading constituents of barley are nearly similar to those of wheat, but it is scarcely so rich in nitrogenized matter as the latter grain. According to Einhoff, the ripe seeds are composed of *meal,* 70·05%; *husk,* 18·75%; and *moisture,* 11·20%. Average fine *barley-meal* contains—*starch,* 68%; *albumen, gluten, &c.,* 14%; *fatty matter,* 2%; *ash* or *saline matter,* 2%; *water,* 14%. (Johnston.)

After wheat, barley may be considered the most valuable grain to man, both for the purposes of food and the manufacture of several beverages in general consumption. It forms good wholesome bread, well adapted for persons who live luxuriously; but for the abstemious and the delicate, wheaten bread is preferable. In a *medical point* of view, barley may be regarded as the mildest and least irritating of the cereals. It has always been in high estimation as a demulcent and emollient. The decoction (*barley water*) is a useful drink in inflammatory diseases, especially in those of the chest and urinary organs. See *Food, &c.*

BARLEY (Pearl). Syn. *Hordeum Perlatum,*—Lat. *Hordeum, Barley,*—Ph. L. E. & D. "The seeds of *hordeum distichon* deprived of the husks,"—Ph. L. That of *commerce* is made by steaming *spring barley* to soften the skin, then drying it, and grinding it in a mill with the stones set wide apart, to reduce the grains to a globular form, and to separate the whole of the husk, except that left in the furrow of the seed. *Scotch pearl barley* and *French barley* resemble the last, but are smaller, being generally made from *winter barley* or *bigg.*

BARLEY SUGAR. Syn. *Saccharum Hordeaceum,* — Lat. *Prep.* (Giordano.) *Decoction of pearl-barley,* 1½ pint; *lump sugar,* 2 *lb.;* boil to a proper consistence and form the mass into lozenges or rolls. As a demulcent in coughs, &c. See *Confectionary.*

BAROMETER (Phial). This amusing philosophic toy is made by cutting off the rim and part of the neck of a common phial with a file. The phial is then nearly filled with clean water, and the finger being placed on its mouth, it is inverted, and suspended in a vertical position by means of a piece of twine or wire, when the finger is withdrawn. In *dry weather* the under surface of the water is level with the neck of the bottle, or even concave; in *damp weather,* on the contrary, a drop appears at the mouth and continues enlarging until it falls, and is then followed by another in the same way.

BARYTA. Syn. (See *Oxide of Barium.*) One of the simple earths, shewn by Sir H. Davy to be an oxide of barium. It occurs abundantly in nature, in combination with sulphuric acid, (*native sulphate of baryta; heavy spar; cawk, &c.;*) and with carbonic acid, (*native carbonate of baryta; barolite; witherite.*)

Prep. See *Protoxide of Barium.*

Prop., &c. With the acids it forms salts which are all white, and more or less transparent. With the exception of the sulphate, they are all soluble in water, or in dilute hydrochloric acid, and are extremely poisonous. The whole of them may be prepared by saturating *baryta water,* or *carbonate of baryta,* with a solution of the given acid; and many of them may be prepared by double decomposition. Several are used in *medicine.*

Baryta and its salts are known by the following tests:—1. They are all (except the sulphate) soluble either in water or hydrochloric acid.—2. Their solutions give an immediate clear white precipitate with dilute sulphuric acid and with solutions of the sulphates, which is insoluble in both acids and alkalies. — 3. Hydrofluosilicic acid gives a very characteristic colourless crystalline and quickly subsiding precipitate, only slightly soluble in hydrochloric and nitric acid.—4. An insoluble barytic salt (*sulphate*) may be mixed with powdered charcoal, and exposed for a short time to a full red heat, when sulphuret of barium will be formed, which is freely soluble in water, and which, after being neutralized with hydrochloric or acetic acid, will yield a solution suitable to the application of the usual tests.

Pois., *&c.* No case of poisoning with caustic baryta has yet occurred. The sulphate, owing to its insolubility, is the only salt of baryta which is *not* poisonous.—*Ant.* Vomiting, followed by copious draughts of water soured with sulphuric acid, or by sulphate of soda or sulphate of magnesia, (*Epsom* or *Glauber salts,*) dissolved in a large quantity of water. Subsequent irritation must be soothed by opium or morphia, and antiphlogistics.

BARYTA (Acetate of). Syn. *Barytæ Acetas. Prep.* (Van Mons.) From *dilute acetic acid*, neutralized with *carbonate of baryta*, and the solution evaporated and crystallized. Very soluble.

BARYTA (Carbonate of). Syn. *Barytæ Carbonas,*—Ph. E. & D. & Ph. L. 1836. A heavy white powder, scarcely soluble in water, and decomposed by nearly all the acids. It is found in the crude state abundantly in nature, but may be obtained absolutely pure, by adding an *alkaline carbonate* to a *solution of chloride of barium*, and washing and drying the precipitate. *Native carbonate of baryta* is ordered in the pharmacopœias, and is sufficiently pure for making the barytic salts, the only purpose to which it is applied. It is "totally soluble in dilute hydrochloric acid. This solution remains colourless, and is not precipitated by ammonia or by hydrosulphuric acid. More sulphuric acid being added than is necessary for saturation, nothing is afterwards thrown down by carbonate of soda."—Ph. L. 1836.

BARYTA (Chlorate of). Syn. *Barytæ Chloras,*—Lat. *Prep.* 1. From a *solution* of *chloric acid*, and *freshly precipitated carbonate of baryta;* the solution being filtered and crystallized by evaporation.

2. (*Wheeler's process.*) Digest, for a few minutes, a *concentrated solution of chlorate of potassa*, with *silicated hydrofluoric acid*, in slight excess. The liquid, filtered, neutralized with *carbonate of baryta*, and again filtered, yields prismatic crystals of *chlorate of baryta* by cautious evaporation.

3. By passing *chlorine* through strong *milk of hydrate* or of *carbonate of baryta*, in the same way as in making chlorate of potassa. *Used* to make chloric acid. It is soluble in 4 parts of cold water.

BARYTA (Nitrate of). Syn., *Barytæ Nitras,*—Ph. E. *Prep.* As "the muriate of baryta, substituting *pure nitric acid* for the *muriatic acid.*" Ph. E.

Prop., *&c.* Transparent, colourless octahedrons, insoluble in alcohol, and requiring 8 parts of cold water, and 3 parts of boiling water for solution. It is chiefly used as a test for sulphuric acid, and to give a green tinge to flame.

BARYTA (Sulphate of). Syn. *Barytæ Sulphas,*—Ph. E. & D. This salt occurs as a native mineral. When pure, its powder is white. It is insoluble in almost all menstrua. Before the blowpipe it decrepitates and fuses with great difficulty; by which it is distinguished from the sulphates of strontia and lime. It is "white or flesh-red; heavy; lamellar; and brittle." (Ph. E.) It is chiefly used as a pigment and to adulterate white lead; for which purposes it is commonly well-washed, first in *dilute sulphuric acid*, and afterwards, in *pure water*, by which any iron that may contaminate it is removed. It is also used to form sulphuret of barium.

BARYTIN. Syn. *Barytia.* A vegetable base found by Simon in the rhizomes of *white hellebore.* It is precipitated from its solutions by sulphuric acid and the sulphates, like baryta.

BASSORINE. Syn. *Insoluble Gum.* A substance found in Bassora gum, gum tragacanth, the salep of the roots of orchis mascula, and in several gum resins. It may be *prepared* by soaking powdered *gum bassora* or *tragacanth* in a large quantity of *hot water*, decanting or filtering off the clear portion, and drying the residuum. To obtain it absolutely pure, those substances, in the state of powder, may be digested, successively, in *alcohol*, *ether*, and *water*. In its properties it much resembles pure gum tragacanth.

BATHING. The importance, and indeed, the absolute necessity of frequent personal ablution, has been already insisted on and explained. (See p. 2.) But, however important and beneficial may be the frequent and copious effusion of water on the surface of the body, the effects arising from the immersion of the latter in that liquid, as in the practice of bathing, are far more extensive and complete. What the one does usefully, but not completely, the other accomplishes readily, satisfactorily, and perfectly. There is no absolute succedaneum for the entire bath. It is the bountiful parent of physiological effects peculiar to itself, and of the utmost importance in pathology and hygiene. The practice of wearing flannel, the daily use of clean linen, the mere washing of the more exposed parts of the body, are but imperfect attempts at cleanliness, without being accompanied with the entire submersion of the body in water. Nor should the action of judicious bathing in the promotion of personal comfort and personal beauty be forgotten nor neglected. Intellectual and moral vigour too, are imperceptibly, but materially promoted by the controlling influence of bathing on the physical system; and he who would increase the one, cannot pursue a safer plan than to adopt the other. The neglect of bathing in this country is certainly an enigma. We are always talking about health, and continually professing to be seeking it; but the practical applications of the principles we advocate, and the doctrines we teach, are, unfortunately, the exceptions and not the rule. The phlegmatic Englishman, unlike his lively French neighbour, is indifferent and careless on this matter; and would rather spend his sixpence or his shilling in a pot of "heavy," a glass of grog, or a trip to Greenwich, than in the healthy recreation of the bath.

Our recommendation of bathing applies to the *warm* and *tepid bath*, which are alike adapted to the delicate and the robust, and to every condition of climate and season. *Cold bathing*, in this climate, is only suited to the healthy and vigorous, and can only be safely practised during the warmer months of the year, and in a mass of water sufficient to permit of the heat of the body being maintained by active exercise, as swimming, &c. The *plunge* and *shower baths* are partial exceptions to these remarks. We may add, that for bathing to produce its best effects, the water should be *soft* and pure, and *good soap*, sparingly, but regularly, employed.

BATH. The construction of baths belongs to *architecture* and *domestic engineering*. The best materials for a *fixed bath*, "are slabs of polished marble, properly bedded with good water-tight cement, in a seasoned wooden case." Welsh slate may be employed as a substitute for marble, where expense is an object. *Portable baths* are best made of copper, galvanized iron, or very stout block tin, thickly covered outside and in with paint or japan. The arrangements for *supplying cold* and *hot water*, must greatly depend on circumstances. For *fixed baths*, the common *circulating water-heater* or *boiler*, placed in some apartment on a lower level than the bath, is perhaps the most convenient. For heating *portable baths* so many plans have been suggested, and patented, that the reader cannot possibly be at a loss for one to suit his particular case. Gas offers an economical and cleanly fuel for this purpose.

The *situation*, and *minor comforts* and *conveniences* of the bath, must generally depend on the character of the building, and the sum to be expended for the purpose. When it is possible, the bath should always be on the same floor as the bedrooms, of easy access to them, and in a place where a *plentiful supply* of *pure water* can be ensured. See *Bathing*, and below.

BATH. (In Chemistry.) The highest temperature that can be given to any substance contained in a vessel placed in another of boiling water, is about 205 or 206°; but by adding $\frac{1}{5}$ of salt to the bath, a heat of fully 212° may be obtained. Baths of fusible metal, saturated solutions of salt, sand, and (on the large scale) steam, are also used for the same purpose. A bath of rape, olive, or fish oil, may be safely heated to about 500° Fahr., without suffering decomposition, and will be found an exceedingly appropriate and convenient species of bath for many processes.

BATH. (In Pharmacology.) These commonly consist of water holding in solution various medicinal or nutritious substances; as *wine-baths*, *milk-baths*, *soup-baths*, &c., (used to convey nourishment to the body;) *sulphurous baths*, *mercurial baths*, &c. (used in skin diseases, syphilis, &c.;) *aromatic* and *chalybeate baths*, (employed as tonics;) and *acid baths*, (sometimes used to remove the effects of mercury.) *Medicated baths*, have been divided into classes and minor subdivisions by writers on the subject, and have received names which are generally indicative of their composition or uses. They are said to be *simple*, when water or its vapour forms the bath; and *compound*, when the water is medicated by the addition of other matters. On the Continent a variety of substances are employed to medicate baths, which are seldom or ever so used in this country. The quantity of the ingredients used for this purpose may, in general, be from the $\frac{1}{6}$th to the $\frac{1}{3}$d of that which is used to form a weak lotion.

BATH (Air). Syn. *Balneum Pneumaticum*,—Lat. 1. (*Cold.*) The mere exposure of the body in a state of nudity for a *short* time to the atmosphere. Tonic and sedative; in febrile excitement, &c.

2. (*Hot.*) An apartment to which dry, heated air is admitted. More stimulant than the vapour bath. Recommended in cholera, (for which it is *said* to be a specific,) congestive fevers, rheumatism, scaly-skin diseases, &c.

3. (*Compressed.*) Recommended by M. Tarberie to be taken for 2 or 3 hours daily in aphonia.

4. (*Rarefied.*) Applied locally. Revulsive. Resembles "dry cupping."

BATH (Aromatic). Syn. *Aromatic Herb Bath; Balneum Aromaticum*,—Lat. *Prep.* 1. (Foy.) *Mint, origanum, rosemary, sage,* and *thyme*, of each, ½ ℔; *boiling water*, 6 pints; digest for 12 hours, strain, and add, of *essence of soap*, 4 oz.; *sal ammoniac*, 2 oz.; and pour the whole into *water*, q. s. for a bath.

2. (Fr. H.) *Dried tops* of *hyssop, lavender, origanum, peppermint, rosemary, sage, thyme*, and *wormwood*, of each, 5 oz.; *water*, 2 gall.; as last. Useful in cutaneous affections, chronic rheumatism, diarrhœa, dyspepsia, stiff-joints, &c.; and particularly so, in debility arising from loss of blood, spermatorrhœa, &c., and in hysteria and hypochondriasis.

BATH (Barèges, — Factitious.) Syn. *Balneum Baretginense*,—Lat. *Prep.* 1. *Crystallized sulphuret of sodium*, 3½ oz.; *chloride of sodium*, 1½ oz.; *gelatine*, (dissolved,) 4 oz.; *water*, q. s.

2. (Trousseau & Reveil.) *Dry sulphuret of potassium*, 4 oz.; *water*, 16 oz.; dissolve, and add the solution to the bath; then further add, of *sulphuric* or *hydrochloric acid*, ½ oz.; previously diluted with *water*, 8 oz. Invaluable in itch, moist skin diseases, chronic diarrhœa, chronic rheumatism, and lead colic.

BATH (Carbonic). Syn. *Balneum Carbonicum, B. Acidum Carbonicum*,—Lat. *Carbonic acid* applied to the body, or any part of it, by a suitable apparatus to prevent its being respired; or a solution of the *gas* in *water*, may be employed instead. Antiseptic, diaphoretic, and excitant to the vascular system; in amenorrhœa, chlorosis, hysteria, scrofula, cancerous and other ulcers, &c.

BATH (Chlorine). Syn. *Balneum Chlorinii*,—Lat. *Water*, to which a little solution of *chlorine gas*, has been added. Useful for itch, &c. A *weak solution of chloride of lime* is commonly substituted for it.

2. (Wallace.) *Chlorine gas*, (obtained from *salt*, 1½ oz.; *oil of vitriol* and *water*, of each, 1 oz.; and *black oxide of manganese*, ½ oz. to 1 oz.;) diluted with air, at a temperature of 104° to 150°, and applied by means of a suitable apparatus, for ½ an hour; the greatest possible precautions being taken to prevent it being inhaled. In chronic liver affections gradually increasing the ingredients to three times the above quantity.

BATH (Cold). Syn. *Balneum Frigidum*,—Lat. Water, *fresh, saline*, or *mineral*, at a temperature varying from 45° to 80°; but usually understood to apply to water between 50° and 70° Fahr. Immersion of the body in water below about 65° cannot be tolerated for any length of time without such a loss of animal heat, as frequently to induce highly sedative and depressing effects, from which the constitution does not readily recover. Water at a temperature below about 50° Fahr., can only be safely used as a plunge bath. When the cold bath produces its full effect, the patient feels a pleasant glow upon the surface of the body, immediately following it. If a sensation of coldness or shivering ensues, it should not be repeated. The duration of the immersion may vary from 2 minutes to a quarter of an hour, depending upon the temperature of the water and the feelings of the bather; the latter period not being too long in fine weather, *provided* swimming or violent exercise be had recourse to in the bath. The cold bath is principally recommended as a tonic and restorative, to increase the tone and vigour of the body; and is contra-indicated when there is a tendency to apoplexy, or to chronic affections of the heart, lungs, or kidneys.

BATH (Douche). Powerfully sedative. *Used* in brain fever and active inflammations. A full inflammatory pulse, under its action, frequently sinks into one almost imperceptible. Sometimes *hot water* is employed, applied for ½ to 1 hour at a time. In chronic rheumatism and deep-seated pains, a temperature of 150° to 160° Fahr. is readily borne.

BATH (Ferruginous). Syn. *Chalybeate Bath; Balneum Ferrugineum, B. Chalybeatum*,—Lat. *Prep.* 1. (Trousseau & Reveil.) *Green sulphate of iron*, 32 oz.; *water*, q. s., using a well-tinned copper, wooden, or japanned bath. In general debility, when chalybeates are indicated, and the stomach will not bear iron. The stains on the towels used to wipe the patient may be removed by soaking them in water acidulated with hydrochloric acid.

BATH (Hot). Syn. *Balneum Calidum*, —Lat. The temperature of this bath ranges between 98° and 112° Fahr. The temperature at which it is usually employed is from 98° to 106° Fahr. It has a remarkably tranquillising effect upon the nervous system, producing a strong tendency to quietude and sleep. It also acts as a powerful antispasmodic, and by determining the blood to the surface of the body, tends to relieve visceral inflammation and congestion. In chronic affections arising from the action of cold and damp, and from exhausted energy, in stiff joints, rheumatism, neuralgia, diarrhœa, and numerous other affections, its effects are often rapid and remarkable.

BATH (Iodine). Syn. *Balneum Iodinii*,—Lat. *Prep.* (Cutan. Hosp.) *Iodine*, 4 dr.; *liquor of potassa*, 4 oz.; *water*, 2 pints; dissolve, and add it to 30 gall. of *water*. In skin diseases complicated with scrofula.

BATHS (Ioduretted). Syn. *Balnea Iodureta, Balneæ Ioduretæ*,—Lat. *Prep.* (Lugol.)—1. (*For adults.*)

	a.	*b.*	*c.*
Iodine . . .	123 gr.	154 gr.	184 gr.
Iodide of potassium .	231 „	308 „	370 „
Water . . .	1 pint.	1 pint.	1 pint.

Dissolve, and add the solutions to a bath of 60 gallons, contained in a wooden vessel.

2. (*For children.*)

	a.	*b.*	*c.*
Iodine . . .	38 gr.	46 gr.	61 gr.
Iodide of potassium .	77 „	92 „	107 „
Water . . .	½ pint.	½ pint.	½ pint.

Dissolve; for a bath of 60 gallons, as before. In scrofulous affections.

BATH (Mercurial). Syn. *Antisyphilitic Bath; Balneum Mercuriale, B. Antisyphiliticum, B. Hydrargyri Bichloridi*,—Lat. *Prep.* 1. *Bichloride of mercury*, 3 dr. to 1 oz.; *hydrochloric acid*, 1½ oz.; *water*, 50 to 60 gall.

2. (Cutan. Hosp.) *Bichloride of mercury*, 3 oz.; *hydrochloric acid*, 1 oz.; *water*, 2 gall.; dissolve. 1 gall. to every 30 gall. of water in the bath.

3. (Fr. Hosp.) *Bichloride of mercury*, 2 oz.; *sal ammoniac*, 3 oz.; *soft water*, 60 galls., or q. s. for a bath, contained in a wooden vessel. In syphilitic affections, either with or without skin disease; in chronic rheumatism, swelled joints, and chronic skin diseases generally, where the use of mercury is indicated, and the remedy is rejected by the stomach; especially in these affections in women and children. Also used in itch, and to destroy lice on the body.

BATH (Mud). Syn. *Balneum Luteum*,—Lat. Mud bathing (*illutation*) was commonly practised by the ancients. The slime of rivers, and the mud on the sea-shore were especially prized for this purpose. The Tartars and Egyptians still employ baths of this description in hypochondriasis, scrofula, and scurvy. At Franzenbad, in Germany, an acidulous species of black bog-earth found there, is beaten up with warm water to a semi-liquid consistence, and used as a bath. This is said to give the skin a satin-like appearance, and to render it very soft for several hours afterwards; and to be useful in debility and in paralytic affections of a gouty origin. In France, hot dung (*dung bath*) is occasionally used as a bath against rheumatism; and in Poland, the same substance is used against syphilis. The *husk of the grape* and the *refuse of the olive*, undergo a species of fermentation, and in this state have been successfully employed in France against rheumatism.

BATH (Nitro-hydrochloric). Syn. *Nitro-muriatic Acid Bath; Balneum Acidi, B. Acidi Nitro-hydrochlorici, B. A. Nitro-muriatici*,—Lat. *Prep.* 1. (Dr. Scott.) —*a. Nitro-hydrochloric acid*, 4½ to 6 fl. oz.; *water*, 3 gall.; for a foot or sponge bath.

b. Hydrochloric acid, 3 fl. oz.; *nitric acid*, 2 fl. oz.; *water*, 5 fl. oz.; mix; and add 2 to 3 fl. oz. to *every gallon of water* used for the bath.

2. (Lendrick.) *Nitric acid*, 1℔; *hydrochloric acid*, 1½℔; *warm water*, 40 gall.

3. (Soubeiran.) *Nitromuriatic acid*, 4 to 16 fl. oz.; *water*, 50 or 60 *gall.*

4. (Cutan. Hosp.) *Nitric acid*, 1½℔; *hydrochloric acid*, 1℔; mix; for *water*, 60 or 70 gall.

Obs. As a remedy for liver complaints, and to relieve the pain on the passing of gall-stones. It must be contained in a wooden vessel, and may be used as a *hip*, *knee*, or *foot-bath;* a knee-bath being the one generally adopted in England. It produces a tingling sensation on the surface of the skin, and a peculiar taste in the mouth, and to be successful, must be applied for 15 to 20 minutes daily, for a fortnight or three weeks, or longer.

BATH (Sea). Syn. *Balneum Marinum*, Lat. Sea bathing, "on account of its stimulative and penetrating power, may be placed at the head of those means which regard the care of the skin; and it certainly supplies one of the first wants of the present generation, by opening the pores, and thereby re-invigorating the whole nervous system." "Besides its great power in cases of disease, it may be employed by those who are perfectly well, as the means most agreeable to nature for strengthening the body and preserving the health." (Hufeland.)

Sea Bath (Factitious). Syn. *Balneum Marinum Factitium*,—Lat. *Prep.* 1. (Cutan. Hosp.) *Common salt*, 8℔; *sulphate of magnesia*, 2℔; *chloride of calcium*, 1℔; *water*, 50 to 60 gall.

2. *Common salt*, 5 oz. to *each gallon of water*.

3. (Beasley.) As a foot-bath, a *handful*

of salt to a *pailful of water*, to which a little *flour of mustard* may be added.

4. *Salt*, 5 oz.; *iodide of potassium*, ½ dr.; *water*, 1 gall.; dissolve.

BATH (Shower). Syn. *Impluvium*,—Lat. This may be regarded as a modification of the cold bath, or plunge bath, and its effects are similar, but without many of its disadvantages. The cold shower-bath is less alarming to nervous persons, and less liable to produce cramp, than cold immersion. It may be considered as the best and safest mode of cold-bathing, and is recommended in many nervous complaints. A good plan is to allow the water to remain in the bedroom all night, by which any undue degree of coldness is removed. Tepid water may be commenced with; and at first, in extreme cases, the patient may stand in hot water at the time of taking the bath.

BATH (Sponging). "In the sponging bath, exercise and ablution are combined, and its employment, by persons of sedentary habits, is highly advantageous." (Eras. Wilson.)

BATH (Sulphurous). Syn. *Sulphurous Acid Bath; Balneum Sulphurosum*,—Lat. *Prep.* From *sulphur*, sprinkled on a hot plate placed under the patient; the proper precautions being taken as directed under *chlorine bath.* Seldom used.

BATH (Sulphuretted). Syn. *Balneum Sulphuretum*,—Lat. *Prep.* 1. *Sulphuret of potassium*, 1 oz.; added for every 10 or 12 gallons of water in the bath.

2. *Sulphuret of calcium*, 4 oz.; *water*, 60 gall. In chronic rheumatism, chronic diarrhœa, lead colic, itch, and the majority of moist skin diseases; also to destroy vermin.

3. (*Gelatinous.*) Syn. *Balneum Sulphuratum Gelatinosum*,—Lat. *Prep.* (Dupuytren.) Adding *Flander's glue*, 2 ℔; (dissolved,) to either of the above *sulphuretted baths.*

Obs. The sulphur-bath under any of the above forms is a powerful remedy in every description of skin disease. *Leprosy*, (the most obstinate of all,) has been completely cured by it; the *common itch* requires only one or two applications to eradicate it entirely; all the *scurfy* and *moist skin affections, local irritation, pimples, inflammatory patches*, &c., speedily yield to its influence; *scrofula*, and, indeed, *all* those affections for which the warm or vapour bath has been recommended also derive powerful assistance from the sulphur-bath.

BATH (Temperate). Commonly applied to baths between the temperatures of 70° to 82° Fahr.

BATH (Tepid). Syn. *Balneum Tepidum*,—Lat. Temperature from 82° to 92°, or 93° Fahr. Its properties approach those of the warm bath.

BATH (Vapour). Syn. *Balneum Vaporis*,—Lat. *Dew Bath, Balneum Roris*,—Obs. The vapour of *hot water* applied to the body, or to any part of it, by a suitable apparatus, and either inhaled, or the contrary. The simplest form of vapour bath, is, perhaps, formed by placing some wet cloths, or sprinkling a little water, on two or three heated bricks, laid under a chair on which the patient is seated; both the patient and whole apparatus being covered with a sheet or blanket to keep in the heated vapour. Dr. Serres has suggested the plan of wrapping a lump of quicklime in a thick cloth soaked in water, when the slaking of the lime which immediately commences produces the rapid disengagement of steam; which may be promoted, as required, by sprinkling on a little more water. This is termed in France "*the poor man's vapour bath.*" It must, however be recollected, that by none of these minor contrivances, can the supply of vapour and its temperature be regulated, as in a perfect bath.

The *vapour bath* is used at different temperatures; as *tepid*, when the temperature varies from 90° to 100°; *warm*, from 100° to 112°; and hot, from 110° to 130°. When the vapour is not inhaled, it may be raised to even 160° Fahr.

Obs. The vapour-bath is the most powerful diaphoretic known, and is almost specific in nearly all those cases wherein warm or hot bathing is recommended—in *chronic rheumatism, contracted muscles* and *tendons, stiffness of joints, indurations, diarrhœa*, &c.

BATH (Warm). The warm bath has a temperature of from 90 *or* 92° to 98 Fahr.; or nearly that of the human body. Its effect is, first to increase the circulation of the blood, and to determine it to the skin. After a few minutes, an agreeable and universal increase of heat is experienced; the face, and forehead, generally, are soon bedewed with perspiration; a pleasing and prevailing calm is felt both mentally and physically; and after remaining in some 12 or 15 minutes the effect is of the most refreshing and happy character.

The warm bath is recommended in *general torpor of the system, liver* and *bowel complaints, hypochondriasis, hysterical affections, morbid suppressions*, *dry skin*, nearly all *cutaneous* and *nervous diseases*, *chronic rheumatism*, &c. As a tonic or stimulant after excessive fatigue, great mental excitement, or physical exertion, it is unequalled, and furnishes one of the most wholesome, and at the same time luxurious sources of refreshment we are acquainted with. "To those who are past the meridian of life, who have dry skins, and begin to be emaciated, the warm bath, for half an hour, twice a week, I believe to be eminently serviceable in retarding the advances of age." (Darwin.)

BATH METAL. *Brass*, 32 parts; *spelter*, 9 parts; melted together under *charcoal*.

BATH PIPE. *Prep.* Of *powdered lump sugar*, 1 *lb.; Italian juice*, (dissolved in a little water,) 3 *oz.; powdered gum arabic*, 1 *oz.; water*, q. s.; make a stiff paste, and roll it into the usual form.

BATTER. A mixture of *flour*, and *milk* or *water*, enriched and flavoured with *eggs*, *oil*, *butter*, and, frequently, with *spices* and *currants*, beat together to a thin paste. *Used* to form puddings, which are either baked alone, or under meat; and also to cover various articles during the operation of cooking them.

BEADS (Lovi's). Syn. *Specific Gravity Beads.* Small hollow globes of glass, about the size of peas, intended to supersede the hydrometer in determining the specific gravities of liquids. Each bead indicates a particular density, and is marked accordingly. They are used by placing them in the fluid, in succession, until one is found which remains indifferently suspended between the bottom and top, when the specific gravity corresponding to its number, is that of the liquid examined. For the use of these beads in preparing *test acids*, see *Alkalimetry.*

BEANS. Syn. *Fabæ*,—Lat. The general characters of those used as esculents are well known. When eaten in the green state, properly dressed, beans are regarded as antiscorbutic and wholesome; but tend to produce flatulence, unless combined with spices. In the dried or ripe state, they are rather difficult of digestion, and very apt to distend the stomach and intestines with wind. This objection does not exist to their use in the form of flour. The amount of nutritious nitrogenous matter in the bean rather exceeds that in wheat, and independently of a disposition to produce constipation in some habits, it must be considered nearly as wholesome as that cereal. The London bakers use large quantities of bean-flour to adulterate their bread.

Beans are cooked by simply boiling them in water; a little *salt of tartar* or *common salt* being frequently added, to preserve their green colour.

BEAR. The *fat* or *grease* of the bear has long been highly esteemed for promoting the growth of the human hair, but in reality possesses no superiority over any other mild animal fat. The mass of that which is sold in England is formed of *hog's lard* or *veal fat.*

BEAR'S GREASE (Factitious). *Prep.* 1. *Washed hog's lard*, 1 *lb.; flowers of benzoin* and *balsam of Peru*, of each ¼ *oz.;* melt together, pour off the clear portion, and stir until nearly cold.

1. *Soft fat of calves*, 3½ *lb.; nitric ether*, 1 *fl. oz.; essence of ambergris*, 20 drops.

3. *Lard* and *veal suet*, of each, 1 *lb.; olive oil*, 3 *oz.; compound tincture of benzoin*, 1 *oz.*

Obs. The above do not readily become rancid by age. They may have a rich *yellowish tinge* given to them by melting along with them a little *annotta* (½ dr. to the *lb.*), or *palm oil* (¼ oz. to the *lb.*); and may be tinged *green* by first digesting the fatty matters with *fresh walnut* or *spinage leaves.* Scent may be added at pleasure;—the *oils* of *cassia, cloves, nutmeg*, and *lavender*, the *essences of musk* and *ambergris*, and *balsam of Peru*, one, or a mixture of them, are the most appropriate.

BEBEERIC ACID. Syn. *Bibiric Acid.* A white, crystalline, diliquescent, volatile acid, obtained from the seeds of the bebeeru tree.

BEBEERINE. Syn. *Bebearine, Bebeerene, Bibirine, Bibirina.* A peculiar alkaloid contained in the bark and seeds of the *bibiri* or *green-heart tree* of British Guiana. It is obtained in the form of a sulphate by a process analogous to that employed in the preparation of sulphate of quinine.

Prop., &c. A white, uncrystallizable, resinous body; slightly soluble in water; soluble both in alcohol and ether; reaction, alkaline; melts with heat, and ultimately suffers decomposition without being volatilized. It has a bitter taste. That of commerce generally contains some *sipirine*, (altered bebeerine,) and a little *lime.* It has been proposed as a substitute for bark in agues.

BEBEERINE (Sulphate of). Syn. *Bibirinæ Sulphas*, — Lat. Yellowish-brown scales. It has been proposed as a substitute for sulphate of quinine. *Dose.* (As a tonic,) 1 to 3 gr.; (as a febrifuge,) 5 to 20 gr.

BECHAMEL. A variety of fine white

broth, sauce, or consommée, thickened with *cream.*

BEE. Syn. *Hive Bee, Honey Bee; Apis,*—Lat.; *Apis Mellifica,*—Linn.; Ph. L. E. & D. This curious and valuable little insect has been known and admired in all ages of the world, on account of its industry, policy, and curious economy. It has alike furnished a study for the naturalist and a theme for the poet; and from its lowly dwelling, philosophy has received the most exalted lessons of prudence and wisdom. Eumelus, of Corinth, wrote a poem on bees, (B.C. 741.) In later times Huber and others have observed and described their marvellous habits and existence.

There is said to be nearly 300 varieties of the genus apis, of which England has considerably above 100. The *wild bee* lives in the hollows of old trees; the *domesticated bee,* in hives, in societies called "*swarms.*" Each hive contains—1 *female, or queen bee,* 800 to 1000 *males* or *drones,* and from 15,000 to 30,000 or upwards of *workers,* or *neuters.* These desirous of studying their *economy* and *management,* are referred to Mr. Cobbett's work on bees. See *Honey* and *Wax.*

BEEF. The flesh of the ox is highly wholesome and nutritious; and well adapted to persons of good appetite, or that labour, or take much exercise. For persons of delicate constitutions, especially those labouring under debility, partial anæmia, amenorrhœa, and similar ailments, it is, perhaps, superior to all other species of animal food. If not overcooked, and left full of gravy, it sits lightly on the stomach, and its fat proves even more digestible than that of veal.

Ox beef is known by having a fine smooth open grain, a good red colour, and a tender texture, with fat, whitish-yellow, or but slightly yellow. *Cow beef* has a closer grain than ox beef, and the lean is of a deeper red. *Bull beef* is closer still, the fat hard and skinny, the lean of a deep red, and it has a stronger smell. *Heifer beef* resembles ox beef, except in being smaller, often an advantage; but it lacks the rich flavour of one of Giblet's full-grown oxen.

Beef is *cured* and *dressed* in numerous ways. See *Roasting, Boiling, &c.*

BEEF A LA MODE. "The real '*beef à la mode*' is made as follows, and is not a kind of soup such as is daily sold in cook-shops."

Prep. 1. (Soyer.) *Rump, surloin,* or *rib of beef,* (about) 12 *lb.;* lard it through with 10 *long pieces of fat bacon;* put it into a long earthern pan with a *calf's foot,* 4 *onions,* 2 *carrots* (sliced), a *bunch of parsley,* 2 *bay leaves,* 2 *sprigs of thyme,* 2 *cloves,* ½ *teaspoonful of pepper,* 1 *do. of salt,* 4 *wine-glassfuls of sherry,* 4 *do. of water,* and 1 *lb. of streaked bacon* (cut into small squares); place on the cover, make it air-tight with a little flour paste round the edges, and expose it in a moderate oven for 4 hours. *Dish up* with the vegetables and bacon round, the gravy (skimmed) being poured over all. *Or,* it may be eaten cold, when the pan should not be opened until the whole has thoroughly cooled.

2. (Rundell.) *Rump,* or any part of the beef which will stew well, 3 or 4 *lb.*; trim it, and cut off the fat; add all sorts of *sweet herbs,* chopped very fine, a little *shalot,* and a *great deal of spice,* (cayenne, white pepper, allspice, cloves, and mace; *or* mixed spices;) and put them into a *saucer of vinegar* that has been rubbed with *garlic;* add *fat bacon* cut into long slips; *lard* the beef regularly on both sides, and rub it over with the *herbs* and *spices; flour,* add a *small piece of butter,* and *a pint* of *water;* bake in an oven till done, strain the gravy, and serve it up with pickles on the top. Excellent either hot or cold.

BEEF (Collared). *Prep.* (Rundell.) From *stewed shin of beef* and *ox-tail,* re-stewed with a *glassful each of wine* and *ketchup,* and some of the *old broth,* and poured into moulds. *Sweet herbs, sliced eggs,* and *pickles,* may be added.

BEEF (Potted). See *Potted Meats.*

BEEF (Salted, various). See *Salting, &c.*

BEER. Syn. *Cerevisia,*—Lat. The common generic term for malt liquors.

Pure malt liquor, which has undergone a perfect fermentation, when taken in moderation, is perhaps the most wholesome beverage that can be drunk. *Ale* is the most nutritious variety, and the one best adapted to the debilitated and delicate; but *good porter* frequently agrees better with bilious constitutions, and the dyspeptic. The most wholesome, and perhaps the least exceptionable beverages obtained from malt, are those known as *East India, Scotch,* and *Bavarian ales,* when honestly prepared and not too highly bittered with the hop. When the latter is the case, their habitual or excessive use cannot fail to produce injury. A late writer has described good beer as *nutritious,* from the sugar and mucilage which it contains; *exhilarating,* from its spirit; and *strengthening* and *narcotic,* from its hops.

Var. The numerous varieties of malt liquor met with in commerce, may be resolved into three great classes—*ale*, *beer*, and *porter*. *Ale*, as the term is generally understood, is a pale liquor, brewed from lightly-dried malt, and abounding more or less in undecomposed saccharine matter and mucilage, and the bitter and fragrant principles of the hop;—*Beer* is a fine, strong, well-fermented liquor, darker, less saccharine, and more alcoholic than ale;—*Porter* is a dark brown-coloured liquor, originally brewed from high-dried malt, but now generally made from pale malt, with a sufficient quantity of "patent" or "roasted malt" to impart the necessary colour and flavour. *Stout*, *Brown Stout*, &c., are varieties of porter differing from that liquor only in their superior strength and quality. —*East India Ale*, *Bitter Beer*, &c., are beverages which combine the pale colour and fragrant bitter of ale with the more perfect fermentation and maturity of beer. —*Table Ale*, *or Table Beer*, is a weak liquor, commonly containing 3 or 4 times the proportion of water that is present in strong beer. In London, *porter* is called *beer;* and indeed, in all parts of the kingdom, the prevailing beverage of this kind consumed by the masses, of whatever class, commonly goes by that name.

The *three great classes of malt liquor* above referred to, are, independently of mere differences of strength and value, practically sub-divided into an almost infinite number of varieties. Every county, every town, and almost every brewer, is distinguished by the production of a different flavoured beer, readily perceived, and highly appreciated by their respective votaries. These differences may be traced to—*variations in the quantity and quality of the materials* employed in their manufacture,—the *heat of the water used for mashing*,—the *duration of the boiling*,—the *temperature at which the fermentation is conducted*, and the *extent to which it is carried*, together with numerous other circumstances, which though of an accidental and uncertain character, are nevertheless sufficient to affect the flavour and quality of a brewing. Among these, such as depend on *locality*, *apparatus*, *water*, *mismanagement*, &c., are not the least important. In general, however, when the same quantity of materials is employed, and the same time allowed for the maturation of the liquor, the chief causes of this diversity will be found to depend on the *water* used in the brewing, and the method followed in the *preparation of the malt*. Thus, *Bavarian*, *Scotch*, and *Burton ales*, differ in style from other ales, chiefly from being fermented at a lower temperature; and *porter* differs from either of these, because it is brewed from higher-dried malt. Hence arise the almost endless varieties of beer met with at the present day. See *Brewing*.

Pur. The leading characteristics of good beer, to whatever variety it belongs, are *transparency*, a *fine colour*, and an agreeable semi-vinous flavour, and the property of remaining for several hours exposed in a glass or cup without becoming "flat" or insipid. When it is pure and has been skilfully brewed, this will usually be the case. Hence colour and transparency, and the power of resisting exposure, are tests of the purity and quality of beer, which should not be lightly treated. There are none more simple and effectual; and together with a good "palate," will readily distinguish pure and wholesome beer from "doctored" and inferior liquors. If, therefore, we find a sample of beer possessing the above qualities or in "good condition," and on testing it for its *alcohol* and *saccharine*, find these substances in such quantities as fairly represent the amount of malt which should have been used in the brewing of such a liquor, we may reasonably infer it, in the absence of proof to the contrary, to be *pure;* because the object for which adulteration is practised,—viz., the *saving of malt* and *hops*,—did not exist in this case. To *demonstrate* the purity of beer requires, however, an elaborate and troublesome chemical analysis. *Good* and *pure beer* should contain nothing but what exists in the *malt*, *hops*, and *water* from which it is brewed, or which is produced from them by fermentation. *Water*, *alcohol*, a *very small quantity of acetic acid*, and a *mere trace of saline matter*, are the *only* substances which should be found in *pure malt liquor*.

Adult. By the laws of England, which have existed with slight modifications ever since the days of Queen Anne, *nothing* is allowed to enter into the composition of beer but *malt* and *hops*. Under the Act, 56 Geo. III, cap. 58, offending parties are punishable by heavy fines and forfeiture. The cupidity of fraudulent brewers and publicans, however, frequently induces them to introduce other ingredients than malt and hops into their liquors, with the view of giving them a false strength, and saving one or other of their constituents. Thus, to impart *bitterness*, and to lessen the quantity of hops required for the beer—**quassia*, **gentian*, **wormwood*, **aloes*, **picric acid*, **chamomiles*, and *broom-tops* have been used; to give *pungency* and *flavour*—**capsicum*, and **grains of paradise*, (in concentrated tinctures,) _*ginger_, _*corianders_, _orange peel_ and _caraways;_ to give _intoxicating properties—*opium_, _cocculus indicus_, _*nux vomica_, _*tobacco_, _strychnine_, _*extract of poppies_, _and *tincture_ and _*extract of henbane;_ as a substitute for _malt—*molasses_, _*corianders_, _*treacle_, _*colouring_, _and sugar;_ to impart a false appearance of _age—*sulphuric acid_, _*alum_, _*green vitriol_, and _*common salt;_ to remove _acidity—*pearlash_, _*salt of tartar_, _*Scotch soda_, _quicklime_, _magnesia_, and _*common chalk;_ to impart a _frothy head—*alum_, _*copperas_, and _*table salt._ The substances whose names in the above list are marked with an asterisk, are still FREQUENTLY and LARGELY employed in the trade.

The _publicans_ generally reduce their strong beer with _water_, (which they call "_liquor_,") and add _treacle_ or _coarse moist sugar_, (which they call "_foots_,") together with a mixture of _copperas_, _salt_, and _alum_, (termed "_heading_,") to make it bear a frothy head; and in many cases, other, and more deleterious ingredients are added, to keep up the appearance of strength, and to improve the flavour.

The "_cheap beer_" now sold in many taverns in London, is made by dividing the contents of _two butts_ between _three butts_, filling them up with _water_, and adding a bladder of _porter extract_ (technically termed, P. E.) to each. This P. E. is a mixture of _powdered cocculus_, _roasted quassia_, _Spanish juice_, _pearlash_, _burnt sugar_, &c., boiled up with _treacle_ and _water_ to the consistence of a thin extract, and put into bullocks' bladders. (Med. Cir., i, p. 299.)

The serious consequences arising from the adulteration of beer, has been frequently insisted on by the medical profession. See _Brewing_, _Porter_, _&c._

BEER (Amber). A liquor formerly drunk in great quantities in London, brewed from a mixture of 3 parts of _amber malt_ and 1 part of _pale malt_, with about 6 _lb._ of _hops_ to the quarter. It was drank within a few days after it had done "working," and was chiefly _mixed with_ "_bitters_" and made into "_purl._"

BEER (Ginger). Syn. _Cerevisia Zingiberis_,—Lat. _Prep._ 1. _Lump sugar_, 1 _lb.;_ _unbleached Jamaica ginger_, (best, well-bruised,) 1 _oz._; _cream of tartar_, ¾ _oz._; 2 _lemons_ (sliced); _boiling water_, 1 gall.; macerate, with frequent stirring, in a covered vessel, until barely lukewarm, then add of _yeast_, 1½ or 2 _oz._, and keep it in a moderately warm situation so as to excite a brisk fermentation; the next day rack the liquor and strain it through flannel; work for _another_ day or _two_, according to the weather; then skim, decant, (or again strain,) put it into bottles, and wire down the corks.

2. (Mr. Pollock.) _White sugar_, 20 _lb.;_ _lemon_ or _lime juice_, 1 pint; _honey_, 1 _lb.;_ _bruised ginger_, 1½ _lb.;_ _water_, 20 gallons. Boil the _ginger_ in 3 gallons of the _water_ for half an hour; then add the _sugar_, the _juice_, and the _honey_, with the _remainder of the water_, and strain through a cloth. When _cold_, add the _white of_ 1 _egg_ and ½ fl. oz. of _essence of lemon;_ after standing 3 or 4 days, bottle it. Both the above yield a very superior beverage, and one which will keep for many months.

3. (Mr. Beasley.) _Cream of tartar_, 3 _oz.;_ _ginger_, 1 _oz.;_ _white sugar_, 1½ _lb.;_ _lemon juice_, 1 _oz._ (or, _a lemon_, sliced); _boiling water_, 1½ gall.; _yeast_, 1 _oz.;_ as before.

4. Into each bottle put _concentrated essence of ginger_, 1 drop; _simple syrup_ or _capillaire_, ½ _oz.;_ and fill with _aerated soda water_ at the bottling machine, in the usual way. Very superior.

Obs. Ginger beer is used as a cooling and refreshing drink in warm weather. An inferior article is made by using _moist sugar_, and a larger proportion of water. See _Powders._

BEER (Spruce). Syn. _Pine Beer;_ _Cerevisia Abietina_, _C. Abietis_,—Lat. _Prep._ 1. _Boiling water_, 10 gall.; _lump sugar_, 10 _lb._; _essence of spruce_, 4 _oz.;_ mix, and when nearly cold, add _yeast_, ½ pint; and the next day _bottle_ in the same way as ginger beer.

2. (Dr. Wood.) _Essence of spruce_, ½ pint; _pimento_ and _ginger_, (bruised,) of each 5 _oz.;_ _hops_, 5 or 6 _oz.;_ _water_, 3 gall.; boil 10 minutes, add _treacle_, 3 quarts; _warm water_, 11 gall.; and (when only _lukewarm_) add _yeast_, 1 pint; ferment 24 hours and bottle. Diuretic and antiscorbutic. When made with _lump sugar_ it is called _White Spruce Beer;_ when with _moist sugar_ or _treacle_, _Brown Spruce Beer._ An inferior sort is made by using _less_ sugar, or _more_ water.

BEER (Twopenny). Syn. _Twopenny._ A cheap beer formerly drank in cold weather as a "warmer" or stimulant, frequently when only a week old. The following formula is that of a brewer once celebrated for this beverage:—_Malt_, 3 bushels; _hops_ and _Spanish juice_, of each, 2 _lb.;_ _burnt sugar_, ½ _lb.;_ _Guinea pepper_, _corianders_, and _grains of paradise_, of each, ½ _oz._ To produce 3 times the malt.

BEERS. (In *Pharmacy.*) See *Medicated Ales.* The following are examples of this class of preparations:—

BEER (Antiscorbutic). Syn. *Sapinette; Cerevisia Antiscorbutica,*—Lat. *Prep.* 1. (P.C.) *Buds of the spruce fir* and *scurvy grass,* of each, 1 oz.; *horse-radish root,* 2 oz.; (all fresh and bruised, or sliced;) *new ale* or *beer,* 3½ pints, (½ gall.;) macerate 4 days, press, and strain for use.

2. (Ph. Castr. Ruth., 1840.) *Horse-radish,* (fresh,) 4 ℔; *juniper berries,* 3 ℔; *root of calamus aromaticus* and *buds of pinus abies,* of each, 1 ℔; *ginger,* 1 oz.; *syrup,* (from brown sugar,) 6 ℔; *beer,* 120 ℔; macerate 4 days, or until it ferments, then decant, strain, and add *cream of tartar,* ½ ℔; *tincture of mustard,* (*flour of mustard,* 2 oz., to *proof spirit,* 12 oz.,) 1 ℔. In scurvy, &c.

BEER (Catharthic). Syn. *Cerevisia Cathartica,*—Lat. *Prep.* 1. Digest *senna,* 4 oz.; *centaury,* and *wormwood,* of each, 3 oz.; in *mild ale* or *beer,* 6 gall.; for a week.

2. To the last add of *powdered jalap* or *aloes,* 4 dr. *Dose.* A half-pint glassful or more.

BEER (Cinchona). Syn. *Bark Beer, Ague do.; Cerevisia Cinchonæ,* — Lat. *Prep.* 1. *Bruised cinchona bark,* 1 oz.; *proof spirit* or *brandy,* 2 oz.; mix; the next day add of *new beer,* 1 quart, and in 3 days decant or filter. *Dose.* 2 or 3 wine-glassfuls.

2. (Mutis.) *Cinchona,* 4 oz.; *sugar,* 2 ℔; *water,* 5 pints; ferment with yeast, as before. *Dose.* 1 or 2 wine-glassfuls.

3. (Ph. Ferrara.) *Bruised Peruvian bark,* 1½ oz.; *cinnamon,* 2 dr.; *nutmeg,* (rasped,) 7 dr.; *sugar,* 25 oz.; *yeast,* 2 oz.; *water,* 5 pints; mix, ferment, decant, and strain. *Dose.* 3 or 4 wine-glassfuls. They are all administered during the intermission of agues.

BEER (Diuretic). Syn. *Cerevisia Diuretica,*—Lat. *Prep.* (H.F.) *Mustard seed* and *juniper berries,* of each, 4 oz.; *wild carrot seed,* 2 oz.; *wormwood,* 1 oz.; (all bruised;) *table beer,* 5 or 6 gall. In dropsies and poisonings. A glassful, several times a day.

BEER (Horse-radish). Syn. *Cerevisia Armoraciæ,* — Lat. *Prep.* 1. *Expressed juice of horse-radish root,* ½ pint; *new beer,* 1 gall.; mix.

2. (Hufeland.) *Scraped horse-radish,* 5 oz.; *new beer,* 1 quart; digest for 24 hours, strain, and add *syrup,* 1 oz. In paralytic, scorbutic, and dropsical affections. *Dose.* Half a tumblerful, 2 or 3 times daily.

BEER (Sarsaparilla). Syn. *Spanish Jarave, Lisbon Diet Beer; Cerevisia Sarzæ, C. Sarsaparillæ,*—Lat. *Prep.* 1. *Compound extract of sarsaparilla,* 1½ oz.; *hot water,* 1 pint; dissolve, and when cold, add *East India ale,* 7 pints.

2. (Hancock.) *Bruised sarsaparilla* and *molasses,* of each, 2 ℔; *guaiacum bark,* (powdered,) 8 oz.; *guaiacum wood,* (rasped,) *liquorice root,* and *aniseed,* (bruised,) of each, 4 oz.; *bark of mezereon root,* 2 oz.; *cloves,* 12 in no.; *boiling water,* 4 gall.; mix, and ferment, shaking frequently. *Dose.* A small tumblerful, 2 or 3 times a day, in all the ordinary cases where the use of sarsaparilla is indicated; especially in old affections.

BEER (Stomachic). Syn. *Medicated Purl; Cerevisia Stomachica,*—Lat. *Prep.* (Quincy.) *Centaury tops* and *Roman wormwood,* of each, 4 handfuls; *gentian root,* (bruised,) 2 oz.; *the yellow peels* of 6 *Seville oranges; Spanish angelica root,* and *winter's bark,* of each, (bruised,) 1 oz.; *new ale* or *beer,* 3 quarts; digest as before. One or two wine-glassfuls early in the morning and an hour before a meal.

BEER (Sulphuric). Syn. *Sulphuric Lemonade; Cerevisia Acidi Sulphurici, C. Anticolica,*—Lat. *Prep.* 1. *Treacle beer,* or other *weak mild beer* or *ale,* to which a little *sulphuric acid* has been added, in the proportion of about 1 dr. to every 8 or 10 pints.

2. (Benson.) *Treacle,* 15 ℔; *bruised ginger,* ½ ℔; *water,* 12 gall.; *yeast,* 1 quart; proceed as for ginger beer, and when the fermentation is nearly over, add, *oil of vitriol,* 1½ oz., (diluted with 8 times its weight of water,) and *bicarbonate of soda,* 1½ oz., (dissolved in 1 quart of water.) It is fit to drink in 3 or 4 days.

Obs. The above are used with great benefit by workers in lead; especially by those employed in white-lead works; also in cases of lead colic, &c. *Two* or *three* or more tumblerfuls daily.

BEER (Tar). Syn. *Cerevisia Picis,*—Lat. *Prep.* (Duhamel.) *Bran,* 2 pints; *tar,* 1 pint; *honey,* ½ pint; *water,* 6 pints; mix, gently simmer together for 3 hours; cool, add *yeast,* ½ pint; work for 36 hours, and strain. Pectoral and antiphthisic. *Dose.* One wine-glassful before each meal, in bronchial and chest diseases, and incipient consumption.

BEETLES. The popular name of a genus of insects, (*scarabæus,*) of numerous species. The term is also familiarly applied to all insects with hard or shelly wing-cases. The common pests of our kitchens and basement floors, which pass under the name of *beetles*, or *cockroaches*, (*blattæ*,) belong to the order *orthoptera*, and not to the *coleoptera*, or beetle tribe, as the name implies. The *blatta*, or *cockroach*, is characterised by its nocturnal appearance, and retiring during the day to the cracks and holes in the floors and walls surrounding the fire-places and chimneys. Warmth and damp are essential to its propagation. The peculiar and disagreeable odour which beetles impart to ill-ventilated apartments where they swarm, is well-known. They contaminate and poison the atmosphere more rapidly than many of even the larger animals. Their *extermination* is therefore of importance to the housekeeper. Beetles, as well as other vermin, constantly increase in direct proportion to the quantity of food which they can obtain. Careless and dirty persons, who allow bones, crumbs, and other waste matters to accumulate on the floors of their apartments, must expect to be constantly annoyed by rats, mice, beetles, and the like. "Stop the supplies," and they will be gradually thinned in number by starvation, or will emigrate to some more congenial quarters where a better supply of food can be obtained. If the situation is very damp, it should be drained, or otherwise rendered thoroughly dry. The common cockroach rapidly dies in a very dry atmosphere.

Exterm., *&c.* Various plans are adopted for this purpose, among which are the following:—

1. Place a few small lumps of *fresh-burnt* and *unslaked lime* near their haunts. Although very fond of it, it soon kills them. *Sliced cucumbers* are said to act in the same way.

2. *Oatmeal* and fresh *plaster of Paris*, about equal parts; either with or without a little *butter* or *sugar*. Used dry, as the last.

3. (Pharm. Journ.) *Phosphorus*, 1 dr.; *water*, 2 oz.; place them in a phial, and plunge it into a vessel of *hot water;* when the phosphorus is melted, pour the whole into a (warm) mortar with *lard*, 2 or 3 oz.; triturate briskly, adding *flour*, ¼℔; *brown sugar*, 2 oz.; and *water*, q. s. It is used as the above. To be really effective, the quantity of phosphorus must be doubled.

4. (*Beetle wafers.*) Those of the shops are made of *flour*, *brown sugar*, and *red lead*, about equal weights, made into a dough with *water*, and either simply rolled into thin sheets, or heated in "wafer irons."

5. (By *trapping* them.) The common *beetle-trap* of the shops is well known. A domestic substitute for that article is often formed with an old dish, containing a few spoonfuls of *mild beer* or *sugar and water;* a few pieces of stick being placed slanting against its sides, so as to form a sort of gangway for the beetles to climb up by, when they fall headlong into the bait. This, also, must be set nightly near their haunts.

BELL METAL. An alloy of copper and tin, (*bronze*,) to which small portions of other metals are occasionally added, employed for making bells, gongs, apothecaries' mortars, &c.

Prep. 1. *Copper*, 100 parts, melt under charcoal; add *tin*, 20 to 25 parts, and unite by frequent stirring. *Used* for Indian gongs, &c.

2. *Copper*, 3 parts; *tin*, 1 part; as above. *Used* for church and other large bells.

3. *Copper*, 2 parts; *tin*, 1 part. *Used* for house-bells, hand-bells, &c.

4. *Copper*, 72 parts; *tin*, 26½ parts; *iron*, 1½ parts. *Used* by the Paris houses for the bells of small clocks or pendules.

5. *Copper*, 72 parts; *tin*, 26 parts; *zinc*, 2 parts. *Used*, like the last, for very small bells.

6. *Copper*, 70 parts; *tin*, 26 parts; *zinc*, 4 parts. *Used* for the bells of repeating watches.

Obs. The larger the proportion of copper in the above alloy, the deeper and graver the tone of the bells formed with it. The addition of tin, iron, and zinc, causes them to give out their tones sharper. Rapid refrigeration increases their sonorousness. M. D'Arcet recommends the pieces to be ignited after they are cast, and then to be suddenly plunged into cold water. They are next to be submitted to a well-regulated pressure by skilful hammering, until they assume their proper form, when they are to be again heated and allowed to cool slowly in the air. In a general way, however, bells are formed and completed by simple casting. Care should be taken to use *pure* copper. The presence of a very little lead or similar metal, greatly lessens the sonorousness of this alloy.

BELLADONNIN. A volatile alkaloid found by Luebekind in the *atropa belladonna.* 2 gr. produce constriction of the throat and larynx. The name is frequently applied to atropia; but these two substances so differ in their properties, that it is most important not to confound them together.

BENZAMIDE. *Prep.* Pure *chloride of benzule*, is treated with *ammoniacal gas* to saturation; the resulting dry white mass is reduced to powder, thoroughly washed with *very cold water*, and the residuum dissolved in boiling water. The *benzamide* is obtained in a crystalline form as the liquid cools.

Obs. Benzamide is soluble in boiling water, and in alcohol and ether; fuses at 240° Fahr.; by distillation it is converted into *benzonitrile.* It is supposed to be formed of the two theoretical bases, *benzoyle* and *amide.*

BENZHYDRAMIDE. It is formed by the action of *strong liquor of ammonia* on $\frac{1}{20}$th of its volume of the *essential oil of almonds,* at a temperature of about 112° Fahr., and is purified by boiling it in *ether*, which, on cooling, deposits it in crystals.

BENZILE. *Prep.* 1. *Chlorine gas* is passed over *melted benzoine,* until fumes of hydrochloric acid cease to be formed; a solution of the residuum of the operation in hot alcohol, deposits crystals of *pure benzile* on cooling.

2. By acting on *benzoine* with twice its weight of *nitric acid,* at a gentle heat.

Obs. Benzile forms sulphur-yellow crystals; inodorous, volatile, inflammable; unaltered by distillation; and soluble in alcohol and ether.

BENZILIC ACID. *Prep.* Boil *benzoine* or *benzile* in a *saturated alcoholic solution of potassa,* adding more as long as a blue colour is produced after the previous portion has been decoloured by boiling; then neutralize with *hydrochloric acid,* filter, and add *hydrochloric acid* in excess; as the liquid cools, crystals of *benzilic acid* will be formed. It is slightly soluble in cold water; more readily so in boiling water; melts a little under 250° Fahr., and suffers decomposition at a higher temperature; with some of the bases it forms salts termed *benzilates.*

BENZIMIDE. The pearly needles and lamellæ which separate, under certain circumstances, from *crude essential oil of almonds.*

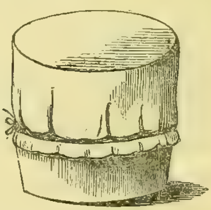
BENZOATES. Salts of *benzoic acid.* They may be formed by either neutralizing the *acid* with the *base*, or by double decomposition. Most of them are more or less soluble in water.

BENZOCINNAMIC ACID. An oily liquid, decomposed by heat, obtained in a similar manner to that adopted for *acetobenzoic acid.*

BENZOCUMINIC ACID. Greatly resembles the last. See *Acids* (Organic).

BENZOIC ACID. Syn. *Flowers of Benzoin, Flowers of Benjamin; Oxide of Benzoyle; Acidum Benzoicum,*—Ph. L. E. & D. *Flores Benzöini,*—Ph. L. 1721; *Flores Benzoës,*—Ph. L. 1788. This substance is the characteristic constituent of the true balsams. That of commerce is principally obtained from *gum benzoin,* either by *sublimation,* ("dry way,") or by *dissolving it out in the form of a salt,* ("moist way.")

Prep. 1. From *coarsely triturated gum benzoin,* placed in an iron pot with a flat bottom from 8 to 9 inches in diameter; so as to form a layer of from 1 to 2 inches deep. The open end of the pot is covered with a *sheet* of soft and loose *blotting paper,* (*felt,*—Liebig;) which is attached to the rim with paste. A cone, cap, or cylinder, formed of strong and thick paper, (*cartridge paper,*) is then placed over the top of the pot, including the blotting paper; and this is also attached with *paste* and *string.* The apparatus thus prepared, is then placed on a sand-bath, and exposed from 4 to 6 hours to a gentle heat. It is next removed from the sand-bath, inverted, and the string detached, when beautiful, white, crystalline needles, of a silky lustre, possessing the agreeable odour of benzoic acid, are found in the paper cone. If, owing to want of care in manipulating, the product thus obtained is either coloured or empyreumatic, it must be enveloped in several folds of bibulous paper, then submitted to powerful pressure, and be again sublimed.



A simple and efficient form of apparatus for the purpose, on the small scale, is that recommended by Dr. Moir, and figured in the Engraving. The processes of the Ph. E. & D. and Ph. L. 1836, are essentially the same as the above. In the present London Pharmacopœia, benzoic acid is placed in the list of the materia medica.

2. (*Process at Apothecary's Hall.*) The best *gum benzoin* is put into an iron pot, set in brickwork, over a proper fire, and communicating by a conical metal neck, with a wooden box, ("house,") lined with paper, as a receiver for the flowers. The sublimation is conducted rather rapidly, and the acid condenses in beautiful elastic prismatic crystals. If the process is con-

ducted more slowly, the product is proportionately scaly.

Obs. From 10% to 12% of flowers may be procured from a good sample of benzoin, by either of the above processes, which after being pressed in blotting paper and again sublimed, give 8½ to 9% of very pure acid. The loss arising from a second sublimation is thus so great, that the utmost care should be taken to avoid the existence of such a necessity.

3. (*Scheele's process.*) Equal parts of *gum benzoin* and *hydrate of lime*, in fine powder, are intimately mixed together, and boiled for about an hour, with 40 parts of *water;* the liquor filtered and evaporated to ⅕; and the lime saturated with *hydrochloric acid,* when the benzoic acid crystallizes out, as the liquor cools; it is then either washed with *cold water* or sublimed, after first well drying it.

Obs. For the success of this process, a *perfect* mixture of the *lime* and *powdered gum* must be first made, or the latter will run into a solid mass in the boiling water, and the operation will fail. "1℔ of (gum) benjamin yields 1 oz. 6 dr. 2 scrup. of flowers." (Gray.) Our own manipulations failed in procuring this large proportion of acid. The above process is similar to that of the Ph. D. 1826.

4. (*Process of Stoltze.*) The *gum* or *resin* is dissolved in 3 times its weight of *alcohol,* the solution introduced into a retort, and a solution of *carbonate of soda* in *weak spirit and water,* add thereto gradually, until all the free acid is neutralized; *water,* equal to about twice the weight of the benzoin employed, is next poured in, and the alcohol removed by distillation. The floating resin is now skimmed off the remaining liquid, washed with a *little* water, and the "washings" added to the contents of the retort, which will deposit crystals of *benzoate of soda* on cooling. From the latter, the *benzoic acid* is obtained by saturating the alkali with an *acid,* and by subsequent sublimation.

5. *Hippuric acid* is boiled for about 15 minutes in *nitric acid* (sp. gr. 1·42); *water* is then added, and the solution allowed to crystallize. The crystals are collected on a filter, washed with a *little very cold water,* dried by pressure in bibulous paper, and purified by sublimation, as above.

6. From the *urine of horses, cows,* and *other graminivorous animals,* in a similar way to that by which *hippuric acid* is obtained, only allowing the urine to acquire a *slight* degree of putridity before commencing the evaporation. The crude acid thus obtained is treated as directed above. Large quantities of benzoic acid are said to be obtained in this way, but owing to it not being generally well purified, it is of inferior quality and unsaleable. It may, however, by careful manipulation, be rendered quite equal to that obtained from gum benzoin. "*A manufactory of sal ammoniac, near Magdeburgh, which uses urine, is able to supply flowers of benjamin by the cwt.*" (Gray.) The processes 1 and 2, (above,) are those usually employed at the present time.

Pur. "White, or nearly so. It volatilizes (totally) by heat, cautiously applied, exhaling a peculiar odour; only slightly soluble in water, copiously so in rectified spirit. It is soluble in solutions of ammonia, potassa, soda, and lime, and is precipitated from them by hydrochloric acid." (Ph. L.) "24 parts of *boiling water* dissolve 1 part of *benzoic acid,* and again deposits the greater portion on cooling." (Ph. L. 1836.) "It is colourless, and is sublimed entirely by heat." (Ph. E.)

Prop., &c. Benzoic acid forms soft, light, feathery, white, flexible, transparent or semitransparent crystals or scales, having a mother-of-pearl lustre; odourless, (that of the shops has, usually, a slight balsamic odour;) fuses at 230° Fahr.; volatile, when heated; dissolves in about 200 parts of cold water and 25 parts of boiling water; very soluble in alcohol; sp. gr. 0·667; its salts are called *benzoates.* It was formerly esteemed as an expectorant, and much used in chronic bronchial affections. At the present time, its chief use in medicine, is as an ingredient in the compound tincture of camphor (*paregoric*) of the pharmacopœia. —*Dose.* 10 to 30 gr. dissolved in water by the aid of a little ammonia or potassa; in old coughs, &c.

BENZOIC ACID (Anhydrous). *Prep.* Add *oxychloride of phosphorus* to excess of *benzoate of soda;* agitate together, and wash the mixture with boiling water. The *anhydrous benzoic acid* sinks like a heavy oil and crystallizes on cooling. See *Acids.*

BENZOIN. Syn. *Benzoine, Camphor of Oil of Bitter Almonds.* A crystalline substance obtained by the action of alkalies on the crude oil of bitter almonds. *Prep.* 1. It is found in the residue left in the retort, when this oil has been distilled with *lime* and *oxide of iron,* to free it from hydrocyanic acid. By dissolving out the lime and oxide of iron with *hydrochloric acid,* and boiling the residuum in *alcohol,* a solution of benzoine may be obtained, which yields crystals on cooling.

2. Mix together equal parts by measure of the *raw oil of bitter almonds*, and *solution of caustic potassa in alcohol.* As soon as the liquid becomes full of crystals, and apparently solid, it must be dissolved in alcohol, filtered, and crystallized.

Prop., *&c.* Brilliant prismatic crystals; tasteless, odourless, volatile, and inflammable; soluble in alcohol, and forms with oil of vitriol, and with alcoholic solution of potassa, a violet-blue solution; it melts at 248° Fahr., and distils without decomposition.

BENZOINAMIDE. Syn. *Hydrobenzoinamide.* A white, tasteless, inodorous, volatile powder, obtained by heating benzoine with water of ammonia.

BENZOLE. Syn. *Benzol, Benzine.* A volatile, ethereal fluid, discovered by Faraday among the products of the destructive distillation of organic substances.

Prep. 1. Of *benzoic acid*, 1 part; *slacked lime*, 3 parts; mix, and submit the compound to distillation; separate the oily product from the water, and rectify it at a temperature under 200° Fahr.

2. (Mansfield.) By distillation from *light coal-tar naphtha*, at a temperature not exceeding 200°. Patent.

Uses, *&c.* As a solvent for gutta percha and Indian rubber; but it leaves the first in a spongy, friable state, and the latter, glutinous or sticky, unless heat is applied to it for some time. It promises to form a valuable article for the manufacture of varnishes, and the production of artificial light. It boils at 176° Fahr., and has the sp. gr. 0·885.

BENZOLINE. Syn. *Amarine.* A crystallizable substance possessing basic properties, formed by acting on *hydrobenzamide* (of Laurent) with a *boiling solution of caustic potassa.* Strongly heated in a retort, it suffers decomposition, *pyrobenzolin*, and other substances, being produced.

BENZONE. Syn. *Benzophenone, Carbobenzide.* One of the products of the distillation of *dry benzoate of lime*, at a very high temperature. In its purest state it may be obtained in a crystalline form, but is otherwise found mixed with various hydrocarbons, in which state it appears as a heavy oily liquid.

BENZONITRILE. One of the products of the destructive distillation of *benzoate of ammonia.* It greatly resembles essential oil of almonds in odour and appearance; is heavier than water, and does not boil much under 380° Fahr.

BENZOYLE. Syn. *Benzoile, Benzoyl, Benzule.* The radical of benzoic acid and the benzoyl-series.

Prep. From *benzoate of copper*, by dry distillation, cautiously conducted. The oily portion of the distilled product crystallizes on cooling; the crystals are *benzoyle.* It has the odour of geranium, and melts at 158° to 160° Fahr.

BENZOYLE (Chloride of). Syn. *Chlorbenzoyle, Chloride of Benzule.* Prepared by transmitting *dry chlorine gas* through *pure oil of bitter almonds*, at nearly the boiling temperature, until hydrochloric acid ceases to be formed. It is a limpid, colourless fluid, slightly heavier than water. *Bromide of benzoyle* may be prepared in a similar manner.

BENZOYLE (Cyanuret of). By distillation from a mixture of *bicyanide of mercury* and *chloride of benzoyle.*

BENZOYLE (Hydruret of). From *oil of almonds*, *hydrate of lime*, and *chloride of iron*, made into a thin paste with *water*, and distilled in a retort. It greatly resembles ordinary oil of almonds, from which it chiefly differs in the absence of hydrocyanic acid. It forms, indeed, the *purified oil of almonds*, of modern pharmacy. Unlike the crude oil, it rapidly deteriorates by age.

BENZOYLE (Iodide of). From a mixture of *iodide of potassium* and *chloride of benzoyle*, by distillation.

BENZOYLE (Sulphuret of). From a mixture of *sulphuret of lead* and *chloride of benzoyle*, by distillation. *Phosphuret of benzoyle* may be prepared in a similar way.

Obs. The *benzoyl-series* also includes *hippuric acid*, *amygdalinic* acid, and *amygdaline*, as well as several other substances whose names contain the prefix benz-, (the first part of the word benzoyle,) as indicative of their constitution.

BERBERINE. Syn. *Barberine; Berberina.* A yellow crystalline substance obtained from the root of the *berberis vulgaris*, (Linn.) or barberry shrub.

Prep. 1. A soft *watery extract of the root* is digested in *rectified spirit*, with trituration, as long as it takes up anything; the tincture is filtered, and the alcohol gradually distilled off to the consistence of a *thin* syrup. The crystals which form as the liquid cools are purified by solution and recrystallization, first in *rectified spirit*, and then in *distilled water.*

2. By digesting the *powdered root* in *rectified spirit*, and proceeding as before.

Prop., *&c.* Berberine belongs to the class of azotised colouring substances and possesses feeble basic properties. It is soluble in boiling water and in alcohol, from either of which it may be readily obtained in crystals. It has been proposed as a tonic in doses of 3 to 10 gr. In larger doses it is laxative. It must not be confounded with *beeberine* or *bibirine*, which is prepared from the *green-heart tree* of Guiana.

BETEL. A common masticatory in the East, formed of the *leaves* of the *piper betel*, (Linn.) *areka nuts*, and *lime*. It produces a species of intoxication, stimulates the salivary glands and stomach, and diminishes cutaneous perspiration.

BETULINE. Syn. *Betulina*. A substance obtained from the bark of the white birch, (*betula alba*,) under the form of white, crystalline needles, soluble in ether, alcohol, oil, and acids. It is fusible, volatile, and inflammable.

BEZOARS. Syn. *Bezoar, Lapis Bezoardicus*,—Lat. Preternatural concretions found in the stomach and intestines of certain animals, formerly supposed to possess great medicinal virtues. They were taken internally and worn as amulets. They have now, however, long fallen into disuse, except among a few of the more weak-minded and ignorant.

BEZOARS (Factitious). *Tobacco-pipe clay* made into a paste with *ox-gall*, a little *hair* or *wool* being added, and the mass formed into shapes. This gives a *yellow tint* to paper rubbed with chalk, and a *green one* to quicklime, which tests are used for genuine bezoars.

BEZOAR (Argentine). Syn. *Bezoardicum Lunare*. Made by distilling a mixture of *butter of antimony* and *nitrate of silver*. Once given in epilepsy and head diseases.

BEZOAR (Mineral). *Powder of algaroth* deflagrated with *nitre* in a red hot crucible, and then well washed with *water*. Once used as a diaphorectic. Other similar preparations were termed *Bezoardicum Joviale* and *B. Martiale*.

BEZOAR (of Lead). Syn. *Bezoardicum Saturni*. Made by distilling a mixture of *oxide of lead*, *butter of antimony*, and *nitric acid*. Once esteemed in diseases of the spleen.

BHAURTA. An Indian dish made of *mashed potatoes*, *onions*, and *capsicum*, moulded in a "shape" and slightly baked.

BIBROMISATINE and *Bromisatine*. Formed by the action of *bromine* on *isatine*. Treated with *potassa*, they yield acids of the same names.

BICARBONATES. Combinations of *one atom* of the *bases* with *two atoms* of *carbonic acid*. Other compounds, whose names possess the prefix *bi-* or *bin-*, have an analogous composition; as, *bisulphates*, *biniodides*, *&c*. For the mode of their preparation see the respective bases.

BICE (Blue). A light blue colour, consisting of native *blue carbonate of copper*, prepared by grinding and washing. That of the shops is generally a factitious compound made from *smalts*.

BICE (Green). The native *green carbonate of copper*, prepared as above. That of the shops is commonly made by mixing a little *yellow orpiment* with *blue bice*. Both the above are used as pigments.

BILE, BILIOUSNESS. Persons subject to bilious attacks should be particularly careful to avoid excess in both eating and drinking, and should more especially avoid using those articles of food which, from experience, they find to disagree with them. A *mutton chop, under-cooked*, is an excellent article for the breakfast or lunch of a bilious patient; and *mutton* or *beef*, either broiled or roasted, so that the gravy is retained, is better for dinner than many articles apparently more delicate. These, with *fresh* game and venison, form a good variety from which to choose a bill of fare. *New beer* and *porter* should be particularly avoided, as well as *puddings* and most articles of *pastry*, as they are very indigestible. *Hard cheese*, *butter*, *unripe fruit*, and especially *beans*, *peas*, and *nuts*, are also objectionable for parties with delicate stomachs or a bilious tendency. An attack of bile may frequently be prevented by the use of a *saline purgative*, and it may generally be removed by an *emetic*, followed by a dose of *castor oil*, *epsom salts*, or *seidlitz powders*. See *Abernethy Medicines*.

BILLS OF FARE. The following tables, for which we are indebted chiefly to Soyer, Rundell, and others, exhibit the various articles in season at different periods of the year.

First Quarter. January.—*Poultry* and *Game:* Pheasants, partridges, hares, rabbits, woodcocks, snipes, turkeys, capons, pullets, fowls, chickens, and tame pigeons.—*Fish:* Carp, tench, perch, lampreys, eels, cray-fish, cod, soles, flounders, plaice, turbot, thornback, skate, sturgeon, smelts, whitings, lobsters, crabs, prawns, and oysters.—*Vegetables:* Cabbage, savoys, colewort, sprouts, leeks, onions, beet, sorrel, chervil, endive, spinach, celery, garlic, scorzonera, potatoes, parsnips, turnips, brocoli, (white and purple,) shalots, lettuces, cresses, mustard, rape, salsafy, and herbs of all sorts, (some dry and some green;) cucumbers, asparagus, and mushrooms are also to be had, though not in season.—*Fruit:* Apples, pears, nuts, walnuts, medlars, and grapes.

February and March.—Meat, fowls, and game, as in January, with the addition of ducklings and chickens.—*Fish:* As the last two months. (Cod is not thought so good from February to July, although it is still sold at the fishmonger's.)—*Vegetables:* The same as the previous months, with the addition of kidney-beans. — *Fruit:* Apples, pears, and forced strawberries.

Second Quarter. April, May, and June. —*Meat:* Beef, mutton, veal, lamb, and venison, (in June.)—*Poultry:* Pullets, fowls, chickens, ducklings, pigeons, rabbits, and leverets.—*Fish:* Carp, tench, soles, smelts, eels, trout, turbot, lobsters, chub, salmon, herrings, cray-fish, mackerel, crabs, prawns, and shrimps. —*Vegetables:* As before; and in May, early potatoes and cabbages, peas, radishes, kidney-beans, carrots, turnips, cauliflowers, asparagus, artichokes, and numerous salads, (forced.) —*Fruit:* (In June,) strawberries, cherries, melons, green apricots, and currants and gooseberries for tarts; pears, grapes, nectarines, peaches, and some other fruit.

Third Quarter. July, August, and September..—*Meat,* as before. —*Poultry, &c.:* Pullets, fowls, chickens, rabbits, pigeons, green geese, leverets, and turkey poults. Two former months, plovers and wheatears; (in September,) partridges, geese, &c.—*Fish:* Cod, haddock, flounders, plaice, skate, thornback, mullets, pike, carp, eels, shellfish, (except oysters,) and mackerel, (during the first two months of the quarter, but they are not good in August.)—*Vegetables:* Of all sorts, beans, peas, French-beans, &c. — *Fruit:* (In July,) strawberries, gooseberries, pine-apples, plums, (various,) cherries, apricots, raspberries, melons, currants, and damsons. (In August and September,) peaches, plums, figs, filberts, mulberries, cherries, apples, pears, nectarines, and grapes. (During the latter months,) pines, melons, strawberries, medlars, and quinces. (In September,) Morella cherries, damsons, and various plums.

Fourth Quarter. October, November, and December.—*Meat,* as before, and doe venison. — *Poultry and Game:* Domestic fowls, as in first quarter; pheasants, (from the 1st of October;) partridges, larks, hares, dotterels; (at the end of the month,) wild-ducks, teal, snipes, widgeon, and grouse.—*Fish:* Dories, smelts, pike, perch, halibuts, brills, carp, salmon-trout, barbel, gudgeons, tench, and shellfish.—*Vegetables:* (As in January,) French-beans, last crops of beans, &c.—*Fruit:* Peaches, pears, figs, bullace, grapes, apples, medlars, damsons, filberts, walnuts, nuts, quinces, services, and medlars. (In November;)—*Meat, &c.:* Beef, mutton, veal, pork, house-lamb, doe venison, and poultry and game as in the last month.—*Fish:* As the last month.—*Vegetables:* Carrots, turnips, parsnips, potatoes, skirrets, scorzonera, onions, leeks, shalots, cabbage, savoys, colewort, spinach, chard-beets, chardoons, cresses, endive, celery, lettuces, salad-herbs, and various pot-herbs. —*Fruit:* Pears, apples, nuts, walnuts, bullace, chesnuts, medlars, and grapes. (In December;) *Meat, &c.:* Beef, mutton, veal, house-lamb, pork, and venison.—*Poultry and Game:* Geese, turkeys, pullets, pigeons, capons, fowls, chickens, rabbits, hares, snipes, woodcocks, larks, pheasants, partridges, sea-fowls, guinea-fowls, wild ducks, teal, widgeon, dotterels, dun-birds, and grouse.—*Fish:* Cod, turbot, halibuts, soles, gurnets, sturgeon, carp, gudgeons, codlings, eels, dories, and shell-fish.—*Vegetables:* As in last month. Asparagus, &c., forced.—*Fruit:* As before, except bullace.

BIRDLIME. *Prep.* The *middle bark of the holly,* (gathered in June or July,) is boiled for 6 to 8 hours in *water,* or until it becomes quite soft and tender; the water is then drained off, and it is placed in a heap, in a pit underground, (commonly on layers of fern,) and covered with stones. Here it is left to ferment for 2 or 3 weeks, and watered, if necessary, until it assumes a mucilaginous state. It is next pounded in a mortar until reduced to a uniform mass, which is then well kneaded with the hands, in running water, until all the refuse matter is worked out. It is, lastly, placed in an earthen vessel, and covered with a film of water; in which state it may be preserved from season to season. In about a week it is fit for use.

Obs. Birdlime may also be made from misletoe berries, the young shoots of the elder, and the bark of the wayfaring tree and other vegetables, by a similar process to that above described. Should any of it stick to the hands, it may be removed by means of a little *oil of lemon bottoms,* or *turpentine.* It is *used* to cover twigs to catch birds and other small animals. It is said to be discutient, but is now never used in medicine.

BIRDLIME (Factitious). *Prep.* From *linseed oil,* boiled until it becomes a viscid paste.

2. From *linseed oil* and *common resin,* as above.

3. *Rape oil* or *linseed oil,* rendered glu-

tinous or viscid by dissolving in it, *yellow resin*, q. s., by heat. Fat is sometimes substituted for the oil.

Obs. The first two are used for the same purposes as ordinary birdlime, to which, however, they are greatly inferior. The last is the composition rubbed over the "adhesive fly-papers," now so commonly sold about the streets of London. The cruelty of this mode of catching flies and like insects, has been ably exposed in Kidd's Journal.

BIRDS. The care of *living birds* will be found briefly referred to under the articles *Aviary*, &c. *Dead birds* may be *preserved* in a fresh state for some time by removing the intestines, wiping the inside out quite dry with a towel, and then "flouring" them. A piece of blotting paper, on which one or two drops of *creosote* have been thrown, is now to be put inside them, and a similarly prepared piece of paper tied round them. They should then be hung up in a cool dry place, free from the attacks of flies or vermin. *Poultry* and other *small animals* thus treated, will be found to keep much longer than without undergoing this process.

BISCOTIN. A species of confection made of *eggs*, *flour*, *marmalade*, and *sugar*, variously compounded and flavoured according to the taste of the operator.

BISCUITS. A well-known variety of hard, dry, unleavened bread, made in thin flat pieces. Those prepared for seamen, (*sea-biscuits*, *captain's biscuits*,) are composed of flour and water only. When a few caraway seeds are added, they are commonly called *Abernethy's biscuits*. *Fancy biscuits* generally contain sugar and butter, to which almonds, caraways, and other articles, are frequently added. The word biscuit is borrowed from the French, and implies twice baked.

Prep. On the *small scale*, biscuits are made by forming the *flour* and *water* into a dough by the common process of kneading with the hands, occasionally assisted with a lever, as in making ordinary bread. The dough is then rolled into a sheet, and cut into pieces of the desired size and form. These, after being stamped, are exposed to the heat of a moderately quick oven, when a few minutes (12 to 18) are sufficient to bake them. On the *large scale*, the whole manual process, from preparing the dough to the point at which the newly made biscuits are ready for baking, is now generally performed by machinery. The articles so prepared are commonly known in trade as "*machine-made biscuits*," and are not only much cheaper, but of fully equal quality to those "made by hand." The bakehouses of her Majesty's Victualling yards at Deptford, Gosport, and Plymouth, are said to be capable of producing annually about 8000 tons of sea-biscuits, at a saving of upwards of 12,000*l.* a year, from the cost that would have been incurred for the purpose before machinery was introduced into these establishments. "Under the *old system*, wages, and wear and tear of utensils, cost about 1*s.* 6*d.* per cwt. of biscuit; under the *new system*, the cost is 5*d.*" (Ure.) Large private machine-biscuit manufactories are now in full operation in various parts of the kingdom, by which a complete revolution has been effected in the trade. To the superior quality of those made by Huntley and Palmer, of Reading, we bear most willing testimony, founded on our personal use and careful examination of them.

BISCUITS (Devilled). *Prep.* Butter *captain's biscuits* (or any similar kind) on both sides, and *pepper* them well; then make a slice of *good cheese* into a paste, with *made mustard*, and lay it on one side of each biscuit; add a little *cayenne pepper*, and grill them. *Chopped anchovies*, or *essence of anchovies*, is also a good addition.

BISCUITS (Fancy). There is no end to the varieties of fancy biscuits, which may be made by varying the number and proportions of the ordinary ingredients used in their composition, and the form and size in which they are "turned out of hand." They are further modified by the relative heat of the oven, as well as the length of time they are allowed to remain in it. It would, therefore, be waste of space to give further directions for their preparation. The proportions of *butter* and *sugar*, or either of them, may be from 1 *oz.* and upwards, to *flour*, 1 *lb.*, according to the degree of richness desired. The following specimen of domestic manufacture is from Mrs. Rundell:—Pound *blanched almonds* very fine, and sprinkle them with a little *orange flower water;* put the paste into a small pan, and add a little of the finest *flour;* mix, put the pan over a slow fire, and move the paste well about to prevent it burning, until it becomes hard enough not to stick to the fingers; then take it out and roll it into small fillets, and make it into knots, rings, or other shapes. Next make an *icing of different colours*, and dip one side of the forms in it and set them to drain on a clean sieve.

BISCUITS (Soda). From the *finest flour* and a little *bicarbonate of soda*.

BISCUITS (Sponge). *Prep.* Add the

whites and *yelks* of *twelve eggs*, previously well beaten, to 1½ *lb.* of *finely powdered sugar*, and whisk it until it rises in bubbles, then add 1 *lb.* of the *finest pastry flour*, and the *rind of two lemons*, grated. Put it into "shapes," sift a *little sugar* over them, and bake them in buttered tin moulds, in a quick oven, for nearly an hour.

BISMUTH. Syn. *Marcasite*, *Tin Glass; Bismuthum*,—Lat. Commercial bismuth is principally prepared in Germany, whence it is exported to England. In this state it generally contains both arsenic and copper. Pure bismuth (*purified bismuth; bismuthum purum, bismuthum repurgatum;*) is made as follows:

Prep. 1. Heat to redness in a covered crucible, a mixture of *oxide* or *subnitrate of bismuth* with *half its weight of charcoal.* Chemically pure.

2. (P.C.) *Bismuth*, in powder, 20 parts; *nitre*, 1 part; mix, heat the compound to redness in a covered crucible, and let it cool. The bismuth will occupy the lower part of the crucible, and is to be repulverized, and treated a second time in the same way. Sufficiently pure for pharmaceutical purposes.

3. (Pruss. Ph.) *Bismuth*, in powder, 16 oz.; *carbonate of soda* (dry), 2 oz.; *sulphur*, 2 dr.; mix thoroughly, and fuse for an hour; afterwards cool, and carefully separate the metal from the scoriæ. Nearly pure.

Prop., *&c.* Crystalline; very brittle; of a reddish-white colour; melts at 480° Fahr.; volatilizes at a strong heat, and the fumes form crystalline laminæ; little acted on by the air; burns when strongly heated in the air; sp. gr. 9·8 to 9·9; when slowly cooled in large masses, it forms cubic crystals of great beauty. "It is dissolved by dilute nitric acid. When subnitrate of bismuth is precipitated from this solution by ammonia, the liquor is free from colour." (Ph. L. 1836.) "Its powder is entirely soluble in nitric acid with the aid of heat; and the solution is colourless, or nearly so, and deposits a white powder when much diluted with cold water." (Ph. E.) Sulphuretted hydrogen gives a black precipitate with bismuth and its salts. The nitric solution is unaffected by the addition of sulphuric acid. Chromate of potassa gives a yellow precipitate, which differs from that from lead, by being *soluble* in nitric acid, and *insoluble* in potassa. The salts of bismuth are non-volatile, (excepting the chloride,) decomposed at a red heat, colourless, and their aqueous solutions are decomposed by water in excess.

Estim. 1.—(*When mixed with bodies unaffected by sulphuretted hydrogen.*) Pass *sulphuretted hydrogen gas* through the liquid previously mixed with a large quantity of *acetic acid*, and *diluted with water.* Collect the precipitated sulphuret on a filter, wash it well with water, redissolve it in *nitric acid*, (in excess,) dilute with *water* and filter; wash the sulphur left on the filter with *water soured with nitric acid;* mix the whole together, and precipitate the bismuth in the state of oxide by *carbonate of ammonia.* After some hours, collect the deposit on a filter, wash it with *water*, and ignite it in a porcelain crucible. The weight of oxide, (in grains,) multiplied by ·899 will give the weight of metal in the sample examined. Should the sample be in the solid state it may be dissolved in nitric acid in excess, before applying the test.

2.—(*When neither mixed with hydrochloric acid nor substances precipitated by carbonate of ammonia.*) The oxide of bismuth may be at once thrown down with *carbonate of ammonia*, ignited, and weighed as before.

3.—(*When mixed with lead.*) Precipitate the oxides with *carbonate of ammonia*, and redissolve them in acetic acid; a strip of clean lead, the weight of which is known, must then be put into this solution, and the whole allowed to stand for some hours. Bismuth separates in a metallic state; that which remains on the lead is washed off, and the *strip* dried and weighed. The bismuth is next brought on to a filter and washed with *water* which has been boiled and allowed to cool; it is then dissolved in *nitric acid*, the solution evaporated, heated, and the oxide of bismuth weighed as before. The *solution of lead* is next precipitated with *carbonate of ammonia*, and the quantity of oxide determined. The loss of weight which the lead has suffered gives the quantity of oxide of lead which was not originally in the solution. A still simpler way is to add *caustic potassa* to the *nitric solution*, in sufficient excess to redissolve all the oxide of lead at first thrown down. The oxide of bismuth remains behind, and may be dried and weighed as before.

Uses, *&c.* Bismuth is used in the composition of *type metal, solder, pewter, fusible metal*, and several other metallic mixtures. When added to other metals it renders them more fusible. An alloy of tin, nickel, bismuth, and silver, is said to hinder iron from rusting. A mixture of bismuth, lead, and tin, is much employed for taking impressions from dies, forming moulds, and for other purposes.

BISMUTH (Bromide of). By heating the *metal* with an excess of *bromine* in a glass tube, when a gray-coloured mass, resembling fused iodine, is formed. It is volatile, and decomposed by water.

BISMUTH (Chloride of). *Prep. Corrosive sublimate*, 2 parts; *bismuth*, 1 part; (both in powder;) mix, and expose the compound to heat until all the mercury is expelled. A granular substance of a grayish-white colour.

BISMUTH (Flowers of). *Prep. Nitre*, 2 ℔; *bismuth*, 1 ℔; (both in powder;) mix, and gradually inject them into an ignited tubulated earthenware retort, having a wide mouth, and furnished with a receiver to catch the flowers. A form of the oxide now disused.

BISMUTH (Nitrate of). Syn. *Neutral Nitrate of Bismuth. Ternitrate of Bismuth*; (?) *Bismuthi Nitras*,—Lat. *Prep.* (Ph. Bor. 1847.) *Purified bismuth*, (broken into fragments,) 2 oz.; *nitric acid*, 6 oz.; dissolve with heat, adding more acid, (if necessary,) to effect entire solution of the metal; add to the solution half its volume of *distilled water*, filter through powdered glass, and evaporate until crystals are formed.

BISMUTH (Oxide of). Syn. *Teroxide of Bismuth, Protoxide of do.; Bismuthi Oxydum*,—Lat. *Prep.* 1. (Anhydrous.) From the *neutral* or *basic nitrate*, by exposing it to gentle ignition in a crucible. A straw-yellow powder.

2. (Hydrated.) *Bismuth*, 2 *lb.*; *nitric acid*, 2½ *lb.*; dissolve, and drop it gradually into a solution of *carbonate of potassa*, 3 *lb.*, in *water*, 6 *lb.* rendered caustic by previous treatment with quicklime, as in making liquor of potassa; lastly, well wash the precipitate with pure cold water. A rich-looking white powder.

Prop., &c. Oxide of bismuth fuses at a high temperature, and then acts as a powerful flux on siliceous matter. It has been used as an antispasmodic; and as a cosmetic by the ladies. See *Bismuthic Acid.*

BISMUTH (Subchloride of). Syn. *Pearl Powder; Bismuthi Subchloridum*,—Lat. *Prep.* Drop a *weak solution of common salt*, or of *hydrochloric acid*, into another of *bismuth*, prepared by dissolving that metal in twice its weight of nitric acid; collect the precipitate, wash it well with *water*, and dry in the shade.—*Uses, &c.* Same as the *trisnitrate*.

BISMUTH (Sulphuret of). This is a natural production, but may be prepared artificially by fusing its elements together, or by passing *sulphuretted hydrogen* through a solution of *nitrate of bismuth.*

BISMUTH (Trisnitrate of). Syn. *Subnitrate of Bismuth, Nitrate of do., Tetartonitrate of do., Pearl-white, Fard's White, Spanish do., Bismuth do.; Blanc de Fard*,—Fr. *Bismuthi Nitras*,—Ph. L. *B. Trisnitras*,—Ph. L. 1836. *B. Subnitras*,—Ph. D. *Bismuthum Album*,—Ph. E. *Magistery of Bismuth*,—Obs. *Prep.* (Ph. L.) *Bismuth*, 1 oz.; *nitric acid*, 1½ fl. oz.; *water*, 1 fl. oz.; mix, and dissolve with heat; throw the solution into *water*, 3 pints; separate the powder by straining through a linen cloth, wash it with *distilled water*, and dry by a gentle heat.

Obs. The processes of the other colleges are essentially the same as the above. Geiseler has ascertained by comparative experiment that the product is greater, if, according to Duflos, the nitrate of bismuth be allowed to crystallize previously to dilution with water, than if the dilution be executed at once. (See *Nitrate of Bismuth*, above.) The proportion of the proceeds was as 10½ to 14, the quality of both preparations being alike.

Prop., &c. A white, inodorous powder, insoluble in water, but freely soluble in nitric acid; a strong light turns it grayish. Under the microscope it is seen to consist of very fine silky acicular crystals. "It dissolves in nitric acid without effervescence. Dilute sulphuric acid being added, nothing is thrown down." (Ph. L.) These tests show the absence of white lead. The presence of hydrated oxide of bismuth is easily detected, by its powder, viewed by a lens, appearing dull and amorphous; whereas trisnitrate of bismuth is silky and crystalline.

Uses, &c. Trisnitrate of bismuth has been given as a tonic and antispasmodic, in some chronic stomach complaints, in intermittent fever, and spasmodic asthma, in doses of 5 to 10 gr. and upwards, in the form of powder, linctus, bolus, or pills, twice or thrice a day. An ointment formed with 1 part of this substance and 4 parts of *lard*, has been long in use as a remedy in certain chronic skin diseases. It is also used by ladies as a cosmetic, but it is said to injure the skin, producing paralysis of its minute vessels, and rendering it yellow and leather-like. Both this article and the basic chloride have received the name of *pearl powder*, from their extreme whiteness and beauty. The term *magistery of bismuth* was also formerly applied to both of them.

The trisnitrate, like the other salts of bismuth, is poisonous when swallowed in large doses, producing vomiting, purging, giddiness, cramp, insensibility, &c. No chemical antidote is known. The treatment may consist of the administration of an emetic, followed by the copious use of bland or emollient drinks, as weak broth, barley water, milk-and-water, &c. To prevent inflammation a low diet and aperients should be had recourse to.

BISMUTH (Valerianate of). *Prep.* (Righini.) From a *nitric solution of bismuth* (neutral), decomposed with a solution of *valerianate of soda* in water containing a little free *valerianic* acid. The precipitate is to be carefully washed in distilled water and dried in the shade. Recommended in gastrodynia, dyspepsia, intermittents, &c.

BISMUTHIC ACID. Syn. *Peroxide of Bismuth, Deutoxide of do., Pentoxide of do.; Acidum Bismuthicum,*—Lat. *Prep.* 1. Suspend *teroxide of bismuth* in a *strong solution of potassa*, and pass *chlorine* through the mixture until the decomposition is complete. The resulting reddish-brown powder is treated with *dilute nitric acid* to remove any of the teroxide which may have escaped oxidation, and is afterwards washed in cold water and dried.

2. The *teroxide* is gently heated for some time in a solution of *chlorate of potassa*, and the resulting powder treated as before.

Prop., &c. Bismuthic acid is insoluble in water. Its salts, of which little are known, are called *bismuthates.* When heated, it loses oxygen, a *bismuthate of bismuth* being formed.

BISTRE. *Prep.* From the *soot of beech-wood* or *peat*, the former being preferred. The most compact, best coloured, and well-burnt parcels of the soot are selected, reduced to powder, and sifted through a very fine lawn sieve. It is then digested in *clear cold water* for several hours, frequently stirring it up during the time with a rod of glass or wood; after which it is allowed to settle, and the liquid portion decanted from the sediment. This process is repeated a second, and even a third time. The paste is next poured into a tall narrow vessel, which is then filled with water, and well agitated. The *grosser* parts are now allowed to subside, (2 or 3 minutes suffices for this purpose;) and the supernatant liquor, containing the *finer* portion of the bistre in suspension, is poured off into another vessel, where it is left to deposit its contents. The deposit is next collected, partially dried, and made into cakes with *gum water* or *isinglass size*, and finally dried for sale.—*Used* to tint water-colour drawings, in the same way as Indian ink. It is esteemed as superior to the latter, for drawings which are intended to be afterwards tinted with other colours.

BITES and STINGS. The bites and stings of *ants, bees, wasps, hornets,* and *similar insects* common to this climate, may be treated by washing the part with *spirit of hartshorn* or *dilute liquor of ammonia,* or a *weak solution of chloride of lime.* Should considerable inflammation ensue, and the part become much swollen, leeches may be applied, and a cooling purgative given. The stings of venomous reptiles may be similarly treated, excepting that the strength of the solutions of ammonia and chloride of lime should be stronger than in the former case, so as to produce some pain and smarting. In cases where the venom is of a very poisonous description, the wound should be first well washed with *water of ammonia,* and afterwards thoroughly seared with *lunar caustic* in every part, especially the interior and deep-seated portions; or the surface of the wound, both internal and external, may be removed with the knife; or, in the case of a small joint, as a finger, the injured portion may be at once amputated. Prior to the use of the washes or caustic, *dry-cupping* or *suction with the mouth* may be had recourse to with advantage. A ligature placed on the limb, above the wound, will impede the absorption of the poison whilst the other treatment is in progress. A similar plan may be followed after the *bite of a dog supposed to be mad.* It has, indeed, been lately asserted by one of our most celebrated veterinarians, that both himself and colleagues have been *repeatedly* bitten by dogs that have afterwards been proved to be mad, but from having fearlessly applied caustic to the parts, they have escaped uninjured.

The poison inserted by the stings and bites of many venomous reptiles is so rapidly absorbed, and of so fatal a description, as frequently to occasion death within a very short space of time, and before any remedy or antidote can be applied. But even in these extreme cases it is probable that absorption, and consequently, the rapidity of the action of the poison, might be considerably lessened by the immediate application of a ligature above the part, as before described, the patient at the same time swallowing a large quantity of liquid, by which partial plethora would be produced, and the functions of the absorbents for a time nearly suspended. A few minutes, thus gained, would permit of the application of the antidotes just referred to, by which the poison might be neutralized before it would become necessary to remove the ligature and the kidneys would be in full action. Unfortunately, these wounds are inflicted in parts of the world where precautionary measures are seldom thought of, and generally at times when people are least prepared to meet them, and so suddenly and unexpectedly, as to stagger even those observers who may be in no absolute danger themselves. Such is the bite of the East Indian *cobra de capello*, against which two Asiatic (arsenical) pills are prescribed by the Hindoos, but which are generally scarcely swallowed, before the poison of the serpent has rendered the patient a stiffened corpse. The bite of the *puff-adder* is of a similarly fatal description. When the venom of any of these animals, or of a rabid dog, is once *fully absorbed into the system*, there appears to be no treatment that can save the patient. A bottle of Madeira wine, drank in two doses, about 3 minutes apart, is a popular remedy in India in such cases. Its effect is to impede absorption. A certain native physician applies a natural magnet to the wound, with, (as is asserted,) undeviating success.

BITTERN. *Prep.* A mixture of 1 part each, of *extract of quassia* and *powdered sulphate of iron*, with 2 parts of *extract of cocculus indicus*, 4 parts of *Spanish liquorice*, and 8 parts of *treacle.* The liquorice is first boiled with water until dissolved, and the solution evaporated to a proper consistence before adding the other ingredients. This mixture is made by the brewers' druggists, and sent out in casks, disguised, to escape detection. It is largely employed by fraudulent brewers and licensed victuallers to impart a false bitter and strength to their liquors. See *Bitter Balls, &c.*

BITTERS. Bitters are considered as tonic and stomachic, and to improve the appetite when taken occasionally and in moderation. The best time is early in the morning, or an hour before a meal. An excessive use of bitters tends to weaken the stomach. They should not be taken for a longer period than 10 days or a fortnight at *one time*, allowing a similar period to elapse before again having recourse to them. Among the principal bitters are *gentian, orange peel, calomba, quassia, chamomile*, and *wormwood.*

BITTERS (Brandy). Syn. *Spirit Bitters. Prep.* 1. *Dried orange* and *lemon peel*, of each, 2 *oz.; fresh do.*, of each, 3 *oz.; good brandy*, 1 gall.; *lump sugar*, 1 *lb.* Digest the peel in the brandy for 10 days, frequently shaking, then press out the liquor and filter through blotting paper; lastly add the sugar. An agreeable bitter, taken either as a dram, or mixed with other liquor.

2. *Gentian root*, bruised, 4 *oz.; fresh orange peel*, 5 *oz.; cassia bark*, 2 *oz.; cardamom seeds*, bruised, 1 *oz.; cochineal*, bruised, ¼ *oz.; proof spirit*, 1 gall. Digest for a week, then decant the clear, press the bottoms, and pour thereon of *water*, 5 pints; again digest for 3 days, then press out the liquor, mix the liquors, filter, and add *sugar*, 2 *lb.*

3. *Gentian*, 2 *oz.; fresh orange peel*, 3 *oz.; cassia bark*, ¼ *oz.; cloves*, 1 dr.; *proof spirit*, 1 gall.; *cape* or *raisin wine*, ½ gall.; digest for a week as before, then add *sugar*, 1 *lb.*, and a little colouring, if it is required deep-coloured.

4. *Gentian*, ¼ *lb.; cochineal*, ¼ *oz.; sugar*, ¾ *lb.; spirit* (24 u.p.), 1 gall. As before.

BITTERS (Calomba). *Prep. Calomba root, fresh orange peel* and *lemon peel*, of each, 1 *oz.; proof spirit*, 1 quart; digest for a week, express the tincture, add *lump sugar*, 4 *oz.*, together with a little colouring.

BITTERS (Wine). *Prep.* 1. *Bruised gentian root, fresh orange* and *lemon peel*, of each, 1¼ *oz.; white wine*, 1 quart; digest for a week and strain.

2. *Fresh lemon peel*, 1 *lb.; dried orange peel*, ½ *lb.; bruised gentian root*, ¼ *lb.; cape wine*, 1 gall.; as before.

3. (M. Dubois.) *Cinchona bark*, bruised, 8 oz.; *white canella*, 1½ oz.; *juniper berries, lemon peel*, and *winter's bark*, of each, 1¼ oz.; *carbonate of soda*, ¾ oz.; *Madeira wine*, 1¾ gall.; digest for a week.

Obs. All the above are used as tonics and stomachics; the last in the debility following agues, &c.

BITUMEN. This common term is, generally, very loosely applied, and includes a variety of inflammable mineral substances; as *asphaltum, naphtha*, and *petroleum.* The *solid bitumens* are now extensively employed in the manufacture of *bituminous mastic* or *cement* and similar compositions, which are used for the lining of water cisterns, pavements, &c. For the last purpose, the native varieties of asphaltic rock, consisting of a mixture of bitumen and calcareous earth, when tempered with a proper quantity of sand or gravel, is found to be the most substantial and durable. The asphalto-bitumen mine of the Val de Travers, in the Canton of Neufchâtel, is said to be the richest and most extensive in the world of its particular class. See *Asphaltum, &c.*

BLACK ASH. The *waste lye of the soapmakers* evaporated in large iron boilers, the salt separated as it falls down, and then heated in a reverberatory furnace until it is partially decomposed and fused, when it is run into iron pots to cool. It is used in the manufacture of alum and common soap.

BLACK DYE. A general description of the operations of the dyer, applicable to all the ordinary colours, will be found under the heads, *Dyeing, Mordants, &c.*, in the present volume, and, therefore, need not be repeated here. The following are the processes and materials *now* generally employed to dye black:—

1. (*For Cotton.*)—*a.* The goods, previously dyed blue, are steeped, for 24 hours, in a *decoction of gall nuts* or *sumach*, then drained, rinsed in water, and passed through a *bath of acetate of iron* for a quarter of an hour; they are next again rinsed in water, and exposed for some time to the air; after which they are passed a second time through the *bath*, to which a little more *iron liquor* must be added. The whole process may be repeated as often as necessary, according to the intensity of the shade of black desired.

b. The goods are steeped in a *mordant of acetate of iron*, worked well, and then passed through a *bath* of *madder* and *logwood* for 2 hours. Less permanent than the last.

Obs. About 2 *oz.* of coarsely powdered galls, or 4 *oz.* of *sumach*, are required for every pound of *cotton*, in the process of galling. The first should be boiled in water, in the proportion of about ½ gallon of *water* to every pound of *cotton*. The *sumach bath* is better made by mere infusion of that dye-stuff in very hot water.

2. (*For Silk.*) Silk goods are dyed much in the same way as woollens, but the process is conducted with less heat. The richness of the dye may be varied at pleasure, by allowing the goods to remain a longer or shorter time in the bath. The following are examples:—

a. A bath of *gall nuts* is given for 12 to 40 hours, occasionally working the goods therein; they are then taken out, rinsed, and aired, after which they are passed through a bath containing a little *sulphate of iron*, for a few minutes; and again drained, rinsed, and aired. The whole operation is repeated as above.

b. Aleppo galls, bruised, 22 *lb.*; boil for 1 hour in *water*, 90 to 100 gall.; then add *copperas*, 32 *lb.*; *iron filings*, 12 *lb.*; and *gum*, 22 *lb.*; digest for 1 hour, and when the ingredients are dissolved, pass the silk, previously prepared with ⅓rd of its weight of *galls*, through the bath for about an hour; then rinse and air it well; next leave it in the dye bath for 6 to 12 hours. The whole process may be repeated as often as necessary. For 1 *cwt. of* silk.

3. (*For Wool.*) To produce a good permament black on wool, woollen goods are usually first dyed *blue*. When the goods are coarse or common, and price is an object, they are generally "*rooted*" instead of being "*blued.*" This consists in giving them a dun or brown colour, with the *husks of walnuts*, or the *roots of the walnut tree.* Other inferior astringent substances are also used for the same purpose.

Process.—*a.* (*For* 1 *cwt. of goods.*) *Logwood chips*, 20 *lb.*, and *bruised galls*, 18 *lb.*, are inclosed in a coarse bag, and boiled with *water* for 5 or 6 hours; ⅓rd of this decoction is then transferred into another copper, with *verdigris*, 2 *lb.*, and a sufficient quantity of *water*; and the goods passed through the liquor for *two hours*, at a heat little below the boiling point. The goods are next drained, another ⅓rd of the *decoction of logwood and galls*, and *copperas*, 9 *lb.*, added to the boiler; the fire is then lowered, and as soon as the copperas is dissolved, the cloth is put in and again well worked for at least an hour; it is then taken out, thoroughly aired, and the remaining ⅓rd of the *decoction* added, with *sumach*, 20 *lb.*; the whole is then brought to a boil, and *sulphate of iron*, 2 *lb.*, together with a pailful of *cold water*, thrown in; after which the goods are put in a third time, and worked for one hour; they are then taken out, rinsed, aired, and again passed through the bath for another hour. After being thoroughly rinsed, the goods are at once either dried and folded, or further softened and beautified by passing them for 15 minutes through a *hot bath of weld*, (not boiling;) after which they are rinsed, &c., as before. This gives a beautiful though expensive dye. With management, the above quantities of the ingredients will dye 1¼ cwt. or 1½ cwt. of goods.

b. (*Without Galls.*) Make a bath, as before, with *fustic*, 2 *lb.*; *logwood*, 5 *lb.*; and *sumach*, 10 *lb.*; boil the cloth for 3 hours, lift it out, add *sulphate of iron*, 10½ *lb.*; and when dissolved, pass the cloth through it for 2 hours; rinse, air well, and again pass the goods through the bath for an hour; lastly, rinse until the water runs clear. Inferior to the last, but much less expensive.

c. (*For 7 lb. of goods.*) *Bruised galls*, $\frac{1}{4}$ *lb.; logwood chips*, $1\frac{1}{2}$ *lb.;* for a bath; boil the goods for 2 hours, take them out, add *copperas*, $\frac{1}{4}$ *lb.;* and when it is dissolved, pass your goods through the liquor for at least 2 hours, keeping the bath *nearly* boiling; again take them out, wash, and air, add 1 oz. more of *copperas* to the bath, and pass the cloth through it for another hour. Suited to articles of dress, as cloaks, coats, &c., dyed in the small way at home.

Obs. In dyeing black, especially on wool, it is absolutely necessary to take the "goods" out of the dye-bath, *several times*, to expose them to the air; this is called "*airing*," and is done to allow the oxygen of the atmosphere to act upon the dye, without which a good colour *cannot* be produced. The usual proportions employed by the dyers of England are 5 *lb.* each of *galls* and *copperas*, and 30 *lb.* of *logwood* for every *cwt.* of cloth; but these weights must be increased for choice goods. The other astringent substances used as substitutes for galls in dyeing black, are taken in quantities proportionate to their respective strengths referred to that of ordinary gallnuts as a standard.

BLACK PIGMENTS. The principal black pigments of commerce are obtained by heating bones in covered vessels, (*ivory black*,) and by burning unctuous and bituminous matters in a species of furnace or lamp, (*lamp black*.) Numerous other substances of a similar class are prepared by artists and amateurs on the small scale, by carbonizing organic matters by heat, or reducing to powder certain mineral productions, as *pit-coal, asphaltum, jet, anthracite*, &c. The following is a brief notice of a number of these articles:—

Beech Black, Vegetable Blue-black. From *beech charcoal*, (carefully prepared by burning the wood in a covered vessel, avoiding too much heat,) reduced to an impalpable powder, edulcorated with *water*, and dried.

Bone Black. From burnt bones; as the last. That of commerce is the residuum of the distillation of bone spirit. It is *used* as a pigment; for making blacking; as a material for the moulds of founders; for clarifying and bleaching liquids, and for removing lime from syrup in refining sugar. It is the *ivory-black* of commerce. See *Animal Charcoal.*

Composition Black, Prussian Black. The residuum of the process of making prussiate of potash from blood and hoofs. It is *used* as a pigment, and to decolour organic solutions, which it does better than bone black.

Florey Black, Florée d'Inde. The dried scum of the dyer's woad-bath. It makes a superior blue-black pigment.

Frankfort Black. From *vine twigs*, as beech black. An excellent black pigment; used by the copper-plate printers to make their ink.

Hartshorn Black. The same as *ivory* and *bone black.* It was formerly prepared by heating the residuum of the distillation of spirit of hartshorn.

Ivory Black, Cassel Black, Cologne Black. From *fragments* or *turnings of ivory*, and the like osseous parts of animals, by exposure to heat in close vessels until reduced to charcoal. When the whole has completely cooled, the hard carbonaceous residuum must be pounded and ground on porphyry with water, washed on a filter with warm water, and dried.

Obs. Black furnished by *bones* has a peculiar reddish tinge. That produced by *ivory* is more beautiful. It is brighter than peach-stone black. When mixed in a proper dose with whitelead, it forms a beautiful pearl-gray. Bone black is commonly sold for it.

Lamp Black. 1. On the *small scale*, is commonly prepared by suspending over a lamp, (*gas, oil, tallow*, or *naphtha*,) a conical funnel of tin plate, having above it a pipe, to convey from the apartment the smoke which escapes from the flame. Large spongy, mushroom-like concretions of an exceedingly light, very black, carbonaceous matter, will be formed at the summit of the cone, which must be collected from time to time. The funnel should be united to the smoke-pipe, by means of wire, as solder would be melted by the flame.

2. (*Commercial.*) On the *large scale*, lamp black is now generally made by burning the *oil of bones*, (previously freed from its ammonia,) or *common coal tar*, and receiving the smoke in a suitable chamber. In the patent process of Messrs. Martin and Grafton, the coal tar is violently agitated with lime water, until the two are well mixed, after which it is allowed to subside, and the lime water being drawn off, it is washed several times with hot water. After subsidence and decantation, it is put into stills, and rectified. The tar or liquor in the receiver is then put into a long cast-iron tube, furnished with numerous large burners, underneath which is a furnace to heat the pipe to nearly the boiling point. Over each burner is a sort of funnel, which goes into a cast-iron pipe or main, which

receives the smoke in a similar way from all the burners. From this the smoke is conveyed by large pipes to a succession of boxes or chambers, and thence into a series of large canvass bags, arranged side-by-side, and connected together at top and bottom alternately. Fifty to eighty of these bags are employed, the last one being left open to admit of the escape of the smoke which has thus been made to traverse a space of about 400 yards. As soon as the bags contain any considerable quantity of black, they are removed and emptied. The black deposited in the last bag is the finest and best, and it becomes progressively coarser as it approaches the furnace.

Obs. The state of minute division in which the carbon exists in good lamp black, is such as cannot be given to any other matter, not even by grinding it on porphyry, or "washing it over" with water. On this account it goes a great way in every kind of painting. It may be rendered less oily and drier by gentle calcination in close vessels, when it is called *burnt lamp black*, and may then be used as a water-colour. It is the basis of *Indian ink, printer's ink,* and most *black paints.*

Oporto Black. From *wine lees;* resembles Frankfort black.

Paris Black. From *turner's bone dust,* as bone black, but more carefully prepared, and afterwards ground very fine. It works well both in oil and water. It is commonly sold for real ivory black, and for burnt lamp black.

Peach-stone Black. From the *stones* or *kernels of peaches, cherries,* and *other similar kinds of fruit;* as the last. It works well with oil; mixed with white lead and oil it makes *old gray.*

Rice Black. From *rice* burnt in close vessels. Colour inferior.

Russian Black, Russian Lamp-black. From the smoke produced by burning the chips of resinous deal. It is a good black pigment, but apt to take fire spontaneously if left for some time moistened with oil.

Soot Black. From the *soot of coal fires,* ground and sifted. Used as a common paint; mixed with Venetian red and oil, it makes a chocolate colour; also used to make gray mortar.

Spanish Black, Cork Black. From *cork cuttings* as bone black. Resembles Frankfort black, but works softer.

Sugar Black, Jamaica Black. By burning common *moist sugar* in close vessels. It has little "body," but is a warm colour for washing drawings, and equal in mellowness to Indian ink and bistre.

Sunderland Black, Pit-coal Black. From the richer-looking varieties of pit-coal by grinding and elutriation. It is perhaps "the most useful brown the artist can place on his palette; being remarkably clear, not so warm as Vandyke-brown, and serving as a shadow for blues, reds, or yellows, when glazed over them. It seems almost certain that Titian made large use of this material." Coal, when carefully burned at a white heat, then quenched in water, and ground down, gives an excellent *blue-black.*

Vine-twig Black. Same as Frankfort black.

Wheat Black. From wheat burnt in close vessels. It is between ivory black and lamp black; it has a full body, and dries hard and quickly with oil.

BLACK (Shoemaker's). A solution of *green copperas* in about twelve times its weight of *water.* It is *used* to black leather which has been tanned or cured with bark or other like astringent matter. It is commonly applied with a feather to the edges of the soles, &c.

BLACKING. The general use of "blacking" as a polish for boots and shoes by all classes of the inhabitants of civilized countries, has given an extent and importance to its manufacture, which a stranger to the fact would scarcely be led to suspect. The princely establishments of some of the firms who compound this sable article, cannot fail to have arrested the attention of the passenger through the streets of this great metropolis; whilst the enormous fortune acquired by one of their late members, and, for the most part, bequeathed by him for purposes of charity and philanthropy, must, ere this, have become patent everywhere, and have invested both the donor and his craft with an interest which they did not previously possess. At the present time, the consumption of blacking is greater than at any former period; and of this, as of many other articles, England is the principal manufactory for the world, alike distinguished for the extent of her trade and the excellent quality of this product of her industry. In truth, England excels all other nations in the manufacture of *common shoe-blacking;* and in no other country is an equal attention paid to the cleanliness and appearance of the external clothing of the feet.

Prep. I. (*Liquid Blacking.*)—1. *Ivory black,* 5 *oz.; treacle,* 4 *oz.; sweet oil,* ¾ *oz.;* triturate patiently together until the oil is perfectly "killed," then stir in, gradually, of *vinegar* and *beer bottoms,* of each, ¼ pint;

and continue the agitation until the mixture is complete.

2. *Ivory black*, 1 *lb.*; *treacle*, ¾ *lb.; sperm oil*, 2 *oz.; beer* and *vinegar*, of each, 1 pint; or, *sour beer*, 1 quart; proceed as before.

3. To the last add of *oil of vitriol*, 1 *oz.*

4. *Ivory black* and *treacle*, of each, 1 *lb.; rape oil* and *oil of vitriol*, of each, ¼ *lb.;* mix the first three as before, then gradually add the *vitriol*, previously diluted with three times its weight of *water;* mix well, let it stand for 3 or 4 hours, or preferably until the next day, and then reduce it to the proper consistence with *water* or *sour beer.*

5. *Ivory black* and *treacle*, of each, ¼ *lb.; oil of vitriol*, 1 *oz.; sperm oil*, 2 *oz.; sour beer*, 1 pint; as before.

6. *Ivory black*, 7 *lb.; treacle*, 6 *lb.; rape oil*, 1 *lb.; oil of vitriol*, ½ *lb.;* water, q. s., as last.

7. *Ivory black*, ¾ *cwt.; treacle*, ½ *cwt.; rape oil*, 1 gall.; *oil of vitriol*, 10 *lb.;* as before.

8. *Ivory black*, 3 *cwt.; crude molasses*, 2 *cwt.; linseed oil*, 3 gall.; *oil of vitriol*, 21 *lb.; water*, q. s., as last.

9. (Ure.) *Ivory black*, 8 *oz.; treacle*, 6 *oz.; vinegar*, 1¼ pint; *oil of vitriol*, 1 *oz.; sperm oil*, 10 dr.

10. (Bryant and James's "*Patent Indian-rubber Liquid Blacking.*") *Indian rubber*, in small pieces, 18 *oz.; hot rape oil*, 9 *lb.*, (or 1 *gall.;*) to the solution add of *ivory black*, in very fine powder, 60 *lb.; treacle*, 45 *lb.;* mix; further add of *gum arabic*, 1 *lb.*, dissolved in *vinegar*, (No. 24,) 20 gall.; reduce to a perfect state of smoothness and admixture by trituration in a paint mill; throw the compound into a wooden vessel, and add, very gradually, *sulphuric acid*, 12 *lb.;* continue the stirring for ½ an hour, repeating it daily for 14 days; then add, *gum arabic*, (in fine powder,) 3 *lb.;* mix well, and repeat the stirring ½ an hour daily for 14 days longer, when the liquid blacking will be ready for use, or bottling.

II. (*Paste Blacking.*)—1. *Treacle*, 1 *lb.; ivory black*, 1¼ *lb.; rape, sperm*, or *sweet oil*, 2 *oz.;* rub together, as before, then add a little *lemon juice* or *strong vinegar.*

2. *Ivory black*, 2 *lb.; treacle*, 1 *lb.; sweet oil* and *oil of vitriol*, of each, ¼ *lb.; beer bottoms*, q. s.; as before.

3. *Ivory black*, 28 *lb.; treacle*, 21 *lb.; common oil*, 1 quart; *oil of vitriol*, 3 *lb.; water*, q. s.

4. *Ivory black*, 3 cwt.; *common treacle*, 2 cwt.; *linseed oil* and *vinegar bottoms*, of each, 3 gallons; *oil of vitriol*, ¼ cwt. *water*, q. s.

5. (Ure.) *Ivory black*, 2 *lb.; treacle*, 1 *lb.; sweet oil*, 4 *oz.; oil of vitriol*, 4 *oz.; vinegar*, 5 *oz.; sulphate of iron*, ½ *oz.*, dissolved in *water*, 5 *oz.; gum arabic*, (in powder,) ¾ *oz.;* mix, (as before.)

6. (Bryant and James's "*Patent Indian-rubber Paste Blacking.*") Of *Indian-rubber, oil, ivory black, treacle*, and *gum arabic*, the same as for their *liquid* blacking, but dissolving the last in only 12 *lb.*, (say 5 quarts,) instead of 20 gall. of *vinegar;* grinding to a smooth paste in a colour-mill, and then adding of *oil of vitriol*, 12 *lb.*, as before. The mass is to be stirred daily for a week, when it will be fit for use, or "potting."

Concluding Remarks.—The manipulations required in the manufacture of both *paste* and *liquid* blacking, are the same, the difference between the two articles, when the same materials are used, depending entirely on the quantity of liquid added. Thus, by diluting *paste blacking* with *water* or *beer bottoms*, it may be converted into *liquid blacking* of a nearly similar quality; and, by using *less* fluid matter, the ingredients of *liquid blacking* will produce *paste blacking.* One thing must, however, be observed, and that is, that the ivory black used for *liquid* blacking must be reduced to a much finer powder than for *paste* blacking, as, if this is not attended to, it will settle to the bottom, and be with difficulty again diffused through the liquid. For those persons who do not like the use of blacking containing oil of vitriol, the first of the above forms either for paste or liquid, may be adopted. The vitriol, however, greatly contributes to promote the shining properties of the blacking, and in small quantities is not so injurious to the leather as some have represented; as it wholly unites itself to the lime of the *phosphate* contained in the ivory black, and is thus, as it were, neutralized, an *acid phosphate* or *super-phosphate* being formed. By its action a portion of the ivory black is reduced to a state of extremely minute division, and with the other ingredients forms a strongly adhesive paste, which clings to the surface of the leather, and is susceptible of receiving a high polish by friction when in a scarcely dry state. This is the reason why *lamp black* should *never* be employed for blacking to the entire exclusion of *ivory* or *bone black*, as it has no earthy base to absorb or neutralize the acid, which would then prove very hurtful to the leather. Oil of vitriol is now employed in the manufacture of all the most celebrated and expensive blackings; and that, simply because no other substance is known so efficient and so little injurious to the leather. In Germany, *hydrochloric acid* is commonly used instead of oil of vitriol; but blacking prepared with it, possesses several disadvantages from which English blacking is free. The addition of *white of egg*, *isinglass*, *gum arabic*, and *similar articles* to blacking, always proves injurious, as they tend to stiffen the leather and to make it crack, without at all improving its polishing properties. Oil has an opposite tendency, and the quantity commonly used might be increased with advantage. *Resin oil* should be avoided. See *Balls*, *Leather*, *&c.*

BLACKING (Harness). *Prep.* 1. *Glue* or *gelatine*, 4 *oz.;* *gum arabic*, 3 *oz.;* *water*, ¾ pint; dissolve by heat; add *treacle*, 7 *oz.;* *ivory black*, (in very fine powder), 5 *oz.;* and gently evaporate until of a proper consistence when cold, stirring all the time. To be kept in corked bottles.

2. *Mutton suet*, 2 *oz.;* *bees' wax*, 6 *oz.;* melt, add *sugar candy*, 6 *oz.;* *soft soap*, 2 *oz.;* *lamp black*, 2½ *oz.;* indigo, in fine powder, ½ *oz.;* when thoroughly incorporated, further add, *oil of turpentine*, ¼ pint; and put it into pots or tins.

3. *Bees' wax*, 1 *lb.;* *ivory black*, ¼ *lb.;* *Prussian blue*, 1 *oz.*, (ground in *linseed oil*, 2 *oz.;*) *oil of turpentine*, 3 *oz.;* *copal varnish*, 1 *oz.;* mix well together, and form into cakes whilst warm.

4. To the last, whilst still hot, add, of *soft soap*, 4 *oz.;* and *oil of turpentine*, 6 *oz.;* and put it in pots or tins whilst still warm.

Obs. A very little of the above is laid on the leather, evenly spread over the surface, and then polished by gentle friction with a brush or an old handkerchief. The last three are waterproof. Numerous compositions of the above class are vended by the sadlers and oilmen, but the mass of them are unchemical mixtures, badly prepared, and cause disappointment to the purchaser, by utterly failing to produce either a good or a permanent polish, whilst they stiffen and rot the leather after a few applications. Such is not the case with the products prepared by the above formulæ. The only article of the kind adapted for the purpose, which we have met with in trade, and which we can recommend, is *Wilson's* "*Waterproof Composition for Harness and Carriage-leather.*" This compound produces a very excellent water-proof polish, and is in no way injurious to the leather; whilst it has the further advantage of being vended at a very reasonable price. Parties who possess valuable harness and carriage furniture would do well to give it a trial.

BLACKING (Self-shining.) *Prep.* 1. *Gum arabic*, 4 *oz.;* *treacle* or *moist sugar*, 1 *oz.;* *ink*, ¼ pint; *vinegar* and *spirit of wine*, of each, 1 *oz.* Dissolve the gum and treacle in the ink and vinegar; strain, and add the spirit.

2. To the above add, of *sweet oil*, 1 *oz.;* *lamp black*, ¼ *oz.*

3. Beat well together the *whites of* 2 *eggs*, a *tablespoonful of spirit of wine*, a *lump of sugar*, and a *little finely-powdered ivory black* to thicken it. The above are *used* for *dress boots* and *shoes*.

4. *Gum arabic* and *glue*, of each, 4 *oz.;* *treacle*, *sugar candy*, and *sweet oil*, of each, 2 *oz.;* *water*, q. s.; dissolve with heat, cool, add *rum*, 3 *oz.;* and at once bottle. *Used* for harness.

Obs. The first two of the above articles are applied to the leather by the tip of the finger or a sponge, and allowed to dry out of the dust, and are only adapted for clean, dry weather, or indoors. The third is laid on and polished with a brush, and then left for a few hours to harden. It may also be used to revive the faded black leather seats and backs of old chairs. The last is commonly laid on with a sponge or brush, and thus left to dry and harden. They all possess great brilliancy for a time.

BLADDERS. These articles are *prepared* by cutting off the fat and loose membranes attached to them, and washing them first in a *weak solution of chloride of lime*, and afterwards in *clear water;* they are then blown out and submitted to pressure by rolling them under the arm, by which they become considerably larger; they are next blown quite tight, dried, and tied up in dozens for sale. They are employed by druggists and oilmen to tie over pots, bottles, and jars, and to contain pill masses, hard extracts, and other similar substances. Bladders should never be purchased unless they are perfectly dry and air-tight; as, if the reverse is the case, they will neither keep nor prove useful. Should they be purchased whilst damp, they should be at *once* hung up in a current of air, so as to dry as soon as possible. If this be not done, they rapidly putrefy and become rotten and useless, and emit a horribly offensive odour.

BLANC. A dish formed of *grated bacon* and *suet*, of each, 1 *lb.;* *butter*, ½ *lb.;* 2 *lemons;* 3 or 4 *carrots*, (cut into dice;) 3 or 4 *onions;* and a little *water;* the whole being simmered for a short time, with or without the addition of a glass of *sherry* or *marsala*.

BLANCHING. (In Cookery.) An operation performed by putting tongues, palates, meat, &c., into cold water, when it is gradually brought to boil, and the article taken out and plunged into *cold water*, where it is left until quite cold. It is intended to impart whiteness, plumpness, and softness. If *strong acetic acid* (concentrated vinegar) be poured upon or rubbed over a piece of hard lean meat, it will gradually become soft and gelatinous. Ordinary *household vinegar* has the same effect, but in a less degree; hence, when tough meat is treated with vinegar for a short time before dressing it, it becomes tender and digestible when boiled or roasted; whilst the taste and flavour of the vinegar is removed by the heat employed in the process. The operation of *blanching* meat, although it renders it whiter and more sightly, at the same time *lessens* its *nutritive qualities*, by abstracting a portion of the soluble saline matter which it contains, especially the phosphates, and thus deprives it of one of the principal features which distinguish *fresh* meat from *salted* meat. Animal food may be washed or soaked in *cold* water for a short time before being dressed, with advantage. Indeed such a course is a mere and necessary act of cleanliness; but the use of *hot* water and the practice of soaking it for some time therein, should be avoided. See *Boiling.*

BLANCMANGE. Jelly, seasoned, and made up into forms. *Prep.* 1. *Isinglass,* 1 *oz.; sweet almonds,* 12 in no.; *bitter do.,* 6 in no.; *milk,* 1 quart. The isinglass and almonds (grated in the milk,) are boiled until of a proper consistence when cold; then strained, and when the liquid is nearly cold, poured into the moulds, previously rubbed with a little *salad oil* and then wiped out again.

2. To the above, ¼ *lb.* of *lump sugar,* and 4 *tablespoonfuls of cream* may be added; when cold, remelt it and add a tablespoonful of *orange flower water,* after which it may be moulded as before.

3. Using *calves' feet jelly* instead of isinglass.

4. (*Mrs. Hoffman.*) *Isinglass,* ¼ *lb.*; *rose-water,* ½ pint; *milk,* 2 quarts; *milk of almonds,* ½ pint.

5. (*Rice Blancmange.*) *Ground rice,* 2 *oz.; milk,* 1 pint; *lump sugar,* 3 *oz.;* a little *lemon peel* and *cinnamon;* adding the spice and sugar last; then boil for 1 minute, strain, and mould as above.

6. (*West Indian.*) Make a jelly with *arrow root,* and to every pint, when nearly cold, add a glass of sherry, a spoonful each of *brandy* and *orange flower water,* and 2 *oz.* of *lump sugar.*

7. (*Transparent.*) Instead of *milk* use *water,* and clarify the liquid with the *white of an egg.* See *Clarification.*

BLANQUENINE. A name given by Dr. Mills to a new vegeto-alkali, which he thought he had discovered in white cinchona bark.

BLANQUETTE. (Fr.) A kind of pear; a species of white wine. Cooks give this name to a sort of white fricasee.

BLASTING POWDERS (Melville and Callow's). *Prep.* (No. 1.) *Chlorate of potassa,* 2 parts; *red sulphuret of arsenic,* 1 part.; the two to be *separately* carefully reduced to powder, and lightly mixed together, *scrupulously avoiding* the use of iron instruments, percussion, much friction, or the slightest contact with acids, or exposure to heat.

(No. 2.) *Chlorate of potassa,* 5 parts; *red sulphuret of arsenic,* 2 parts; *ferro-cyanide of potassium,* (prussiate of potash,) 1 part; as No. 1.

(No. 3.) *Chlorate of potassa* and *ferro-cyanide of potassium,* equal parts.

Obs. Neither salt nor fresh water has any injurious effect upon the above compounds, which merely requires to be dried to regain their explosive character. They possess eight times the force of ordinary powder. One of their advantages, especially to the underground miner, is the very trifling amount of smoke emitted by them on explosion. On the other hand, the extreme facility with which they explode by attrition, contact with a strong acid, and a slight elevation of temperature, render them unsuited to most of the purposes of ordinary gunpowder. On this account they should only be prepared in small quantities at a time, and with the utmost caution. Mr. Callow, the inventor of them, lost several of his fingers, and was rendered a cripple for life by an explosion of the kind referred to, which occurred only a few weeks after the sealing of his patent. A straw or small strip of wood only slightly wetted with oil of vitriol, and applied to a small heap of the powder, produces instantaneous explosion.

BLEACHING. The operation by which the natural colours of substances are discharged, and by which they become white or colourless. Bleaching is performed either by natural means, as by *exposure to light, air,* and *moisture;* or, by chemical agents, as *chlorine, chloride of lime, sulphurous acid, &c.* In many of the processes adopted in our great establishments for this purpose, both methods are combined.

Cotton is more easily bleached than most other substances. On the old plan, it is first well washed in warm water to remove the weaver's paste or dressing, then "*bucked*" (boiled) in a *weak alkaline lye*, and after being well washed, is spread out upon the grass, or bleaching ground, and freely exposed to the joint action of light, air, and moisture. The operation of "*bucking*" and exposure, is repeated as often as necessary, when the goods are "*soured*" or immersed in *water acidulated with sulphuric acid*, after which they receive a thorough washing in clean water, and are dried. From the length of the exposure upon the bleaching ground, this method is apt to injure the texture of the cloth, and from the number of operations required, is necessarily expensive and tedious. It is therefore now very generally superseded by the system of chemical bleaching, by means of *chloride of lime*. In this method, the goods are first "washed" and "bucked" as on the common plan, then submitted to the action of *weak solutions of chloride of lime*, and afterwards passed through *soured water*, when they have only to be *thoroughly* washed and dried for the process to be complete.

Linen is bleached in a similar way to cotton, but the operation is more troublesome from its greater affinity for colouring matter. Grass-bleaching is still extensively employed for linen, but is rapidly giving place to the system now almost universally adopted for cotton goods of every description.

Wool is bleached by exposing it to the joint action of *fuller's earth* and *soap*, in the fulling mill, (to remove grease and dirt,) after which it is well washed and dried, and is then ready for the dyer. When it is intended to preserve it white, it is commonly run through *water tinged blue with indigo*, or it is exposed to the *fumes of burning sulphur*. By the last method, especially if not very skilfully managed, it acquires a harsh feel, which is best removed by a *bath of soap and water*, but this, for the most part, reproduces its previous yellowish-white tinge.

Silk is bleach by boiling it in a mixture of *white soap* and *water*, after which it is subjected to repeated rinsings. When required to be very white, (as *gloves, stockings, &c.*,) the goods are commonly submitted to the action of *sulphurous acid*, or the *fumes of burning sulphur*.

Straw is generally bleached by the fumes of sulphur. The goods are enclosed in a chamber connected with a small stove, in which *brimstone* is kept burning. On the *small scale*, a large chest or box is commonly employed for the purpose. A piece of brick, or an old box-iron heater, heated to dull redness, is placed in an earthen pan at the bottom, a few fragments of *roll sulphur* thrown on, and the lid instantly closed, and the whole left for some hours. Care should be taken to avoid inhaling the fumes, which are very deleterious as well as disagreeable and annoying. Straw goods may, however, be bleached in a much better manner by the use of a little *oxalic acid* or *chloride of lime*.

Old Rags, (for the manufacture of paper,) and *paper pulp*, are now almost universally bleached with *chlorine* or *chloride of lime*.

Printed Books, Engravings, &c., may be whitened by first subjecting them to the action of a weak *solution of chloride of lime*, next to *water soured with sulphuric acid*, and, lastly, to *pure water*, until all adhering acid or chlorine is removed.

BLEAR-EYE. Syn. *Lippitudo*,—Lat. An exudation of a puriform matter from the margins of the eye-lids, which are red, tumid, and painful, and frequently, during the night, glued together by the discharge. The best applications are mild astringent collyria, as those of *sulphate of zinc* or *alum*, (6 or 8 gr. to *water*, 1 oz.) An ointment formed of *ointment of nitrate of mercury*, (Ung. hydrargyri nitratis,—Ph. L.) 1 part, diluted with *lard*, 11 parts, may be advantageously applied nightly, by means of a camel-hair pencil, the smallest quantity possible only being used. Excess in eating and drinking should be avoided, and some aperient medicine taken.

BLEEDING. See *Hæmorrhage*.

BLEEDING (from the Nose). When this is not the result of violence, it may be regarded as an effort of nature to relieve the system from an excess of blood; but when it is habitual, or the result of violence, remedial measures should be had recourse to. A simple means of arresting the hæmorrhage is to introduce, by means of a probe, a *small piece of lint* or *soft cotton*, previously dipped into some *mild styptic*, as a *solution of alum, white vitriol*, or *creosote*, or even into *very cold water*. Should this not succeed, cold water may be snuffed up the nostrils, or a *small piece of ice* placed in the one from which the blood flows. When the bleeding is very profuse or persistent, medical advice should be had recourse to. A person (an innkeeper), known to the author, lost his life in the course of a few days from a voluntary hæmorrhage from the nose, which it was found impossible to stop or lessen.

Dr. Negrier, of Angiers, has proposed a plan of arresting bleeding from the nose, which, he says, is both simple and certain. It consists in *simply elevating the arm of the affected side.* He has never found this method to fail, and explains the rationale of the cure, by assuming that part of the force previously expended in sending the blood up the carotids is subtracted, and added to that which drives it through the brachial arteries. This explanation may or may not be confirmed by experiment; but the subject is worth investigation.

BLISTERS. See *Vesicants.*

BLISTERS (Extemporaneous).— 1. A *piece of lint* dipped in *vinegar of cantharides*, and immediately after its application to the skin, covered over with a *piece of strapping*, to prevent evaporation, speedily raises a blister.

2. *Concentrated acetic acid*, applied in the same way, has a similar effect.

3. (Dr. Darcq.) Into a flat watch glass, pour from 8 to 10 drops of highly *concentrated liquor of ammonia;* cover the liquid with a small piece of *linen*, of rather less diameter than that of the glass, and at once apply this little apparatus to the previously shaved skin. The whole must be kept in its place by means of moderate pressure with the fingers, until a red ring, about 2 *centimetres* in breadth, is observed round the glass, when it is certain that vesication is effected. Sometimes scarcely 30 seconds are necessary for obtaining the result. The apparatus may then be removed, and the blistered part treated in the usual manner; the dressing being according to the object in view.

4. (Trousseau.) *Bibulous paper*, slightly wetted with a little of the *ethereal extract of cantharides*, and instantly applied to the skin, the whole being covered with a piece of *common adhesive plaster* to prevent evaporation.

5. By the application of *boiling water*, by means of a suitably shaped tube; the adjacent parts being protected from injury.

BLISTERS (for Horses, &c.) See *Veterinary Medicines.*

BLISTERS (Perpetual). Common blisters, raised in the usual way, but instead of allowing the surface to heal, after the discharge of the water, it is kept open by dressing it with *savine ointment* or *cantharides ointment.*

BLISTERING TISSUE. Syn. *Tela Vesicatoria, Sparadrapum Vesicans, Taffetas Vesicant.* Waxed silk, spread over with a thin coat of alcoholic, acetic, or ethereal extract of cantharides.

Prep. 1. (P. C.) *Powdered cantharides* are exhausted with *sulphuric ether*, by percolation, and the resulting tincture reduced to the consistence of treacle by distillation; this extract is mixed with twice its weight of *yellow wax*, (melted by a very gentle heat,) and is then spread on *waxed cloth.*

2. (W. Cooley.) *Powdered cantharides*, 5 parts; *glacial acetic acid*, 1 part; *rectified spirit* (64 u. p.), 15 parts; digest 10 days, decant, filter, evaporate as before, and add to the extract its own weight (each) of *pure bees' wax* and *resin cerate*, (Ph. L.) melted by a gentle heat, as above.

3. (Oettinger.) *Powdered cantharides*, 3 dr.; *ether*, 1 *oz.;* digest for a day or two, decant, add *sandarach*, 4 dr.; *mastic*, 2 dr.; *turpentine*, ½ dr.; *oil of lavender*, 10 or 12 drops.

4. (Chilton.) *Acetic extract of cantharides*, 2 parts; *resin cerate* and *bees' wax*, of each, 1 part; as before.

5. (Cadet.) *Cantharides*, (in powder,) 3 dr.; *acetic ether*, 4 oz.; infuse 8 days, decant, (evaporate as before,) add, of *resin*, 4 dr.; and spread on court plaster.

Obs. The above blistering compositions have now nearly superseded the common plaster of cantharides for use among the middle and better classes, from their greater cleanliness, efficiency, and ease of application; and from being less liable to produce strangury, or excessive irritation. They are spread upon adhesive plaster, court plaster, waxed and oiled paper, silk, sarsanet, leather, and other similar materials, just as the convenience or taste of the practitioner or pharmaceutist may dictate. Paper so prepared is sold under the name of *Charta Vesicatoria.*

BLONDE. See *Lace.*

BLOOD. *Bullock's blood* is employed for the *clarification of wines* and *syrups;* in the *preparation of adhesive cements; coarse paint for out-door work;* as a *manure;* as a *bleaching powder;* and for *several other purposes.* The *blood* of *sheep, pigs*, and *bullocks*, mixed with *flour* or *oatmeal*, and seasoned, is eaten by the common people, but it is rather indigestible, and apt to induce disease.

Bullock's blood, dried by exposure in thin layers to a current of air, at a heat under 125°, and then reduced to powder; is exported in large quantities to the colonies, where it is used in the sugar works. When dried at a temperature ranging between 212° to 225°, then coarsely powdered, and the dusty portion sifted off, it is much used by fraudulent dealers to adulterate *grain musk.*

BLOOD (Spitting of). See *Hæmoptysis.*

BLOOM (Almond). *Prep.* Boil 1 *oz.* of *ground Brazil wood,* in 3 pints of water for 15 minutes, adding the juice of 2 *lemons* towards the end; strain, and add ¾ *oz.* of *isinglass,* ¼ *oz.* of *powdered cochineal,* 1 *oz.* of *alum,* and ½ *oz.* of *borax*; boil again for 4 or 5 minutes, and strain through a clean piece of fine muslin. *Used* as a skin cosmetic. The whole process should be conducted in glass or earthenware vessels as metals injure its colour.

BLOOM OF ROSES. *Prep.* 1. Dried *red rose leaves,* 1½ *oz.*; *boiling water,* 1 pint; infuse 2 hours, press out the liquor and add the *juice of* 3 *lemons;* the next day decant the clear. It should be kept in a cool place. A little *spirit of wine,* (3 or 4 *oz.* to the pint,) is sometimes added to make it keep.

2. *Carmine* is dissolved in *liquor of ammonia,* and the resulting solution added to *rose water* in quantity sufficient to give it the desired tint. Both the above are used as cosmetics, and for colouring liqueur, confectionery, &c.

BLOWPIPE. An instrument by means of which the flame of a candle or lamp is directed upon any substance placed to receive it, which is thus subjected to an intense heat. The blowpipe is to the artist and experimentalist, what the wind-furnace is to the artisan; but it is proportionately more powerful, convenient, and economical.

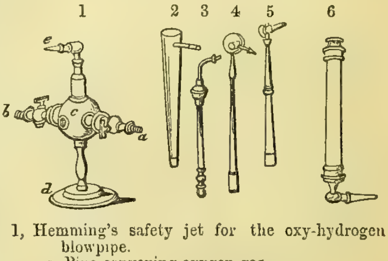
Beginners are usually unable to maintain a continual stream of air from the jet, which is, however, very simple to accomplish. The operation depends upon a little artifice in blowing through the pipe, which is in reality more difficult to describe than to acquire. The effect intended to be produced is a continual stream of air for many minutes, if necessary without ceasing. This is done "by applying the tongue to the roof of the mouth, so as to interrupt the communication between the mouth and the passage of the nostrils; by which means the operator is at liberty to breathe through the nostrils, at the same time that by the muscles of the lips he forces a continual stream of air from the anterior part of the mouth through the blowpipe. When the mouth begins to be empty, it is replenished by the lungs in an instant, while the tongue is withdrawn from the roof of the mouth, and replaced again in the same manner as in pronouncing the monosyllable *tut.* In this way the stream may be continued for a long time without any fatigue, if the flame be not urged too impetuously; and even in this case no other fatigue is felt than that of the muscles of the lips." (Ure.)

The *hottest portion* of the flame produced by the action of the blowpipe is at the tip of the *outer white flame,* which has also the property of rapidly burning or oxidizing any substance placed in it, which is capable of such an action, hence it has been called the "*oxidizing flame.*" The *interior blue flame* has also been called the "*reducing flame,*" from the property it possesses of abstracting oxygen from most substances placed in it.

Substances submitted to the action of the blowpipe are placed on a *support,* which is either a *piece of charcoal,* or a *wire,* or *small spoon of platinum, gold,* or *silver,* as the case may require. Sometimes a plate of *cyanite* is used. Charcoal from the pine is preferred, and the sides, not the ends of the fibres, are presented to the flame. When a very intense heat is required, the substance operated on should not exceed the size of *half* a peppercorn.

For producing extreme degrees of heat, the flame is blown with a jet of oxygen gas, and the instrument is then called an "*oxygen blowpipe;*" or a mixture of oxygen and hydrogen is burned, when it is called an "*oxy-hydrogen*" blowpipe. The heat produced by the last is so great that no substance can stand before it. The most refractory native compounds being immediately fused. Gold is volatilized, and iron is rapidly consumed the instant it is placed in the flame.

The principal blowpipes in general use are figured in the engravings.



1, Hemming's safety jet for the oxy-hydrogen blowpipe.
  a, Pipe conveying oxygen gas.
  b, Do. hydrogen gas.
  c, Ball stuffed with fine wire gauze.
  e, Jet (internal diameter 1-80th of an inch.)
2, Black's blowpipe.
3, Bergman's do.
4, Pepy's do.
5, Wollaston's do.
6, Oxy-hydrogen do.

Beside the above there are several other varieties of blowpipe. One, in which the air is expelled by the pressure of a column of water, and hence called the "*hydrostatic blowpipe.*" Another, in which the flame is blown with the vapour of boiling alcohol, is named the "*spirit blowpipe.*"

BLUBBER. This substance, so plentiful on some parts of the coast of England, forms a rich and cheap manure for pasture and arable land. It is used at the rate of 1 ton to every 20 or 30 loads of mould, together with a *chaldron* of *lime* per acre. In 3 or 4 months the land is usually found in prime condition. Pilchards and other fish that swarm upon our coasts, may be used in the same way, and are, indeed, when properly managed, but little inferior to guano.

BLUE DYE. The method of dyeing cotton, linen, silk, and wool, of a *permanent blue colour*, is noticed under the heads, *Dyeing*, *Indigo*, and *Prussian Blue.* The following plans are also adopted; but although cheaper, the shades produced by them are not so durable as when the substances just referred to are employed.

1. Give the goods a *mordant of alum*, then rinse them well and boil them in a *bath of logwood*, to which a small quantity of *blue vitriol* has been added.

2. Boil the goods for a short time in a *bath of logwood*, then add to the liquor *tartar* and *verdigris*, in the proportion of 1 *oz.* each, to every *lb.* of *logwood* employed; and again boil.

3. *Bilberries*, *elder-berries*, *mulberries*, *privet-berries*, and *several other blue vegetable substances*, may be used to dye blue, as above, instead of logwood.

Obs. By increasing the proportion of alum the colour verges on *purple;* and by employing a little acetate of iron or green copperas, the *darker shades of blue* are produced. Verdigris, blue vitriol, and alkalies *turn it more on the blue*, and a mordant of tin imparts a *violet cast.*

BLUE PIGMENTS. The preparation of the principal blue pigments of commerce is described under their respective names. The following are of a miscellaneous and less usual character:—

Azure Blue, *Azure Pigment.* Terms frequently applied to *smalts*, and similar compounds of an azure colour.

Charcoal Blue. Carbonized vine stalks are triturated with an equal weight of *salt of tartar* or *pearlash*, the mixture put into a crucible, and heated over the fire, until it ceases to swell, keeping it well stirred all the time; when cold, it is dissolved in *water*, and the excess of alkali saturated with *dilute sulphuric acid.* The liquid becomes blue, and a dark precipitate falls down, which turns of a brilliant blue colour when dried and cautiously heated.

China Blue, *Royal Smalts. Oxide of cobalt* or *zaffre*, ground with an *equal weight of potash*, and about 8 *times its weight of felspar*, the mixture submitted to fusion in a crucible, and when cold reduced to an impalpable powder. *Used* to paint pottery, and as a blue pigment.

Cobalt Blue. Prep. 1. *Zaffre*, 1 *lb.*, is dissolved in *nitric acid*, diluted with an *equal weight of water*, ¾ *lb.*, by digestion for some hours; the solution is then evaporated nearly to dryness, and dissolved in *warm water*, filtered, and a *solution of phosphate of soda* added, as long as a precipitate is formed; this last is collected on a filter, washed with *cold water*, and mixed whilst still moist, with 8 *times its weight of freshly precipitated hydrate of alumina;* the paste is then dried, and exposed to a cherry red heat in a crucible, after which the mass is cooled and reduced to fine powder.

2. From a *solution of nitrate of cobalt*, (as above.)

3. From a *solution of nitrate of cobalt*, precipitated with *ammonia alum*, and the precipitate washed, dried, and heated to a cherry red, as before. The products of the above formulæ are very beautiful and permanent.

Egyptian Azure. From *carbonate of soda*, 1 *lb.; calcined flints*, 1½ *lb.; copper filings*, ¼ *lb.;* (all in fine powder;) fused together in a crucible for 2 hours, and when cold, reduced to an impalpable powder. A beautiful and permanent sky-blue colour. It is used in painting, as a substitute for smalts, of which, indeed, it is a variety.

Iron Blue, *Ferric Blue.* From a *solution of protosulphate of iron*, precipitated with another of *phosphate of soda*, the resulting powder being washed and dried. A lively sky-blue colour, without much depth or body.

Molybdenum Blue. From *sulphuret of molybdenum*, dissolved in *nitric acid*, and some *tin filings* and a little *muriatic acid* added. After digestion for some time, the clear liquid is poured off, and evaporated to dryness. The resulting powder is then mixed with *moist hydrate of alumina*, (as in making cobalt blue,) and heated to a very dull red.

Mountain Blue. Carbonate of copper, mixed with earthy matter, ground to powder.

Saxon Blue, Saxon Azure. 1. From *sulphate of iron,* 1 *oz.;* and *alum,* 8 *oz.;* dissolved in *water,* 1 gallon; adding simultaneously, separate *solutions* of *prussiate of potash* and *common pearlash,* until they cease to produce a precipitate; the deposit is washed well with water, and dried.—2. A solution of the *sulphate of iron* may be made first, then precipitated with *prussiate of potash,* and instantly mixed with a *solution of alum* and a *solution of pearlash,* until precipitation ceases.

Stone Blue, Fig Blue, Thumb Blue, Knob Blue, Crown Blue, Mecklenburg Blue, Queen's Blue.—1. From *finely powdered indigo* and *starch,* made into a paste, and then formed into small lumps or cakes.—2. Instead of *starch* using *whiting* and a little *weak size.* Employed by laundresses to give a faint blue tinge to linen.

BLUE WASHES. Syn. *Blue Stains, Liquid Blues.* The following are useful formulæ for this class of preparations. Others will be found under *Inks, Writing fluids, &c.*

Prep. 1. *Prussian blue,* (pure, in fine powder,) 1 *oz.;* is placed in a small mattress or common phial, and *concentrated hydrochloric acid,* 2 *oz.,* poured over it. Effervescence ensues, and the mixture soon assumes the consistence of a thin paste. After about 24 hours, it may be diluted with 8 or 9 *oz.* of *water,* and preserved in a glass bottle. The intensity of this colour may be lessened by new doses of water. If the whole be poured into 1 quart of water, it will still exhibit a colour sufficiently dark for washing prints. It forms an excellent *blue writing fluid,* for which purpose it is commonly vended.

Chemic Blue, Saxon Blue, Liquid Blue, Sulphate of Indigo. Prep. 1. *Indigo,* 1 *lb.; oil of vitriol,* 8 *lb.* Put the acid into a hard earthenware pan, placed in a tub of water to keep it cool, and add the indigo, in fine powder, in small successive portions, carefully stirring to prevent the liquid *heating;* next cover up the vessel and let it stand for 5 or 6 hours, occasionally stirring it during the time; lastly, dilute it with an *equal weight* of *water.*

2. *Indigo,* 1 *oz.; oil of vitriol,* 4 *oz.;* dissolve as before; the next day add, of *dry potash,* 1 *oz.;* let it stand a day longer, then dilute it with *water,* 12 *oz.*

Used in dyeing *greens* and *blues,* either without preparation or with a *mordant* of *alum and tartar.*

BLUSHING is caused by a sudden increase in the quantity and velocity of the blood in the capillaries, occasioning their turgescence; and, consequently, a heightening of the natural pale-reddish hue of the skin. It is referable to mental emotions, such as surprise, confusion, consciousness of slight, injury, or indignity, and the like. Emotions of a depressing character frequently produce an opposite effect. This is termed *pallor;* and depends on the rush of blood from the skin and surface of the body upon the internal organs. The *first* is often unpleasant, but never dangerous; the *last,* always so. The cure of blushing consists in an effort in the party to maintain his or her *presence of mind,* and to reflect and reason on the exciting circumstance, instead of sinking into a state of temporary mental imbecility and confusion.

BOILERS. See *Incrustation* and *Steam.*

BOILING. (In Cookery.) The operation of dressing food in water in a state of ebullition, or nearly approaching it. The practice of cooking animal food by boiling, although exceedingly simple, and often most convenient, is neither judicious nor economical, when the broth or liquid in which it has been dressed, is to be rejected as waste; as in this way, the most nutritious portion of the flesh of animals, consisting of soluble saline and other matter required for the formation of bone, and the nutrition of the muscular tissues, &c., is to a great extent lost. This particularly applies to *small pieces* so dressed, and to those presenting a large surface to the action of the water in proportion to their weight. Large pieces of meat suffer less in proportion than small ones, for the same reason; but even with them the outside should be rejected, as it is both insipid and unnutritious, compared with the interior portion. To reduce the solvent and deteriorating action of the water to the lowest possible point, the articles to be boiled should not be put into the water until it is in the state of full ebullition, which should be maintained for 5 or 6 minutes afterwards, by which time the surface will have become, to a certain degree, hardened, and will then act as a shield to the inner parts. To induce tenderness, the subsequent portion of the operation should be carried on at a mere "*simmer;*" the slighter the better. The practice of dressing meat by putting it into cold water, which is then *gradually* raised to the boiling point, cannot be too much censured. A quarter of an hour per *lb.,* for dressing *young meat, poultry,* and *small pieces,* and twenty minutes per *lb.* for *old, tough,* and *large ones,* are the usual times allowed by cooks for the purpose. See *Food, &c.*

BOILING POINT. See *Ebullition.*

BOILS. Syn. *Furunculi,*—Lat. Boils generally attack the healthy and robust, during the period of youth and early manhood, and seldom trouble persons who have arrived at the middle age of life.

Treat., &c. When boils appear, suppuration should be promoted by *poultices of bread and linseed meal,* to which a little *fat* or *oil* may be added, to prevent their getting hard. When poultices are inconvenient, exposure to the vapour of hot water, or the application of stimulating plasters, may be adopted instead. When the tumour is sufficiently ripe, the matter should be evacuated, and the wound dressed with a little *simple ointment* spread on a piece of clean lint or linen. The diet may be full and liberal until the maturation of the tumour and the discharge of the matter, when it should be lessened, and the bowels opened by some saline purgatives, as *Epsom salts* or *cream of tartar.* When there is a disposition in the constitution to the formation of boils, the bowels should be kept regular, and tonics, as *bark* or *steel,* had recourse to, with the frequent use of sea-bathing when possible. A course of sarsaparilla may be taken with advantage.

BOLAS. *Prep.* (Rundell.) Into *flour,* 2 *lb.,* pour *warm milk,* ¾ pint, a small teacupful of *yeast,* and 6 *eggs;* make a dough, add *butter,* 1 *lb.,* (by degrees,) and let it rise for an hour; then mix in *powdered sugar,* 1 *lb.;* and make the mass into cakes; put these into cups or tins previously well buttered, and ornament the top with *candied orange* or *lemon peel;* lastly bake them.

BOLETIC ACID. An acid discovered by Braconnot in the juice of the boletus pseudo-igniarius.

Prep. The *expressed juice* is evaporated to the consistence of a syrup by a gentle heat, digested in *strong alcohol,* and the residuum dissolved in *water;* a solution of *nitrate of lead* is then added as long as any precipitate falls, from which crystals of *boletic acid* may be obtained as directed for absinthic acid; purify by re-solution and crystallization from *alcohol.*

Obs. Boletic acid dissolves in 45 parts of alcohol, and in 180 parts of water, and is volatile. It is doubtful whether it is a distinct acid principle.

BOLOGNA PHIAL. Syn. *Philosophical phial.* A small vessel of glass, which has been suddenly cooled, open at the upper end, and rounded at the bottom. It is made so thick at the bottom that it will bear a smart blow against a hard body without breaking; but if a little pebble, or piece of flint, is dropped into it, it immediately cracks, and the bottom falls to pieces; but unless the pebble or flint is large and angular enough to scratch the surface of the glass, it will not break.

BOLUS. Syn. *Bolus,*—Lat. Boluses are small, roundish masses of medicinal substances, which are taken in the same manner as pills, which they resemble, except in their larger size. Those persons who object to swallowing them in their common state, may wrap them in soft paper, or introduce them into the emptied husks of raisins or grapes.

Boluses are prepared with the same ingredients and in a similar manner to pills, (which see.) The following may be taken as examples:—

BOLUS (Alum). Syn. *Bolus Alumini,*—Lat. *Powdered alum* and *conserve of roses,* of each, 1 dr.; *syrup of saffron* or *orange peel,* q. s.; for 4 to 6 boluses. *Dose.* One, as required, in diarrhœa, &c.

BOLUS (Capivi). Syn. *Bolus Copaibæ,*—Lat. *Prep.* 1. (Evans.) *Balsam of capivi,* (pure,) 16 parts; *calcined magnesia,* (recent,) 1 part; mix, set it aside for a few days until it becomes nearly solid, then place it on a hot slab, and divide it into oval pieces of ½ dr. each, which are to be wrapped in wafer paper.

2. (Radius.) *Copaiba,* 2 dr.; *gum arabic,* 1 oz.; *powdered liquorice,* q. s. to form a mass; to be divided as before.

3. (Righini.) *Copaiba,* 5 dr.; *extract of rhatany,* 1½ dr.; *oil of sassafras,* 15 gr.; *calcined magnesia,* q. s.; for 80 boluses. *Dose.* Three, four, or more daily, in gonorrhœa, &c.

4. (Henschel.) *Copaiba,* 1 oz.; *calcined magnesia,* 1 dr.; *opium,* 4 gr.; *powdered cubebs,* 3 dr.; *syrup of poppies,* q. s.; for ½ dr. boluses. *Dose.* Two every night in gonorrhœa. The products of the above formulæ are vastly superior to the *capivi capsules* of the shops.

BOLUS (Cubebs). Syn. *Bolus Cubebæ,*—Lat. *Prep.* 1. (Velpeau.) *Powdered cubebs,* 6 dr.; *balsam of capivi,* 2 dr.; *calcined magnesia,* q. s.; for 36 boluses. The whole to be taken in 2 or 3 days.

2. See *Capivi Bolus,* No. 4, (above.)

BOLUS (Emetic). Syn. *Bolus Zinci Sulphatis,*—Lat. *Sulphate of zinc,* 10 to 20 gr.; *conserve of roses,* q. s. to make a bolus. As an emetic, when poison has been taken; followed by copious draughts of *warm water* or *weak tea.*

BOLUS (Musk). Syn. *Bolus Moschi,*—Lat. *Prep.* 1. *Grain musk,* 15 gr.; *cam-*

phor, 5 gr.; *powdered gum*, 3 gr.; *syrup of saffron*, q. s. for a dose; in convulsions, typhus fever, &c.

2. *Musk* and *carbonate of ammonia*, of each, 10 gr.; *conserve of roses*, q. s. to make a bolus. One, when required, in spasms, hysteria, convulsions, lowness of spirits, &c.

BOLUS (Vermifuge). Syn. *Bolus Vermifugus*,—Lat. *Prep.* 1. *Wormseed*, ½ dr.; *calomel*, 6 gr.; *camphor*, 15 gr.; for 2 boluses; one to be taken at night, the other the next morning, followed by a purge.

2. (Dr. Campbell.) *Basilic powder*, 1 scrup.; *conserve of wormwood*, q. s.

3. (Foy.) *Powdered pomegranate roots*, 1 dr.; *assafœtida*, ½ dr.; *croton oil*, 4 drops; *syrup of wormwood*, q. s. for 15 boluses. The whole to be taken in 3 days, in doses of 1 or 2 at a time. In tapeworm, &c.

4. (Guy's Hosp.) *Tin filings*, ½ *oz.; compound tragacanth powder*, ½ dr.; *syrup* (buckthorn), q. s.; for 3 boluses. *Dose.* 1 to 3. The use of all the above should be followed by a purgative. See *Worms.*

BOMBIC ACID. An acid found by M. Chaussier in the silkworm. It has since been shown to be identical with formic acid.

BON-BONS. See *Sugar Plums* and *Confectionary.*

BONE. The bones of animals are employed for various purposes in the arts, manufactures, and domestic economy. The *bones of good meat* form most excellent materials for making *soups* and *gravies*, as is well known to every good cook. In France, soup is extensively made by subjecting bruised bones to a steam heat of 2 or 3 days' continuance. In England the same is commonly effected in an iron *Papin's digester.* When the earthy matter of a bone is dissolved out by digesting it in a large quantity of *very dilute hydrochloric acid*, a lump of *gelatine* is obtained, which after being well washed with water, is equal to isinglass for all the purposes of making soups and jellies. The following is the process recommended by Proust, for making the best of bones, in *hospitals, gaols*, and *similar establishments*;—

The bones, crushed small, are to be boiled for 15 minutes in a kettle of water, and the fat (which is fit for all common purposes) skimmed off, as soon as cold. The bones are then to be ground, and boiled in 8 to 10 times their weight of water, (of which that already used must form a part,) until half of it is wasted, when a very nutritious jelly will be obtained. Iron vessels should alone be used in this process, as the jelly and soup act upon copper, brass, and the other common metals. The bones of *fresh meat* are the most productive; those of *boiled meat* come next; whilst those of *roasted meat* scarcely afford any jelly. As "*boning*" meat before cooking it, is now a very general practice, a quantity of fresh bones may always be obtained. See *Ivory, &c.*

BONE ASH. Impure phosphate of lime, obtained by calcining *bones* to whiteness, and reducing the ash to fine powder. It is *used* to make pure phosphate of lime, to form cupels, &c.; and is sold for *burnt hartshorn.*

BONE DUST. Syn. *Bone Manure.* Bones ground to a coarse powder in a mill. It is sowed along with the seed in a drill. Wheat thus treated, is said to yield 30 to 50 per cent. more weight in straw and grain than by the common methods. Turnip and light soils, it renders more than ordinarily productive. Bone manure is much used in the west of Yorkshire, Holderness, and Lincolnshire. The usual quantity per acre is 70 bushels, when used alone; but when mixed with ashes or other common manure, 30 bushels per acre is said to be enough. When applied in the same manner as other manures, it has been found to remain seven years in the ground.

BONE GREASE. From *refuse bones*, bruised, boiled in water, and the broth skimmed when cold. *Prod.* ⅛th to ¼th of the weight of the dry bones. (Proust.) *Used* for making soap and candles. See *Animal Charcoal.*

BONE SHAVINGS. Syn. *Bone Dust, Bone Turnings.* These, by boiling with water, yield a beautiful jelly, which is nearly equal to that produced from hartshorn shavings, and for which they are very frequently sold. *Used* to make jellies and blancmanges, to stiffen straw bonnets, &c.

BOOKBINDING. A notice of the various operations of the binder does not properly come within the province of the present work. The extreme novelty, simplicity, and durability of the variety known as "*Hancock's Patent Binding*," induce us, however, to give the reader a short description of that admirable invention. By Mr. Hancock's method the sheets are folded in double leaves, and being properly placed together and adjusted, the book is subjected to the action of a press, and a *strong* and *quickly-drying solution of Indian rubber* is smeared over the back with the finger, when the whole is left for 3 or 4 hours, or longer, to dry. The operation is repeated, as often as necessary, after which fillets of cloth are cemented on with the varnish, and the book is ready to have the boards attached. In this way, several of the usual operations of binding are dispensed with. We most willingly bear testimony to the strength and durability of this method, as well as to the great convenience it affords in allowing the books to open *perfectly flat* upon a table, or to be distorted in any possible manner, without injury to their backs. It is, undoubtedly, the best way of binding books for travellers. The Editor of this work, once had a large trunk of books, among which was a massive volume bound on Hancock's plan. All the rest were nearly torn to pieces by a few months' journey, but this one remained uninjured even after three years, during which time it accompanied him in his travels, extending, collectively, to upwards of 20,000 miles.

BOOTS and SHOES. The *cleaning* of boots and shoes forms no unimportant part of the domestic duties of a large establishment; as, on it being properly performed, depend both their appearance and durability. A votary of St. Crispin, in whom we place considerable reliance, assures us, that to effect this object in the "best style," all that is necessary is to employ *very little blacking*, (merely enough to *moisten* the surface of the leather,) and to *brush it off* whilst still *damp*. Never make the surface *wet*, nor allow the blacking to *dry* before applying the polishing brush. For this purpose, a portion only of the boot or shoe should be attended to at a time. The dirt is, of course, to be carefully brushed off before applying the blacking. When it is desired to restore the *shape* of a boot or shoe, as well as to clean it, "boot trees" may be used. Of the *brushes*, we are told that there should be at least three,—one, (*dirt brush*,) with bristles stiff, but not "wiry" nor "scratchy," to remove mud and dirt; another, (*blacking brush*,) with fine, flexible hair, and plenty of it, for applying the blacking; and a third, (*polishing brush*,) covered with long, fine, springy, and *slightly* stiff hair, for giving the polish. The employment of *inferior* or *worn-out* brushes, is said to be "false economy," and proves particularly destructive to the "lighter classes" of leather.

A word or two here about blacking may also be useful to the reader. That of any known "good maker" may be employed. The blackings of different houses vary, however, considerably in some of their properties; as also do those of the same maker by age. Some blackings "dry off" rapidly, and give a very brilliant polish with very little labour; whilst others take a little longer to "dry off," and somewhat more labour to polish them. The former, are best adapted to hasty use, and when a very brilliant surface is desired; the latter, when depth of polish, without extreme brilliancy, satisfies the wearer. The *first* best meets the requirements of fashionable life; the *last*, those of the middle classes and pedestrians exposed to dirt, mud, and the various vicissitudes of travelling and weather. To the one belong the blackings of Everett, and Day and Martin; to the other, those of Warren, Bryant and James, and most of the smaller manufacturers. Time, however, equalizes the qualities of these two classes. Blackings which are moist and oily lose these properties, and become drier and more brilliant by age. The practice of several of the first-class West-end houses is never to use a blacking which they have not had in their stock at least a twelvemonth.

The occasional use of a *little* oil or grease to the *uppers of boots* and *shoes*, increases their *softness* and *durability*, as well as the "depth," but not the brilliancy of the polish from common blacking. For this purpose some *good tallow* or "*dubbing*" may be used; the absorption being aided by a very *gentle* heat. The *soles* or *bottoms* of boots and shoes may be thoroughly saturated with similar substances, when new, by which means their durability will be fully doubled. The common practice among the shoemakers is to moisten the surface of the leather with a *wet sponge* before applying the oil or grease; by which (they say) its pores are opened and its absorbent powers increased.

Patent leather boots and *shoes* are best cleaned with a little *sweet oil* or *milk*, (preferably the first,) the dirt having been previously removed in the usual way.

Indian-rubber goloshes and *overshoes* may be cleaned with a *sponge* or *brush*, and *water*, care being taken not to wet the linings. The same applies to Gutta percha. See *Blacking*, *Leather*, *Waterproofing*, *&c.*

BOOT POWDER. *Scraped* or *powdered French chalk.* It is used to facilitate the "getting on" of new or tight boots. The bootmakers commonly rub a little of it on the insides of the backs, heels, and insteps of boots before handing them to their customers.

BOOT-TOP LIQUID. Syn. *Boot-top Composition.* There are numerous compositions of this class extant, but with two or three exceptions they are most unchemical compounds, containing several ingredients, part of which are either unnecessary or opposed to the action of the rest. The following original and selected formulæ are given for the reader's guidance:—

Prep. 1. *Oxalic acid* and *white vitriol*, of each, 1 *oz.; water*, 1½ pint; dissolve. To be applied with a sponge to the leather previously washed with water; then washed off with water, and the boot-tops dried by a gentle heat; after which, they may be polished with a brush, so as to appear like new leather, or left to dry rough, as the case may require.

2. *Sour milk*, 1 quart; *gum arabic*, 1 *oz.; juice of* 2 *lemons; white of* 2 *eggs; oil of vitriol*, 2 *oz.* Mix.

3. *Sour milk*, 1 quart; *butter of antimony, cream of tartar, tartaric acid*, and *burnt alum*, of each, 2 *oz.* Mix.

4. (Gray.) *Sour milk*, 3 pints; *butter of antimony, alum*, and *cream of tartar*, of each, 2 *oz.; citric acid, alum*, and *burnt alum*, of each, 1 *oz.*

5. (Redwood.) *Sour milk*, 3 pints; *cream of tartar*, 2 *oz.; alum* and *oxalic acid*, of each, 1 *oz.*

6. (Beasley.)—*a.* (Brown-top.) *Alum, annatto*, and *oxalic acid*, of each, 1 *oz.; isinglass* and *sugar of lead*, of each, ½ *oz.; salt of sorrel*, ¼ *oz.; water*, 1 quart; boil for 10 minutes.—*b.* (White-top.) *Alum, cream of tartar, magnesia*, and *oxalic acid*, of each, 1 *oz.; salt of sorrel* and *sugar of lead*, of each, ¼ *oz.; water*, 1 quart.

BORACIC ACID. Syn. *Boric Acid; Acidum Boracicum*,—Lat. *Sedative salt, Sed. Salt of Vitriol, S. S. of Homberg*,—Obs. The only compound of boron with oxygen. It is obtained from common borax. That of commerce is extracted from the boracic acid lagoons of Tuscany.

Prep. 1. *Borax*, 1 part; *boiling water*, 4 parts; dissolve, then add *sulphuric acid* until the solution acquires a distinctly acid reaction, (about ½ the weight of the borax.) As the solution cools, crystals of boracic acid will be deposited. They may be purified by placing them on a filter, washing them with a little *very cold water*, re-solution in *boiling water* and recrystallization. Nearly pure.

2. By decomposing *borax* by *hydrochloric acid*, instead of *sulphuric acid*, as above. Purer than the last.

3. By exposing the product of the first crystallization (*see* above) to heat in a platinum crucible, and redissolving and crystallizing the product, as before. Chemically pure. *Used* in analysis.

Prop., *&c.* Odourless; tastes bitter; dissolves in 25 times its weight of cold water, and 3 times its weight of boiling water; very soluble in alcohol, which then burns with a bright green flame; reddens litmus; browns turmeric paper; (these properties are characteristic of this substance;) when strongly heated, it forms a brittle glass (*Vitrified Boracic Acid*) on cooling. Its salts are called *borates.*

Uses. Boracic acid was once administered internally in large doses as an anodyne, antispasmodic, and sedative, but is now scarcely ever employed as a medicine. The crude acid is used in the manufacture of borax; the pure acid in the manufacture of certain chemicals.

BORATE. Syn. *Boras*,—Lat. Several of the borates may be formed by digesting the *hydrate of the base* in a *solution of the acid*, with the assistance of heat; others by double decomposition. They are all decomposed by the stronger acids.

Tests. The borates may be tested by digesting them in a slight excess of oil vitriol, evaporating the resulting solution to dryness, and powdering and dissolving the residuum in alcohol; the solution possesses the property of burning with a green flame. See *Boracic Acid.*

BORAX. Syn. *Biborate of Soda, Borate of do.; Borax, Soda Biboras*,—Lat. & Ph. L. *Sub-borate of Soda, Gold Solder, Refined Tincal*,—Obs. Commercial borax is obtained either by purifying native borate of soda, (*tincal, tincar;*) or by saturating crude boracic acid with the alkali. It is never prepared on the small scale unless for chemical analysis.

Pur. This is best ascertained by determining the quantity of sulphuric acid required to neutralize a given weight of borax, as indicated by litmus paper. Common salt and alum are frequently mixed with borax to lower the value. The first may be detected by a solution in hot water, giving a curdy white precipitate with nitrate of silver, soluble in ammonia; the last, by water of ammonia, giving a bulky white precipitate. The former must be distinguished from the white pulverulent precipitate of borate of silver, which will be thrown down from pure borax.

Uses, &c. Borax is extensively employed as a flux for metals, for soldering, and in medicine. *Internally*, it is diuretic, sedative, emmenagogue, and refrigerant, in doses of 15 to 40 gr.; *externally*, as a gargle for sore throat, and in powder, as a detergent in aphthæ, and ulcerations of the mouth. Dissolved in rose-water, it is used as a cosmetic, and mixed with 8 times its weight of lard, forms a useful ointment in piles and sore nipples.

BORAX (Glass of). Borax dried at a gentle heat, and then melted by increasing the heat until it forms a vitreous mass on being cooled. *Used* in soldering, and as a flux.

BORO-FLUORIDES. These compounds possess little practical interest. *Boro-fluoride of hydrogen* is prepared by passing *fluoboric acid gas* through *water*, carefully concentrating the solution, cooling it, and separating the crystalline powder, which is boro-fluoride of hydrogen. With most of the protoxides and their carbonates, it interchanges bases, and metallic boro-fluorides result.—*Boro-fluoride of Barium.* By adding carbonate of baryta to boro-fluoride of hydrogen, until it ceases to be dissolved; and evaporating to the consistence of a syrup, when crystals will form. The *boro-fluorides* of *calcium, magnesium,* and *lead,* may be formed in a similar way.—*Boro-fluoride of potassium.* By dropping boro-fluoride of hydrogen into a solution of carbonate of potassa, collecting the white powder that falls, and washing it with cold water.—*Boro-fluoride of sodium.* By dissolving fluoride of sodium in boro-fluoride of hydrogen, and crystallizing. *Boro-fluoride of lithium* may be formed in a similar way.

BORON. The base of boracic acid. It was discovered by Sir H. Davy, in 1807.

Prep. Boron is prepared by a process similar to that employed to obtain silicium. —*Potassium* and *perfectly dry boracic acid,* or preferably, *boro-fluoride of potassium,* intimately mixed together, are placed in a glass adopter tube, and submitted to a low red heat. When cold, the loose cork that fastened its mouth is removed, and hot water poured in, in successive portions, until the whole matter is detached and dissolved; the liquid is allowed to settle, and the precipitate washed first with a *solution of sal ammoniac,* and afterwards with *alcohol;* the residuum (boron) is lastly dried in a capsule, and put into a well-stoppered phial.

Prop., &c. A solid, tasteless, and inodorous powder, of a grayish-brown colour. With sulphur it unites at high temperatures, forming sulphurets, (*sulphurets of boron,*) and when placed in chlorine gas it spontaneously inflames, and a gaseous *chloride of boron* is formed. The compounds of boron with simple bodies are termed *borides* or *borurets.*

BOTTLING. See *Malt Liquors, Wine, &c.*

BOUGIES. Syn. *Cerei, Cereoli,*—Lat. A long slender instrument introduced into the urethra, œsophagus, or rectum, in stricture and other diseases of those organs.

Prep. 1. (Prof. Pickel's.) *Amber* (melted), 1 part; *boiled oil,* 3 parts; mix, cool a little, and further add of *oil of turpentine,* 1 part; spread the mixture at 3 successive intervals upon *loose spun silk cord* or *web;* dry in a heat of 150°, and repeat the process until the instrument has acquired the proper size; then polish, first with *pumice-stone,* and afterwards with *tripoli* and *oil.*

Obs. This is the original receipt of the once celebrated French professor Pickel, and is still generally used, slightly modified, on the Continent. At the present time, in Paris, a little *caoutchouc* is added, equal to about $\frac{1}{20}$ of the weight of the oil employed. For the best elastic bougies the process usually occupies from 6 to 8 weeks, to allow full time for the drying and hardening of the composition. When the bougie is required to be hollow, a piece of polished metallic wire is introduced into the axis of the silk; or tinfoil is rolled round the wire and the composition applied as before. When dry and hard the wire is withdrawn.

2. (Hunter's.) *Yellow wax,* 2 parts; *red lead,* 3 parts; *olive oil,* 6 parts; slowly boiled together until combination takes place; strips of soft linen (rather wider at the one end than the other,) are then dipped into the composition, rolled up firmly, and finished off on a polished slab.

3. (Piderit's.) *Olive oil,* 1 part; *wax,* 6 parts; as before.

4. (Bell's.) *Lead plaster,* 11 parts; *yellow wax,* 4 parts; *olive oil,* 1 part.

5. (St. B. Hosp.) *Wax,* 12 parts; *Chio turpentine,* 4 parts; *red sulphuret of mercury,* 1 part.

6. (*Caoutchouc bougies.*) In France, where ether is comparatively inexpensive, these are made by applying an *ethereal solution of Indian rubber* to the silk or foil prepared as before.—In England, *naphtha* is employed instead of ether, but it furnishes a very inferior product. Sometimes *slips of Indian rubber,* previously boiled in water, or that have had their edges softened by moistening them with a little *ether,* are wound round the wire or foil, and kept in their place by a piece of tape applied over them. They are afterwards carefully smoothed off and polished.

7. (*Gutta percha bougies.*) These are formed of *gutta percha,* (previously softened by immersion in boiling water,) by rolling it between plates of polished glass or marble. When skilfully prepared from the

best (*uncoloured*) gutta percha, they are admirable instruments. A bougie of this description, of moderate size, and slightly oiled or wetted with glycerine or gum water, may be passed through the whole length of the urethra of a healthy person without causing the slightest pain. *Gutta percha catheters* (hollow bougies) are still more flexible and easily introduced, and may remain in the urethra for a long time without causing irritation; an important advantage in such matters. The reader cannot, however, be too careful to avoid those made of *coloured* gutta percha which, unfortunately, rapidly become very brittle by age. Those originally manufactured in this material were coloured black, and were constantly breaking whilst in use; a disaster from which several serious and even fatal cases ensued.

BOULES DE NANCY. Equal parts of *iron filings* and *red tartar* made up into balls with *spirit*. *Used* as a tonic, dissolved in hot water.

BOUILLI. This name is frequently applied by cooks to dishes of boiled meat, as a refinement on its plain English synonym. Thus "*beef bouilli*," "*beef in bouilli*," &c., means stewed or boiled beef, &c. As, however, the name is à la français, so must be the accompaniments, which generally consist of herbs and vegetable seasoning in greater quantity and variety than is usually deemed essential for an humble piece of English boiled or stewed meat.

BOUILLON. (In Cookery.) See *Broth* and *Soup*.

BOUQUET DE LA REINE. *Prep.* 1. *Essence of bergamotte*, 1 dr.; *English oil of lavender*, 25 drops; *oil of cloves*, *aromatic vinegar*, and *essence of musk*, of each, 10 drops; *alcohol*, ¾ *oz.*; mix.

2. *Oils of bergamotte* and *lavender*, of each, 30 *drops*; *neroli*, 15 drops; *oils of verbena* and *cloves*, of each, 5 drops; *essences of musk*, *ambergris*, and *jasmin*, of each, ½ dr.; *rectified spirit of wine*, (strongest), 2 *oz.*; mix. A highly fragrant and much esteemed perfume for the handkerchief, &c.

BRA GRAS. *Tar*, *black rosin*, and the *dregs of strained rosin*, melted together.

BRAINS. There appears to be scarcely anything which is at all eatable, that the ingenuity and taste of the modern cook does not appropriate to his purposes, and clothe with delectability, or transform into something execrable. We observe that our chef de cuisine, (no unimportant personage,) has taxed every viscera and brought together every novelty and dainty to humour and excite the appetite. Animals which were guiltless of brains whilst living, are found by him to possess excellent ones when dead, from which he prepares a variety of miniature dishes, which are truly novel and inviting. Let frugal housewives for the future carefully value their brains, and apply them to useful purposes in a double sense. When cleaned, washed, blanched, and flavoured with the necessary seasoning, they may be formed into a variety of hors-d'œuvres, creditable to any table. Mrs. Rundell tells us, that "beat up with a little *white pepper* and *salt*, a *sage-leaf* or two (scalded and finely chopped,) and the *yelk of an egg*, and fried, they make excellent cakes, fritters, &c." What Soyer, (that king of cuisiniers,) can therefore do with them, the reader can well anticipate.

BRAN. The inner-husk or *bran of wheat* when diffused through hot water, is largely employed by the calico printers to remove the colouring matter from those parts of their goods which are not "mordanted." A handful mixed with a pail of warm water forms an excellent *emollient foot-bath*. Infused in hot water (*bran tea*), and sweetened, it forms a popular demulcent, much used in coughs and hoarseness, and which, taken in quantity, proves gently laxative. It also forms an excellent manure, and, from containing the ammoniaco-magnesian phosphate, is especially adapted as a "dressing" for potatoes. It is frequently mixed with flour, and made into bread, (*bran bread*,) which is eaten by the poorer orders for economy, and by the higher classes because it is recommended by the faculty as being more wholesome than white wheaten-bread.

BRANDY. Syn. *Eau de Vie*,—Fr. *Spiritus Vini Gallici*,—Ph. L. *Spiritus Gallicus*, *Aqua Vitæ*, *&c.*,—Lat. var. *Brandy-wine*,—Obs. A well-known spirituous liquor obtained by the distillation of the wine of grapes. When first distilled, brandy is colourless, and only acquires a yellowish tint from the wood of the casks, in which state it is known and sold as "*pale brandy*" or "*white brandy*." The deep colour that this spirit usually possesses, is imparted to it by the addition of a little *colouring* (burnt sugar, or caramel); and, occasionally, of a little *red sanders wood* (rasped) as well. Catechu or terra Japonica, in powder or solution, is also frequently added. The original intention was to imitate the appearance acquired by brandy from great age, when kept in wood, but in process of time the thing has come to be overdone. The natural colour, which the spirit receives from the cask, however long it may have been kept in it, never exceeds a light amber tint, about equal to that of pale Jamaica rum; but the public taste has become gradually vitiated in this respect, until only a spirit of a lively and full "*brandy colour*" (unless for a pale brandy) will sell. The consequence is that more "colouring" is commonly added than is compatible with a rich appearance or fine flavour.

The brandies most esteemed in England are imported from France, and are those of Cognac and Armagnac, the preference being generally given to the former. The brandies of Rochelle and Bordeaux may be reckoned next in quality; while those obtained from Portugal, Spain, and Italy are very inferior. Those of commerce are readily distinguishable from each other by an experienced spirit-taster.

The *constituents* of *pure brandy* are *alcohol* and *water*, and small quantities of *volatile oil*, *acetic acid*, *acetic ether*, *œnanthic ether*, *colouring matter*, and *tannin.* It is from the presence of the last six of these substances that the spirit derives its characteristic smell and flavour. The per centage richness of brandy in alcohol varies from 48 to 55 per cent. When first imported it is generally 1 or 2 overproof, but its strength decreases by age, and by the time it is usually taken from the bond-store for sale, it is seldom stronger than 3 or 4 under proof. Pure brandies of the best quality seldom exceed proof, and are generally a little below it. The common practice in France is to add *spirit of wine* and *colouring* to raise the strength of the liquor before exporting it. This is done to any extent desired by the English purchaser, and the quantity and prices of the substances so added are regularly set out in the invoice. When the purchaser is not *well acquainted* with the trade, and desires a strong spirit at a low rate, the common practice is to sell him brandy so mixed as genuine. The *very finest brandies* average from 5 to 10 u. p., and never exceed 2 u. p,; they then contain more than ½ their weight of water, and from their boiling point being higher, they come over more fully charged with essential oil, and the other volatile and fragrant principles of the grape, and thus possess in a greater degree that peculiar aroma and flavour for which they are so much esteemed. French brandy or wine, distilled at a low temperature in a water bath, yields a very pure and almost flavourless spirit.

The quality of the brandy imported from France varies considerably from that which is drunk on the continent, principally from it being *prepared*, or, as it is technically termed "*made up*," for the London market; which means lowering it by the addition of spirit, colouring, &c., as above described. The common strength at which foreign brandy is sold in England is about 11 or 12 u.p.; when weaker than 17 u.p., it becomes seizable by the excise. The strength at which it is sold and "permitted" in the wholesale trade, is generally 10 u p., to which it is reduced by adding *water;* and it is never less than 12 u.p., unless a different strength has been agreed on at the time of sale. In large quantities and from bond, the strength of course, depends much upon the age and quality of the spirit; a fine old brandy being, perhaps, 8 or 10 u.p., while one of the last year's vintage of a commoner quality may be as strong as 2 u.p., or even 1 u.p. These matters are familiar to every experienced brandy dealer.

In France there are several varieties of brandy, which are known by names descriptive of their qualities and source:—

"*Eau de vie supérieure*," is obtained from pale white wines, by skilful distillation, and is remarkable for its superior flavour. It forms the finest variety of *Cognac brandy* of the English drinker. When it is kept in glass or stone bottles, it is called *white brandy;* when in casks, (but has not been artificially coloured,) "*pale brandy.*" The latter, which has a pale amber tint, is also called *white brandy* by the inexperienced.

"*Eau de vie ordinaire*," or *common brandy*, is distilled from inferior or spoilt white or red wines; sp. gr. about 0·948, (from 22 to 27 u.p.)

"*Eau de vie de marc.*" From the lees of sour, damaged, and inferior red wines, the marc or cake of grapes, &c., distilled by a quick fire, to drive over as much essential oil and flavouring matter as possible. Used, chiefly to mix with other brandy, or to flavour plain spirit.

"*Eau de vie seconde.*" The weak spirit that passes over, after the receiver has been changed. Very weak and inferior.

"*Eau de vie à preuve d'Hollande.*" Sp. gr. about ·9420, (19° Baumé, or 20 u.p.) The common strength at which brandy is retailed in France, and at which it will stand the "*proof*" or "*bead.*"

"*Eau de vie à preuve d'huile.*" Sp. gr. ·9185, (23° Baumé, or 1 ½ o. p.); pure olive oil just sinks in it. It is the strongest brandy retailed in France.

"*Eau de vie' forte.*" From common brandy. It answers to our spirit of wine. Sp. gr., about ·839, (38° Baumé, or 55 o. p.)

"*Esprit de vin*" is brandy or spirit, rectified to 0·861, (28° Baumé, or 42 o. p. and upwards.)

Pur., &c. The method of determining the strength of brandy is explained under "Alcoholmetry." Of the large quantity of this liquor consumed in England, we can assure the reader, that a small fraction only escapes adulteration. Pure French brandy, is indeed an article quite unattainable by the small consumer. The brandy of our shops and taverns is not only systematically "lowered" a little (with spirit of wine or British brandy) by the wholesale dealer, but it undergoes a like process at the hands of the retailer. The only method to obtain perfectly pure brandy is either to take it direct from the bond store, without allowing it to *enter* a private cellar even for an hour, or to buy it of some known respectable party, and to pay a price that offers no inducement to dishonesty. When this cannot be done, British brandy had better be at once purchased, by which money will be saved, and a more wholesome article obtained.

French brandy, as already noticed, is commonly "lowered" with water, malt brandy, and spirit of wine, by which its original flavour is more or less weakened or modified. This species of adulteration is best detected by the "palate." Another, and no very uncommon fraud practised by the retailers, is to reduce their brandy with a larger quantity of water than the strength fixed by the excise laws and honesty to their customers will permit. As a natural consequence their liquor suffers so greatly in flavour, and its deficiency in alcohol becomes so apparent, that they soon see the necessity of either abandoning the nefarious practice, or resorting to others of a like kind to disguise it. The latter alternative is commonly adopted. An excess of sugar colouring, (*burnt sugar,*) is immediately introduced into the spirit, followed by sundry portions of cayenne pepper, grains of paradise, horse-radish, acetic acid, almond cake, and other flavouring and acrid substances, to give it a pungency and "make-believe strength" that "passes muster" with the petty consumer. This fraud may be detected by gently evaporating a little of the suspected liquor in a spoon or glass capsule, when the acrid matter, colouring, and sugar, will be left behind, and may be readily detected by their flavour, sweetness, glutinosity, &c. A little perfectly pure brandy evaporated in a similar manner, (on a watch-glass for instance,) merely leaves an extremely trifling discoloration on the surface. Genuine French brandy always reddens blue litmus paper, from containing a little acetic acid; the old coloured varieties are also blackened by a solution of a persalt of iron. Sometimes brandy is contaminated with a small quantity of lead or copper, derived from the apparatus or utensils with which it has been prepared or measured. Sugar of lead has also been used by the ignorant to clarify it. The presence of these highly deleterious substances may be detected in the following manner:—

1. (Copper).—*a.* A small piece of clean polished iron or steel immersed in the suspected liquid for a short time, (with agitation,) becomes coated with a film of metallic copper when that metal is present. To facilitate the precipitation of the metal, the sample under examination may be slightly acidulated with a few drops of pure acetic acid. Minute traces of copper may sometimes be detected on the surface of the iron with a lens, which would be passed over unnoticed by the naked eye.

b. (Böttger). A little of the brandy is to be agitated with a few drops of pure olive oil. The latter will acquire a green colour if copper is present.

2. (Lead).—*a.* Sulphuretted hydrogen and hydrosulphuret of ammonia produce a black precipitate in brandy containing lead.—*b.* A solution of sulphate of soda, (*Glauber salts,*) or water soured with sulphuric acid, produces a heavy white precipitate, which turns black when moistened with hydrosulphuret of ammonia.

Concluding Remarks. In the "trade," the addition of water (*liquor*) to spirit is technically called "*reducing;*" whilst absolute adulteration is known under the questionable name "*improving.*" Both of these operations have now been so long practised with impunity as to form the leading qualifications demanded in a "cellarman." Indeed the adulteration of liquors of every class is the "*rule;*" NOT the "*exception.*" Yet such is the poverty of palate of the majority of English brandy drinkers, that this adulteration is often not suspected, much less *detected*, even when it is carried to the most fraudulent extent. So long as the foreign spirit constitutes about ½ of the mixture, and was at first of decent quality and age, the infatuated brandy-drinker smacks his lips, and cunningly holding up his glass between the light and his eye, exclaims, "Ah! this is a drop of the real." See *Spirit*, *Alcoholmetry*, *&c.*

The following formulæ for "*reducing brandy*" are those of two large wholesale dealers, who deliberately assured us that they conceived themselves more honest than their brethren in the same line:—

1. *Cognac brandy*, (10 u.p.), 20 gall.; *British* or *malt brandy*, (good,) 5 gall.

2. To 72 gallons of *full flavoured* French brandy, add 10 gallons of *spirit of wine* (58 o. p.), 8 gallons of *water*, and 1 pint of *good colouring;* "rummage" up well, and let it stand two days.

3. *French brandy*, and *patent brandy* (i.e. best malt brandy), equal parts.

BRANDY (British). Syn. *Malt brandy*, *British Cognac*, *&c.* For a long time this liquor was distilled from spoiled wine and dregs of wine, both British and foreign, mixed with beer bottoms, spoiled raisins, and similar articles. Malt and molasses spirit were afterwards employed, as at the present day, for the purpose; but it was long considered as "an unpardonable and wicked misuse of these articles." Modern experience, however, has proved, that perfectly pure and tasteless malt spirit is the best article to use as the basis of an imitation brandy.

Prep. 1. To *malt spirit*, (the finest, flavourless, at proof; or, if of a different strength a proportionate quantity,) 12 gall.; add *water*, 5 gall.; *crude red tartar* or *wine-stone*, ¾ *lb.;* (previously dissolved in) *boiling water*, 1 gall.; *acetic ether* 6 *fl. oz.;* *French wine vinegar*, 2 quarts; *French* plums, (bruised,) 5 *lb.;* *wine bottoms* or *flavour stuff* (from Cognac,) 5 quarts; mix in a fresh-emptied sherry cask, and let them stand together for 14 days, frequently rummaging up the liquor with a stick; next draw over 15 gallons of the mixture from a still furnished with an agitator. Put the rectified spirit into a clean, fresh emptied Cognac brandy cask, and add thereto of *tincture of catechu*, ¾ pint; *oak shavings*, (fresh and clean,) 1 *lb.;* and *spirit colouring*, (about) a pint; Agitate occasionally for a few days, when it will be fit for use.—*Prod.* 15 gallons of brandy, 17 u.p. Age improves it.

2. *Pure spirit*, (as before,) 99 gall.; *red tartar*, (dissolved,) 7 *lb.;* *acetic ether*, ½ gall.; *wine vinegar*, 4 gall.; *bruised raisins* or *French plums*, 14 *lb.;* *bitter almonds*, (bruised) 1 *oz.;* *water*, q. s.; macerate as before, and draw over 120 gallons. To the *distilled spirit* add a *few lb. of oak shavings*, 1 *lb.* of *powdered catechu* (made into a paste with water), and *burnt-sugar colouring*, q. s., as before.—*Prod.* 120 gallons of spirit fully 17 u.p. Equal in quality to the last.

3. *Clean spirit*, (17 u. p.), 100 gall.; *nitric ether*, 2 quarts; *cassia buds*, (ground,) 4 *oz.;* *bitter almond meal*, 2 *oz.;* *orris root*, (sliced,) 6 *oz.;* *powdered cloves*, 1 *oz.;* *capsicum*, 1½ *oz.;* *good vinegar*, 2 gall.; *brandy colouring*, 3 pints; *powdered catechu*, 1*lb.;* *full flavoured Jamaica rum*, 2 gall.; mix in an empty cognac "piece," and macerate for a fortnight, occasionally stirring.

4. *Malt spirit*, (17 u. p.), 100 gall.; *catechu*, 12*oz.;* *tincture of vanilla*, ½ pint; *burnt-sugar colouring*, 1 quart; *good rum*, 3 gall. or more; *acetic* or *nitric ether*, 2 quarts; mix as the last.

5. *Clean spirit*, (17 u.p.), 89 gall.; *high flavoured cognac*, 10 gall.; *oil of cassia*, 2 dr.; *oil of bitter almonds*, 11 dr.; *powdered catechu*, 1 *lb.;* *cream of tartar*, (dissolved,) 1¼*lb.;* *Beaufoy's concentrated acetic acid*, 3 pints; *sugar colouring*, 1 quart, (or more;) *good rum*, 1 gallon. When the above mixtures are distilled, the *French brandy*, *colouring*, *catechu*, and *tartar*, should be added to the distilled spirit.

6. To *plain spirit*, (coloured,) at 17 u. p., add a little *tincture of catechu*, and a sufficient quantity of *eau de vie de marc*, or of the *oil distilled from wine lees*, to flavour.

Obs. The oil referred to in the last formula is obtained by distillation from the lees of wine, either dried and made up into cakes, or in their wet state, mixed with about 7 or 8 times their weight of water. This oil should be dissolved in alcohol, and kept in this state, as it is apt to lose its flavour. The spirit produced by this, as well as the other forms above, is better for distillation. The brandy from any part of the world may be very closely imitated, by distilling the oil from the lees of the wines produced in the particular district. A certain writer recommends a pound each of *finely powdered charcoal* and *ground rice* to be digested in a gallon of *plain spirit* for a fortnight, to convert it into brandy; but we do not see it can effect that object. Where *black tea* is cheap, as in the United States of America, it is very commonly employed to impart the roughness and flavour of brandy to coloured spirit. A good article of cider spirit thus treated, forms a passable "mock brandy." In conclusion, we may remark, that as the strength and quality of ingredients frequently vary, and success depends greatly on skill in manipulation, much must be left to the experience, judgment, and discretion of the operator. The production of a flavoured British spirit closely resembling French brandy, is a subject well worthy of the attention of the ingenious chemist, rectifier, and cellarman, as a matter of profit; and of the amateur, as affording an interesting field for useful and amusing experiment.

BRANDY (Caraway). *Prep.* 1. *Caraway seeds*, (bruised,) 4 *oz.; lump sugar*, 2 *lb.; British brandy*, 1 gall.; macerate a fortnight, occasionally shaking the bottle.

2. *Sugar*, 1 *lb.; caraways*, (bruised,) 1 *oz.;* 3 *bitter almonds* (grated); *spirit colouring*, 1 *oz.; plain spirit*, (or *gin*, 22 u. p.,) ½ gall.; as before.

3. As the last, but using 1 quart each of *rectified spirit of wine* and *water*, instead of the plain spirit there ordered. Some persons also omit the colouring.

BRANDY (Cherry). *Prep.* 1. *Brandy* and *cherries* (crushed), of each, 1 gall.; let them lie together for 3 days, then express the liquor, and add 2 *lb.* of *lump sugar*; in a week decant the clear portion for use.

2. To the last add 1 quart of *raspberry juice*, and ½ a pint of *orange-flower water*. Both the above are excellent.

3. *Treacle*, 1 cwt.; *spirit* (45 u. p.), 41 gallons; *bitter almonds* (bruised), ½ *lb.;* (or more or less to taste;) *cloves*, 1 *oz.; cassia*, 2 *oz.;* macerate a month, frequently stirring. This is the article now very commonly vended for cherry brandy.

Obs. Equal parts of fully ripe Morello cherries and black cherries produce the richest cordial. Some persons prick each cherry separately with a needle instead of crushing them; in which case they retain them in the liquor, and serve up a few of them in each glass. The plan named in the first formula is, however, that usually adopted. On the small scale, the fruit is commonly bruised between the fingers. A portion only, (if any,) of the stones in the cherries should be crushed, to impart a nutty flavour.

BRANDY (Cider). From *cider* and *perry*, and the *marc* of *apples* and *pears*. It is largely manufactured in the United States of America and in Canada, where it may be purchased for about 2*s.* 1*d.* a gallon. An illicit distillation of this spirit is frequently carried on by the farmers of the West of England.

BRANDY (Dantzic). From *rye*, ground with the *root* of *calamus aromaticus*. It has a mixed flavour of orris and cinnamon.

BRANDY (Lemon). *Prep.* 1. *Fresh lemons*, (cut in slices,) 1 dozen; *brandy*, 1 gallon; macerate for a week, press out the liquor, and add of *lump sugar*, 1 *lb.*

2. *Proof spirit*, 7 gall.; *essence of lemon*, 3 dr.; *sugar*, 5 *lb.; tartaric acid*, 1 *oz.;* (dissolved in) *water*, 2 gallons; *colouring*, q. s. Sometimes *milk* is added to the above, in the proportion of 1 quart (boiling hot) to every gallon.

BRANDY (Malt). See *British Brandy.*

BRANDY (Orange). *Prep.* 1. As lemon brandy, but employing oranges.

2. To each of the above add *orange-flower water*, 1 pint.

BRANDY (Pale). This article has been already referred to. (See *Brandy.*) That of the gin shops and publicans is generally made by the admixture of about equal parts of their *best brown French brandy, clean spirit of wine*, and *soft water*, "rounced together," and allowed to stand until the next day to "fine down." If the *first* is 9 u.p., and the *second*, 58 o.p., the product will be 17 u.p. Any deficiency of strength may be made up by adding a little spirit of wine.

BRANDY (Peach). From *peaches*, by fermentation and distillation. Much used in the United States, where peaches are plentiful and cheap. A *cordial spirit* under the same name is prepared as follows:—

1. From *peaches*, sliced and steeped in twice their weight of *British brandy* or *malt spirit*, as in making Cherry brandy.

2. *Bitter almonds*, (bruised,) 2 *oz.; proof spirit*, (pale,) 10 gall.; *water*, 3 gall.; *sugar*, 5 or 6 *lb.; orange-flower water*, ½ a pint; macerate for 14 days. Add *brandy colouring*, if *required* darker.

BRANDY (Raspberry). From *raspberries*, as directed under Cherry brandy. Sometimes a little cinnamon and cloves are added. The only addition, however, that improves the flavour or bouquet, is a little *orange-flower water*, a *very little essence of vanilla*, or a single drop of essence of *ambergris.*

BRASS. This useful alloy of copper and zinc, is now generally manufactured by plunging the *copper*, in slips, into the *zinc*, melted in the usual manner. The former metal rapidly combines with the fluid mass, and the addition is continued until an alloy is formed, somewhat difficult of fusion, when the remainder of the copper is at once added. The brass thus formed is broken into pieces, and remelted under charcoal, and a proper addition of either zinc or copper made, to bring it up to the colour and quality desired. It is next poured into moulds of granite. Before being submitted to the rolling-press for reduction to *thin* plates, it undergoes the operation of annealing.

Prep. The proportions of the metals forming this alloy are varied according to the desired colour and the purposes to which it is to be applied. The following formulæ are founded, chiefly, on analysis of standard brasses and yellow metals, made expressly for this work. Small fractions are omitted; the nearest whole number being generally taken.

1. (*Fine Brass.*)—*a.* From *copper*, 2 parts; *zinc*, 1 part; either combined as explained above, or the two metals separately melted, suddenly poured together, and united by vigorous stirring.

b. From *copper*, 7 parts; *zinc*, 3 parts. Bright yellow; malleable.

c. From *fine copper*, 4 parts; *zinc*, 1 part. Deeper coloured than the last; an excellent and very useful alloy.

2. (*Malleable Brass.*)—*a.* From *copper*, 33 parts; *zinc*, 25 parts; as before.

b. From *copper*, 3 parts; *zinc*, 2 parts. These alloys are malleable whilst hot.

3. (*Red Brass.*) This name has been applied to all those alloys which do not contain more than 18% to 20% of zinc. In the deeper-coloured foreign varieties (*red tombac*) the per centage of copper occasionally amounts to 88%, 90%, or even 92%.

4. (*Yellow Brass.*) See *fine brass*, (above.)

5. (*Brass for Buttons.*)—*a.* From *copper*, 8 parts; *zinc*, 5 parts. This is the "*platin*" of the Birmingham makers.

b. From *yellow brass*, 16 parts; *zinc*, 2 parts; *tin*, 1 part. Paler than the last.

c. From *copper*, 25 parts; *zinc*, 20 parts; *lead*, 3 parts; *tin*, 2 parts. Pale; used for common buttons.

6. (*For fine castings.*)—*a.* As *fine brass*, according to the colour desired. (See *above.*)

b. From *copper*, 62 parts; *zinc*, 35 parts; *lead*, 2 parts; *tin*, 1 part.

c. From *copper*, 60 parts; *zinc*, 36 parts; *tin*, 4 parts. Both the above are rather pale and brittle.

d. From *copper*, 90 parts; *zinc*, 7 parts; *tin*, 2 parts; *lead*, 1 part. Rich deep colour.

e. From *copper*, 91 parts; *zinc*, 5 parts; *tin*, 3 parts; *lead*, 1 part; as the last.

7. (*For gilding.*)—*a.* As *fine brass*, (above.)

b. From *copper*, 64 parts; *zinc*, 32 parts; *lead*, 3 parts; *tin*, 1 part.

c. From *copper*, 82 parts; *zinc*, 18 parts; *tin*, 3 parts; *lead*, 1 part.

8. (*For solder.*)—*a.* From *fine brass*, 12 parts; *zinc*, 6 parts; *tin*, 1 part; melted together.

b. From *brass*, 2 parts; *zinc*, 1 part; as before.

c. From *brass*, 3 parts; *zinc*, 1 part. Very strong. *Used* for soldering tubes and other like purposes requiring great strength. The above alloys form the "*hard solder*" of the braziers. For certain purposes a little silver is added to them, when the compound receives the name of "*silver solder.*"

9. (*For turning.*)—*a.* From *fine brass*, 98 parts; *lead*, 2 parts; melted together.

b. From *copper*, 61 parts; *zinc*, 36 parts; *lead*, 3 parts.

c. From *copper*, 65 parts; *zinc*, 33 parts; *lead*, 2 parts.

10. (*For wire.*)—*a.* From *copper*, 72 parts; *zinc*, 28 parts; properly annealed.

b. From *copper*, 64 parts; *zinc*, 34 parts; as before.

c. To the last add of *lead*, 2 parts.

Analysis.—*a.* Digest 100 gr. of the alloy in *nitric acid.* The insoluble portion is *peroxide of tin*, every 74 gr. of which, when washed and dried, are equivalent to 58 gr. of METALLIC TIN.

b. Add to the nitric solution *sulphuric acid*, as long as a white precipitate falls. After a time, collect this on a filter, wash it with a mixture of *water* and *alcohol*, and ignite it in a porcelain crucible. Every 152 gr. of the residuum is equivalent to 104 gr. of METALLIC LEAD.

c. The liquor is filtered from the precipitate of sulphate of lead, and treated with a stream of *sulphuretted hydrogen;* the precipitate collected on a filter, washed with *water* mixed with a little *sulphuretted hydrogen*, dried, and digested in *pure nitric acid* until the separated sulphur acquires its full yellow colour; the resulting solution diluted with *water*, and reprecipitated with *potassa;* the whole being boiled until the precipitated protoxide of copper becomes deep brown or black; and the latter collected on a filter, washed, dried, ignited in a platinum crucible, and weighed therein immediately after it becomes cold, gives the weight of pure protoxide of copper, every 40 gr. of which are equivalent to 32 gr. of PURE COPPER.

d. The liquid poured from the precipitate of sulphuret of copper, boiled for a minute, precipitated with a *solution* of *carbonate of soda*, the whole boiled a few minutes, the precipitate collected, washed, dried, and ignited, consists of *oxide of zinc*, of which every 40 gr. are equal to 32 of METALLIC ZINC.

Concluding Remarks. In the adoption of his formula, the operator must be entirely led by the object he has in view. The larger the proportion of *copper*, the deeper will be the colour, and the greater the density, and, within certain limits, the toughness of the alloy. *Zinc* lessens its specific gravity and colour. *Tin* gives it hardness and grain; whilst *lead* toughens it, and renders it fitter for turning. This is known to every experienced brass-founder. See *Alloys, Copper, Mosaic Gold, Prince's Metal, Tombac, &c.*

BRASS COLOUR. Syn. *Brass Pigment, Brass Bronze. Prep.* 1. Grind *copper filings* or the *precipitated powder of copper*, with a little *red ochre.* Red-coloured.

2. *Gold-coloured brass*, or *Dutch leaf* reduced to a very fine powder. Yellow or gold-coloured.

Obs. Both these powders are used mixed up with any pale varnish; no more being worked up at once than is wanted for immediate use. They are also applied by dusting them over any surface previously covered with varnish to make them adhere.

BRASS PASTE. *Prep.* 1. *Soft soap*, (in fine powder,) 2 *oz.; rotten-stone*, 4 *oz.;* beaten to a paste.

2. *Rotten-stone* made into a paste with *sweet oil.*

3. *Rotten-stone*, 4 *oz.; oxalic acid*, 1 *oz.; sweet oil*, 1½ *oz.; turpentine*, q. s. to make a paste.

Obs. The above are *used* to clean brass-work, when neither *varnished* nor *lacquered.* The first and last are best applied with a *little water.* The second, with a *little spirits of turpentine*, or *sweet oil.* Both require friction with soft leather. (See *below.*)

BRASS STAIN. *Prep.* 1. *Sheet brass* is cut into small pieces, and exposed to a strong heat for 2 or 3 days, then powdered and again further exposed in a like manner for several days; the whole is then reduced to powder, and exposed a third time to heat, testing it occasionally, to see if it be properly burnt. When a little of it fused with glass makes the latter swell and froth up, the process is complete. It imparts to glass a green tint, passing into turquoise.

2. *Plate-brass* and *sulphur*, equal parts, are stratified together in a crucible, and calcined, until they become friable; the whole is then reduced to powder, and exposed to heat as before. This imparts a calcedony red or yellow tinge to glass by fusion; the precise shade of colour being modified by the mode of using it.

Obs. The common practice in the glass-houses is to conduct the calcination by exposing the metal, placed on tiles, in the "leer" or "annealing arch" of the furnace, a plan both convenient and economical.

BRASS-WORK. Articles of *brass* and *copper*, when not varnished or lacquered, may be CLEANED and POLISHED with *sweet oil* and *tripoli, rotten-stone*, or *powdered bath-brick*, rubbed on with flannel and finished off with leather; due care being taken to ensure the absence of anything gritty, which would scratch and disfigure the surface of the metal. A strong *solution of oxalic acid* in *water* gives brass a fine colour. *Vitriol* and *spirits of salts* make brass and copper very bright, but the polish thus obtained soon tarnishes, and the articles consequently require more frequent cleaning. A strong *ley of roche-alum and water* also improves the appearance of brass. In all cases where acids or saline matter is used, the metal should be well rinsed in clean water, and then wiped dry, and finally dry polished with soft leather.

Brass inlaid work may be cleaned with *tripoli* and *linseed oil*, applied by a *rubber of felt* or *leather;* afterwards rubbing off the whole with clean soft leather. The ornaments of a French clock, are said to be best cleaned with *bread-crumb*, carefully rubbed, so as not to injure the wood-work. *Or-molu candlesticks, lamps*, and *branches*, may be cleaned with *soap and water. Lacquered* and *gilded articles* are spoiled by frequent rubbing, and by acids and alkaline leys.

A fine colour may be given to *brass ornaments*, when *not* gilt or lacquered, with a little *sal ammoniac*, in fine powder, moistened with *soft water.* The articles must be afterwards rubbed dry with *bran* and *whiting. Another plan* is to wash the brass-work with a *strong ley of roche alum*, (1 *oz.* to *water*, 1 pint;) and after rinsing it in *clean water* and drying it, to "finish it off" with *fine tripoli.* These processes will give to brass the brilliancy of gold.

BRASSING. Syn. *Brass Coating.* 1. *Copper plates* and *rods* may be covered with a superficial coating of brass, by exposing them in a heated state to the fumes given off by *melted zinc* at a high temperature. The coated plates and rods are rolled into thin sheets or drawn into wire. The spurious gold wire of Lyons is said to be thus made.

2. *Vessels of copper* may be coated with brass, internally, by filling them with *water strongly soured with hydrochloric acid*, adding some *amalgam of zinc* and *cream of*

tartar, and then boiling the whole for a short time. This plan may be usefully applied in certain cases to copper boilers in laboratories, and to other purposes.

BRAWN. When young, the horny parts feel moderately tender; if the rind is hard, it is old. (Mrs. Rundell.)

BRAWN (Mock). *Prep.* "Take the *head* and *belly piece of a young porker*, well saltpetred; split the head and boil it; take out the bones and cut it to pieces; then take *four ox-feet*, boiled tender, and cut them in thin pieces; lay them in the belly piece with the head cut small; roll it up tight with sheet tin, and boil it four or five hours. When it comes out set it up on one end, put a trencher on it, within the tin, press it down with a heavy weight, and let it stand all night. The next morning take it out of the tin and bind it with a fillet, put it into cold salt and water, and it will be fit for use; it will keep a long time, if fresh salt and water are put into it every four days." (New Syst. of Cookery.)

BRAZIL WOOD. Syn. *Sapan Wood, Saint Martha do., Pernambuco do.* This wood is much used in dyeing various shades of red. A decoction is made by boiling it for some hours in *hard spring water*, and is generally kept for some time, or until it undergoes a species of fermentation, as it is thus found to yield more permanent and beautiful colours, than when employed fresh.

1. (*For cotton* and *linen.*)—*a.* The goods are first boiled in a *bath of sumach*, next worked through a *weak mordant of solution of tin*, and then run through the Brazil bath, lukewarm. This gives a *bright red*.

b. The goods are "alumed," rinsed, a *mordant of solution of tin* given them, rinsed again, and then turn them through the dye-bath. This gives a *rose colour*.

2. (*For silk.*) The silk after being "*alumed*" in the same way as wool, but at a *lower temperature*, is rinsed, and passed through the *decoction-of-Brazil-wood bath*, just lukewarm.

3. (*For wool.*) Boil the wool in a *weak mordant* of *alum* and *tartar*, for 1 hour, then let it lie in the cold liquor for 2 or 3 days, frequently moving it about; lastly, boil it in a *decoction-of-Brazil-wood bath* for ½ an hour.

Obs. The shades of colour given with Brazil wood may be modified by varying the strength of the bath, the mordant, &c. The addition of a little *alum* turns it on the *purple*. A *little alkali* added to the bath, or by passing the goods, after being dyed, through *water holding a little alkali in solution*, produces what is called the false crimson. For a deeper crimson a *little logwood* is added to the *Brazil-wood bath*. 1 *lb.* of *Brazil-wood*, ½ *oz.* of *alum*, and 2 *oz.* of *tartar*, will dye 20 to 25 *lb.* of *cotton.*

BRAZILINE. Syn. *Brezeline, Sapanine.* The colouring matter of Brazil wood. It forms small orange-coloured needles, soluble in both water and alcohol; alkalies turn it violet; acids turn it yellow.

BRAZING. This term is applied to the operation of uniting the edges of pieces of copper, brass, iron, &c., by means of *hard solder*.

Proc. The edges, after being filed or scraped quite clean, are covered with a mixture of *hard solder* and *powdered borax*, made into a paste with *water*. The whole is then allowed to dry, and is afterwards exposed in a clear fire to a heat sufficient to melt the solder.

BREAD. This important article of food is made of the flour of different grains, but only those that contain gluten admit of conversion into light spongy bread. On this account wheat flour makes the best bread. When flour is made into a paste or dough with water, and this dough, previously to baking, is left for sometime in a moderately warm place, a state of fermentation comes on, owing to the sugar of the flour gradually undergoing the process of conversion into alcohol, which resembles in every respect the same change which takes place during the fermentation of wine and beer. In this process a large quantity of carbonic acid gas is liberated, and the toughness of the dough preventing its escape, the whole mass becomes puffed up and spongy, and a light porous paste is formed, the porosity of which is still further increased by the heat of the oven. The natural process of fermenting the dough just described, is, however, tedious and uncertain, whilst the dough has a tendency to run into the acetous fermentation, and to acquire a sour and disagreeable taste, by which it is rendered less nutritious and easy of digestion. This has led to the use of a *ferment*, which produces a similar condition more speedily. *Leaven* or *dough* was originally employed for this purpose, and the bread so made was hence called *leavened bread.* At the present time barm or yeast is wholly used for this purpose. All that is essential to make a loaf of bread, is to add a proper quantity of yeast to the dough, and to allow it to remain for a short time in a warm place, and as soon as it rises or becomes spongy, to subject it to the process of baking.

In preparing his dough, the modern

baker takes a part of the water needed for the batch, and having rendered it lukewarm or tepid (80° to 90°,) by the addition of *boiling water*, dissolves his salt therein, and adds the *yeast*, together with a *portion of the flour*. With these he forms a thin dough, which he sets aside in a moderately *warm place*, usually provided for the purpose, and called the "*kneading trough*," or "*tryer*," where it soon begins to ferment and swell up. This process is called "*setting the sponge*," and according to the proportion the water in it bears to the whole quantity that is to be used, it receives the name of "*whole*," "*half*," or "*quarter sponge*." Here, the sponge heaves and swells, and ultimately the surface bursts and subsides, and if not checked, swells again and again in a similar manner, and would continue to do so, until the whole of the saccharine matter was destroyed, and the dough had become sour. The baker is careful, however, to stop it before it has communicated a sourness to the mass. After the *first*, or at the *furthest*, after the *second* or *third* "*dropping of the sponge*," he adds the remaining quantity of *flour*, *water*, and *salt*, necessary to form the batch, and kneads the mass until it becomes sufficiently tough and elastic to bear the pressure of the hand without adhering to it. The dough is now left to itself for a few hours, during which the fermentation still goes on. The inflated mass is then again kneaded, cut into pieces, weighed, and shaped into loaves. In an hour or two, these unbaked loaves swell up to nearly double their former size, and are then placed in the oven and baked. During this operation they continue for a time to increase in size, in consequence of the dilation of the pent-up gas by the heat of the oven. At length, the fermentation is checked, and the dough becomes too solid to *admit* of further alteration.

Such are the *principles* and *practice* of the *art of baking*. The operations are precisely the same on both the *small* and *large scale*, and therefore need not be separately described.

Adult. The adulteration of both flour and bread is carried to a fearful extent, more especially in London. "The *bakers' flour* is very often made of the worst kinds of damaged foreign wheat, and other cereal grains are mixed with them in grinding them into flour. In this capital, no fewer than *six* distinct kinds of wheaten flour are brought into the market,—*fine flour*, *seconds*, *middlings*, *fine middlings*, *coarse middlings*, and *twenty-penny flour*. Common garden beans and peas are also frequently ground up among the London bread flour." (Accum.)

Among the principal substances which have been used to adulterate wheat flour and bread are the following:—

**Alum.
*Ammonia (Carbonates).
**Beans.
*Bone dust.
*Chalk.
Clay.
Copper (Sulphate).
Lime, (Sulphate from the soda water makers.)
*Magnesia (Carbonate).
*Plaster of Paris.
*Potash (Carbonate and bicarbonate).
**Potatoes.
**Rice.
**Soda (Carbonate and sesquicarbonate).
*Starch (Potato).
**Water (in excess).
Zinc (Sulphate).

Of the above, those marked thus * are very frequently used, and those marked thus **, almost universally so.

According to Mr. Accum, "the smallest quantity of alum that can be employed with effect to produce a white, light, and porous bread, from the inferior kinds of flour, is from 3 to 4 oz. to a sack of flour weighing 280 *lb.*" But Dr. P. Markham states in his 'Considerations on the Ingredients used in the Adulteration of Flour and Bread,' that the ordinary bread of the London baker is made of *one sack* or 5 *bushels of flour;* 8 *oz. of alum;* 4 *lb. of salt;* ½ *gall. of yeast;* and about 3 *gall. of water.*

Alkaline substances, as the *carbonates of ammonia*, *soda*, and *potash*, are added to realise the important consideration of producing light and porous bread from spoiled, or, what is technically called, *sour flour*. The first salt becomes temporarily converted into a gaseous substance during the operation of baking, causing the dough to swell up into air bubbles, which carry before them the stiff dough, and thus renders it light and porous; the salt itself is at the same time, for the most part, volatilized during the operation of baking. *Alum* is added, not only with a like intention, but also to enable the dough to "carry" more water. There are several instances of *convictions on record*, of millers and bakers having used gypsum, chalk, and pipeclay, in the manufacture of their goods. A gentleman, lately writing from the north of England, says, that he found in one sample of flour which he recently examined, upwards of 16 *per cent. of gypsum*, and in another, 12 *per cent. of the same earth.*

A few years since it was discovered that some of the bakers in France and Belgium added *blue vitriol* to their dough to make it take more water, in the same way as the English baker uses alum. 1 *oz.* of this *sulphate* was dissolved in a *quart of water,* and a wine-glassful of this solution added to the *water necessary to make about* 50 4 *lb. loaves.* This enormous crime was soon detected and caused the ruin of its heartless perpetrators.

Exam. The principal adulterants above referred to are fortunately easy of detection. The following are the simplest and most approved methods for this purpose:—

1. *Alum.* — *a.* (Robine and Parisot.) About $\frac{1}{4}$ *lb.* of the *suspected bread* (somewhat stale or dry) is reduced to crumbs, macerated for 2 or 3 hours in *cold water,* and then squeezed through a clean piece of white linen. The liquid is next evaporated to dryness at a steam heat, the residuum redissolved in a little *hot water,* and the solution filtered. *Liquor of ammonia* or a *solution of sal ammoniac,* and *a solution of chloride of barium,* added to the filtered liquid, will give a white precipitate, if alum is present.

b. (M. Kuhlman.) 4 or 5 *oz.* of bread are reduced to ashes, which are powdered and treated with *nitric acid,* the mixture evaporated to dryness, and about 1 *oz.* of *hot water* added. A little *caustic potassa* is added to the last solution, (unfiltered,) the whole boiled a few minutes, and passed through a filter. The filtrate is next tested with a solution of sal ammoniac, and the whole again boiled for 2 or 3 minutes. If a precipitate forms it is alumina; every 50 gr. of which are equivalent to 332 gr. of crystallized alum.

2. *Copper.* — *a.* Moisten the crum of the suspected bread with a few drops of *solution of ferrocyanide of potassium.* It will assume a pinkish-brown colour if copper is present.

b. A little of the bread may be steeped in *hot water,* and the clear liquor poured off, and tested with *ferrocyanide of potassium,* as before.

3. *Magnesia.* Bread adulterated with magnesia, digested in *hot water acidulated* with *sulphuric acid,* furnishes a liquid which gives a white precipitate when tested with a *solution* of either *carbonate of potassa* or of *soda,* especially on boiling.

4. *Soda; Potassa.* Hot water after digestion on the ashes or charcoal turns turmeric paper brown. The liquid is evaporated to dryness, redissolved in *distilled water, slightly* acidulated with *hydrochloric acid,* and tested with *bichloride of platinum.* If a yellow crystalline precipitate is formed, either at once or after some hours, it is *potash;* otherwise, the alkali present is *soda.*

5. *Chalk, whiting, burnt bones, plaster of Paris,* and *similar substances,* are easily detected by burning a little of the flour or bread in a clean open vessel, when the amount of ashes left will indicate the quantity of adulteration. The quantity of ashes left by genuine flour is very trifling indeed, (about 2%.)

Concluding Remarks. A number of processes are used by cooks and confectioners to make the different varieties of *fancy bread, cakes, puddings, &c.,* most of which vary according to the peculiar characteristic it is desired to communicate to them; but none of these articles properly belong to the trade of the common baker. Thus some kinds of *cakes* and *pastes* are made to eat "*short,*" as it is called, or are rendered less tenacious, and a species of brittleness imparted to them by the addition of *starch* and *sugar.* In pastry a similar effect and peculiar lightness is produced by *butter* or *lard,* whilst in some articles, *white of egg, gum water, isinglass,* and other adhesive substances are added to produce an exceedingly light and porous mass.

The different varieties of bread made in England vary in their quality, chiefly according to the flour of which they are formed. *The best white bread* is made from the purest wheat flour; *ordinary wheaten bread,* of flour, to which a little of the finest bran has been added; *seconds,* from flour containing a still larger proportion of bran, and *common household bread,* from flour, produced by grinding the whole substance of the grain without *any* separation of the bran. The last variety is undoubtedly the most wholesome and nutritious, although that least frequently used. *Symnel bread, manchet* or *roll bread,* and *French bread,* are varieties, made of the purest flour, from the finest wheat, a little milk being usually added for rolls, and butter and eggs for choicer purposes. Several other minor kinds of bread are also made, varied by the addition of sundry trifles, as *sugar, currants,* and other palatable ingredients. The *Scotch "short bread"* is made from a *very thick dough,* to which *butter, sugar, orange peel,* and *spices* are added, according to the taste of the maker.

In the manufacture of white bread from damaged or inferior flour, a large quantity of alum is employed by the bakers, but with the best flour no alum is required. The utmost beauty, sponginess, and sweetness, may be given to bread without the addition of *one particle* of alum, provided the *best* *materials* are employed. As such is not, however, generally the case, the common practice with the bakers is to introduce 4 or 5 *oz.* of alum to every sack of flour, or about 1 *oz.* to each bushel; but very frequently fully *double this quantity of alum is employed.* The method of detecting this pernicious adulteration has been already explained. The proper quantity of *salt* to be used is about 5 *lb.* to the *sack*, or 1 *lb.* to the *bushel. One sack of the best flour*, and 4 or 5 *lb.* of *salt*, yield about 360 *lb.* of *good bread;* and a *sack of seconds*, 345 to 350 *lb.* of bread, when moderately baked. If the loaves are "*well-baked*" or "*over-baked*," the product will be from 345 to 350 *lb.* only; but if they are "*slack-baked*" or "*under-baked*," from 370 *lb.* to 385 *lb.* of "*crumbling bread*" may be obtained from 1 sack of good white flour.

The attention of chemists has, at various times, been directed in search of some method to rectify or lessen the effects of "bad harvesting" and improper "storage" in grain, so that a damaged or inferior article might be rendered serviceable, and available for human food. Professor E. Davy recommends the addition of ¼ *oz.* of *carbonate of magnesia* to about every 3 *lb.* of sour, "melted," "heated," and similarly damaged flour. This substance materially improves the quality of the bread, "even when made from the worst new seconds flour;" whilst it is perfectly harmless, and the bread so prepared, for temporary use, is unobjectionable. What effects would arise from the daily consumption of such bread for several months has not been determined. (See *Magnesia.*) Our own experiments in bread-making, extending over a period of several years, lead us to prefer *sesquicarbonate of soda*, or *bicarbonate of soda* for the purpose. Theoretically, the corresponding salts of potassa would be preferable. A mixture of equal parts of the *bicarbonates of potassa* and *of soda*, will, perhaps, ultimately be found to be more useful than either substance used separately.

In times of scarcity and famine, various substances besides the flour of the cereals have been made into bread, or have been mixed with it, in order to lessen the quantity of the former required by the people. For this purpose, almost every amylaceous vegetable, at once plentiful and cheap, has, in its turn, been eagerly appropriated. *Acorns*, *beech-mast*, the *leguminous seeds*, numerous *starchy bulbous roots*, and similar substances, have been employed, either in the form of meal, or made into an emulsion or jelly, which has been used instead of water to form the flour of bread-corn into a dough. At such times *bran*, the most nutritious and valuable portion of the grain, although usually rejected as worthless, has been retained in the flour, and has been even added to it in excess. Birkenmayer, a brewer of Constance, during a period of scarcity, succeeded in manufacturing bread from the farinaceous residue of beer, (*brewer's grains.*) 10 *lb.* of *this substance*, rubbed to a paste, with ½ *lb.* of *yeast*, 5 *lb.* of *ordinary meal*, and a *handful of salt*, produces 14 *lb.* of black bread, "both savoury and nourishing." The nutritious qualities of brewer's grains is shown by their extensive employment at the present day as food for pigs and cattle, especially for milch cows. In like manner, *Iceland*, *Carragheen*, and *other mosses*, have been made into bread, either alone or mixed with flour or meal. They are used, in the *first* case, in the state of meal, in the same way as flour; in the *second* case, 7 *lb.* of *moss* are directed to be boiled in 10 or 12 gall. of *water*, and the resulting glutinous liquid or jelly to be employed to make 70 *lb.* of *flour* into dough, which is then fermented and baked in the usual way. It is said that flour thus produces fully double its weight of good household bread. A simpler plan is to mix 1 *lb.* of *lichen meal*, with 3 or 4 *lb.* of *flour*. The bitterness of the lichen is extracted by soaking it in cold water. Bread so prepared has of late been highly recommended for the delicate and dyspeptic. The modern baker is in the habit of mixing large quantities of *potatoes* with his bread, whenever he can purchase them at "paying" prices. Mealy potatoes are selected, and are carefully "mashed" or "pulped," and the dry flour is worked into this pulp or dough, which is then mixed with the sponge in the usual manner. For inferior bread, equal weights of *potato pulp* and *dry flour*, are often used. Bread so prepared, eats "short," and is deficient in sponginess, and in that fine yellowish-white tint which forms one of the characteristics of pure wheaten bread. Recently, *rice*, boiled with water to a jelly, has got into very extensive use among the bakers. A sponge is made with a portion of the jelly thickened with some flour, and the whole process is conducted in the ordinary manner, except that the fermentation is generally more slowly conducted and allowed to proceed for a longer period. Flour so treated yields fully 50$\frac{0}{0}$ more bread than when merely mixed up with yeast and water. This constitutes the process of Messrs. Morian, Martin, and Journet, of Paris, which was recently tested at Marylebone Workhouse. The experiment succeeded, but the only result to the public has been, that the common bakers have adopted the plan, and now very generally surcharge their bread with such an excess of water, that in many cases, it only possesses two thirds the amount of nourishment which it did before the publication of the system just referred to. Unfortunately, the cupidity of dishonest tradesmen, appears to be continually impelling them to avail themselves of the exertions of philanthropists and the discoveries of science, in order to increase their profits, regardless alike of the quality of their commodities and the health of their customers. Bread containing an excess of water, rapidly becomes sour and mouldy, and is apt to disorder the digestive functions of those who eat it.

From the experiments of Dr. Colquhoun, it appears, that the starch of flour is partially converted into sugar during the process of fermenting and baking the dough, and thus contributes to the sweetness of the bread. He proposes to add to the flour, *arrow-root*, the *farina of potatoes*, and similar *amylaceous substances*, made into a jelly with hot water, for this purpose. Dr. Percival has recommended the addition of *salep* with the same intention. 1 *oz.* of *salep* dissolved in 1 *quart* of *water;* 2 *lb.* of *flour;* 80 *gr.* of *salt;* and 2 *oz.* of *yeast*, gave 3 *lb.* 2 *oz.* of *good bread.* The same weight of materials, without the salep, gave only 2⅝ *lb.* If too much salep is added, it gives its peculiar flavour to the bread.

In the preceding article we have not entered into particulars respecting "oven management," because, on the large scale, it is thoroughly understood by every practical baker. For the instruction of the busy housewife, we may state, that the oven should always be sufficiently heated before the bread is put into it, in order that the gas contained in the cells of the sponge may be expanded as rapidly as possible by the heat, and the resulting light mass quickly rendered sufficiently solid to prevent its subsequent collapse. The heat should also be maintained at nearly the same temperature during the whole of the time the bread is submitted to its action. In general, with ordinary kitchen ovens, properly heated, 30 minutes' baking is sufficient for *one-pound* loaves and cakes, and 15 minutes in addition for *every pound* after the *first*, for *larger ones.* Thus, a 1 *lb.* loaf requires ½ hour; a 2 *lb.* loaf ¾ hour; and a 4 *lb.* loaf 1¼ hours.

It is the common ambition of the English baker to give that peculiar tint to the crust of his bread in the process of baking which is so highly esteemed by connoisseurs, and so successfully produced by the Viennese and Parisians. It has been long known at *Vienna*, that if the hearth of an oven be cleaned with a moistened wisp of straw, the crust of bread baked therein immediately afterwards presents a beautiful yellow tint. It was thence inferred that this peculiarity depended on the vapour, which being condensed on the roof of the oven, fell back on the bread. At *Paris*, in order to secure with certainty so desirable an appearance, the hearth of the oven is generally laid so as to form an inclined plane, with a rise of about 11 inches in 3 feet, and the arched roof is built lower at the end nearest the door, as compared with the furthest extremity. When the oven is charged, the entrance is closed with a wet bundle of straw. By this arrangement the steam is driven down on the bread, and a golden-yellow crust is given to it, as if it had been previously covered with the yelk of an egg.

Pure wheaten bread is one of the most wholesome articles of food, and has been justly termed the staff of life. When well fermented and baked, it is very easy of digestion. It should never be eaten until it has stood at least 24 hours after being taken out of the oven. When newer, bread is apt to disagree with the stomach, frequently producing indigestion, biliousness, diarrhœa, dyspepsia, and other like ailments. Bread prepared from meal, containing the *whole* of the bran, is the most nutritious and digestible, and should alone be given to children and growing persons, and eaten by the dyspeptic and delicate. "*Wheaten bread,*" ("*Panis,*") is included in the Materia Medica of the London Pharmacopœia. See *Alum, Flour, &c.*

BREAD (American). From American barrelled flour. "14 *lb.* of *American flour* will make 21½ *lb.* of bread; whereas the best sort of *English flour* produces only 18½ *lb.* of bread." (Mrs. Rundell.)

BREAD (Bee). The matter collected by the bees to form the bottom of the hive. It greatly resembles a mixture of rosin and wax; and its fumes are thought to be anti-asthmatic.

BREAD (Bran). 1. From the whole meal, without sifting out any of the bran.

2. By adding *bran*, 3 oz. to every pound of *flour.*

BREAD (Extemporaneous). See *Unfermented Bread.*

BREAD (French). *Prep.* 1. From the *finest flour*, as the best white bread. For the better kinds, and for those intended for rolls and small fancy bread, the sponge and dough is wetted with *milk-and-water*, and, occasionally, a *very little butter* is added. "When the rolls or small fancy loaves have lain in a quick oven about a quarter of an hour, turn them on the other side for about a quarter of an hour longer. Then take them out and chip them with a knife, which will make them look spongy, and of a fine yellow; whereas rasping takes off this fine colour, and renders their look less inviting."

2. (*French Soup-bread.*) From *fine flour*, but employing fully double the usual quantity of salt. It is baked in thin loaves, so as to be nearly all crust, by which means it becomes more soluble in hot soup.

BREAD (Hick's Patent). This is ordinary bread baked in an oven so arranged that the vapours arising during the process are condensed in a suitable receiver. The condensed liquor is a crude, weak spirit, produced during the fermentation of the dough, and possesses little commercial value; indeed, insufficient to pay for the expenses attending its collection. Besides which the bread so prepared was rejected by the vulgar, who flocked to the shops of the neighbouring bakers, who professed to sell their bread with "the gin in it."

BREAD (Household). This name is commonly given to bread made with flour from which only the coarser portion of the bran has been removed; and to bread prepared from a mixture of flour and potatoes. The following are examples:—

1. (Rev. Mr. Haggett.) Remove the *flake bran* from *flour*, 14 *lb.*, and boil it in 1 gall. of *water*, until it is reduced to 7 pints; strain, cool, and knead in the flour, adding *salt* and *yeast* as for other bread.

2. *Flour*, 7 *lb.*; *mealy potatoes*, (well-mashed,) 3 *lb.*; as before.

BREAD (Leavened). Using *leaven* instead of yeast, and in the same way. About 1 *lb.* to each bushel of flour is sufficient; it is set for sponge in the usual manner. The more leaven used the lighter the bread made with it will be; and the fresher and sweeter the leaven, the less sour will it taste. The use of leaven is now superseded by that of yeast.

BREAD (London White). The common proportions are:—*Flour*, 1 sack; *common salt*, 4½ *lb.*; *alum*, 5 *oz.*; *yeast*, 4 pints; *warm water*, for the sponge, (about) 3 gall. The process has been already noticed.

BREAD (Paris White). The following is handed to us as the plan adopted by the Paris bakers for their best white bread:—On 80 *lb.* of the *dough*, before the yeast was added, (from yesterday's baking,) as much *lukewarm water* is poured as will make 320 *lb.* of *flour* into a *thin* dough; as soon as this has risen, 80 *lb.* are taken out and reserved in a warm place as leaven for the next baking, and 1 *lb.* of *dry yeast*, dissolved in *warm water*, is to be added to the remaining portion, the whole lightly kneaded, and as soon as it has sufficiently risen, made into loaves, and shortly afterwards baked; the loaves being placed in the oven without touching each other, that they may become crusty all round.

BREAD (Unfermented). Syn. *Extemporaneous Bread. Prep.* 1. From *Jones' Patent Flour.* Both wholesome and excellent; equal to French bread, when skilfully made and baked.

2. From *Sewell's Patent Four.* Slightly inferior to the last.

3. To every pound of *flour*, add, separately, 1¼ dr. of *bicarbonate of soda*, and 1 dr. of *tartaric acid*, (all perfectly dry, and in very fine powder.) Rub them well together with the hands until *perfectly* incorporated; then form the whole into a dough with *water*, q. s., as quickly as possible, and at once bake in a quick oven. About 8 *oz.* of water are required for every *lb.* of flour. Answers well when expertly managed.

4. *Flour*, 1 *lb.*; *bicarbonate of soda*, 1 dr.; mix; make a dough with *water*, q. s., to which has been added *hydrochloric acid*, (commercial,) 1 dr.; and proceed as before.

5. (*Whiting's Patent.*) This closely resembles the last. The proportions are:—*Flour*, 7 *lb.*; *carbonate of soda*, and *hydrochloric acid*, of each, 1 *oz.*; *water*, 2⅝ pints. This method was suggested by Dr. Henry, in 1797, and was patented by Dr. Whiting in 1836. If the proportions are not observed, or the mixture not perfect, the quality of the bread suffers. The union of the acid and soda forms common salt.

6. (*Ammoniacal Bread.*) *Sesquicarbonate of ammonia*, 1 *oz.*; *cold water*, q. s.; dissolve, add *flour*, 7 *lb.*; and make a dough, which must be formed into loaves and baked immediately, as before. For this process to answer, the sesquicarbonate should be recent and free from bicarbonate; the presence of which is known by its being white and powdery, and of inferior pungency. If any of the last salt is present, the bread will have a yellowish colour, and a slightly alkaline or urinous flavour. It answers best for small loaves, cakes, and fancy bread. By employing *pure carbonate of ammonia* instead of the *commercial sesquicarbonate*, the process succeeds admirably, and the resulting bread is most wholesome. A late writer recommends the use of bicarbonate

of ammonia, but evidently does so in ignorance, as in practice it is inapplicable, as we have verified by actual experiment, over and over again. (See pages 57 and 58.)

7. It has been proposed to form the dough with water charged with *carbonic acid*, (soda water.) "If water highly impregnated with carbonic acid gas be used for kneading the dough, the resulting bread will be somewhat spongy." (Ure.) We have repeatedly endeavoured to make bread in this way, but never could succeed. The quantity of gas in the water is too trifling for the purpose, and the greater part of it escapes in the process of making the dough, even though all the materials be well cooled, and the operation conducted in a cold place.

Obs. Unfermented bread has been recommended as being more wholesome and generally better adapted to bilious and dyspeptic patients than fermented bread. As the sugar in the flour is undecomposed by having undergone fermentation, it is necessarily sweeter, and hence, more nutritious, than common bread; at the same time, however, it must be confessed that the unfermented bread commonly met with has a slightly "raw-grain" taste, which is very disagreeable to some persons. The process of fermentation doubtless modifies the condition of the starch and gluten of the dough, and renders them easier of digestion. This species of bread is sadly adulterated with a variety of indescribable messes. See *Flour*, *Gingerbread*, *&c.*

BREAKFAST. The morning meal or breakfast, the "early bit" of the Germans, is, perhaps, the most important of the day. According to Erasmus Wilson, it is usually "taken at *eight* or *nine*." The proper period for that purpose must, however, depend upon the time at which the party rises. About an hour after leaving the bed will be found the most appropriate for the morning meal. By that time the powers of the system have fully recovered from the inactivity of sleep, and the functions of the stomach and other viscera have again come into full play. The appetite is excited and seeks appeasing, and both instinct and reason direct us to the social board. If abstinence is now prolonged, the physical and mental energies, unsupported by the supply of food which indirectly gives them birth, gradually lessen, and incipient exhaustion ensues. The fluids of the stomach and smaller tissues begin to act upon the coats of those viscera, instead of on the food, and an unpleasant feeling of hunger, or a loss of appetite, comes on as a natural consequence. When breakfast cannot be taken within a reasonable period after rising, the gap should be filled up by chewing a crust, a biscuit, or the like. A raw egg or two, "sucked" from the shell, or broken into a tea-cup and drank, will be found most valuable for this purpose. Raw milk, cheese, salted food, and other indigestible matter, should be particularly avoided at this early period of the day.

The *articles of food to be chosen for the breakfast table*, must depend entirely on the state of the health, the occupations, &c., of those assembled round it. Coffee appears to be, by common consent, the *favorite beverage*. For the delicate, the bilious, and the young, it should not be taken strong, and should be well softened-down with milk and dulcified with sugar. Tea is more apt to affect the nerves and stomach than pure "*un*chicoried" coffee. Green tea taken thus early in the day, acts as an absolute poison. We have seen severe fits of vomiting and exhaustion follow its use. The *solid food* for breakfast should be easy of digestion and nutritious. Females, children, and persons leading a sedentary life, should confine themselves to a sufficient quantity of good *meal-bread-and-butter*, to which an egg or a small rasher of mild bacon may be advantageously added. Parties engaged in active occupations, may extend their exploits somewhat farther, and add to this bill of fare a little ham or cold meat. When an undue time will elapse before the luncheon or dinner, and particularly during the colder season of the year, the broiled leg of a fowl, an underdressed mutton chop, or a little tender beefsteak, will be found, by the parties last referred to, most useful; nay, in most cases, invaluable. But excess must be particularly avoided. The object is to take enough food to maintain the system in full energy and vigour, and particularly to avoid offending the stomach by overloading it; a misfortune easily effected at the breakfast table. Old commercial travellers, (men wise in the mysteries of life and its enjoyments,) are scrupulously careful to make a *good*, but not a *heavy breakfast* before commencing the arduous duties of the day.

BREAKFAST POWDER. Syn. *Rye Coffee*, *Dillenius's do.*, *Hunt's Economical Breakfast Powder*. From *rye*, roasted along with a *little fat*. It was once sold at 2*s.* 6*d.* the *lb.*, and was formerly extensively used as a substitute for foreign coffee, of which it is one of the cheapest and best. Since the reduction of duty on coffee, it has nearly fallen into disuse.

BREATH (Fetid). Scarcely anything is more disagreeable or disgusting than a stinking breath. Various means have been proposed to remove this annoyance, depending principally on the administration of *aromatics*, which by their odour smother it for a time; but these require continual repetition, and are liable to interfere with the functions of digestion. The real cause of stinking breath may generally be traced to either a diseased stomach or decayed teeth. When the *former* is the case, aperients should be administered; and if these do not succeed, an emetic may be given, followed by an occasional dose of *salts*, *castor oil*, or some other *aperient*. When *rotten teeth* are the cause, they should be removed; or, if this is impossible, they should be kept scrupulously clean. Dirty teeth also often cause the breath to smell. The use of the tooth-brush should be a daily habit. Occasionally rinsing out the mouth with a little clean water, to which a few drops of a solution of chloride of lime, or of chloride of soda, has been added, is an effective method. As a tooth-powder, *fresh-burnt charcoal* is the best. The following lozenges have been strongly recommended to sweeten and purify the breath:—

Gum catechu, 2 *oz.*; *white sugar*, 4 *oz.*; *orris powder*, 1 *oz.*; make them into a paste with *mucilage*, and add a drop or two of *neroli*. One or two may be sucked at pleasure. See *Catechou Aromatisé*, *&c.*

BREWING. The art of making beer.

The *only ingredients* allowed by law to enter into the composition of beer, are *malt*, *hops*, and *water*, together with a *little yeast*.

The *apparatus* and *utensils* required in brewing beer are—

1. A *copper* or *boiler* capable of holding fully two thirds of the quantity proposed to be brewed; with a *gauge-stick* to determine the number of gallons of fluid at any given depth therein; and a *wooden cover* to place over it before the boiling commences, or when not in use. A copper capable of holding about 150 gallons is a convenient size for brewing a quarter of malt, and is commonly known as a *one-quarter copper*.

2. A *mash-tub* or *tun*, capable of containing rather more than the copper.

3. *One* or *more tuns* or *vessels*, to ferment the beer in.

4. *Three* or *four shallow coolers* to reduce the wort as rapidly as possible to a proper temperature for fermenting.

5. *One* or *two copper* or *wooden bowls*, for bailing, &c.

6. A *thermometer* with a scale reaching from 0° to above the boiling point of water, (say from 0° to 220° Fahr.)

7. A *saccharometer* for taking the density of worts and beer.

8. A *suitable number of casks* (clean) to contain the beer.

9. *One* or *more large funnels* or *tunners*.

10. *Two* or *more clean pails*.

11. A *hand-pump* of a size proportionate to the brewing.

12. A *mill* for *crushing* the malt.

These articles will vary in value from £10, upwards, to many hundreds, or even thousands, according to the extent of the brewing; but the whole of them, necessary for a private family, may be bought for less than the former amount, as the mill, pump, &c., may then be dispensed with, and the rest may be of the simplest and least expensive character possible. By proper care brewing utensils will last for 30 or 40 years, and still continue in a useful state.

Preliminary proceedings;—

The malt is *chosen*, according to the intended character of the brewing,—pale, amber, high-dried, or any mixture of them as the occasion may require. It is *bruised* or *crushed* in a mill, (*malt mill*,) before brewing, that it may be the more readily acted on by the water. It should not be ground too small, as it would then make the wort thick; the crushed malt may advantageously lay for a few days in a cool situation, by which it will attract a considerable quantity of moisture from the air, and be the more easily exhausted by the water used in mashing. *Pale malt* may be used coarser than amber or brown malt. A bushel of malt should make a bushel and a quarter when ground, and a quarter should yield between 9½ and 10 bushels, the quantity slightly varying according to the degree of bruising it has undergone. On the large scale, malt is ground in crushing mills, furnished with iron rollers; and on a smaller scale, by wooden rollers or small mills worked by hand. For private brewing, the malt is generally bought ready ground, for convenience sake.

The *hops*, after being taken from the "pockets" or "bag," are crumbled with the hands ready to be thrown into the copper. For general purposes, those grown in Kent, and of the present season, are preferred. For the finer sorts of ale, East Kent hops are commonly used; and when it is intended to keep the liquor for a long time, those known by the names of *Country's*, *Alton's*, or *Farnham Hops*, are employed. The quantity of hops required by a given measure of malt varies from 2 *lb.* to 16 *lb.* per quarter, according to the nature of the brewing. The following are the usual proportions :—

	HOPS.	MALT.
Strong beer (for keeping)	8 *lb.*	1qr., or 8 bls.
Strong ale (aromatic) .	8 „	1 „
Strong ale, beer, or porter, (ordinary) . . .	5 „	1 „
Brown stout . . .	$4\frac{1}{2}$	1 „
Mild ale	4 „	1 „
Mild porter, (draught)	$3\frac{1}{4}$	1 „
Table ale	$1\frac{1}{2}$	1 „
Scotch ale, (best) . .	$4\frac{1}{2}$	1 „
Bitter ale . .	10 to 16 „	1 „

The *water* which should be *soft* and *clear,* must be provided in abundance. Of late years, hard water has been chosen by many brewers, on the ground that beer brewed with it is "*self-fining,*" requiring no artificial clarification, either in the vat or cask. The water at Burton-on-Trent, a place celebrated for its ales, is of this class.

The *yeast* must be *sweet* and *good,* and all the vessels and utensils both *sweet* and *clean.* If this last be neglected, the most skilful brewing in the world will prove a failure.

Process of Brewing :—

1. (*Mashing.*) The *ground* or *bruised malt,* placed in the "*mash-tun,*" is macerated for some time in *hot water,* and the infusion or "*wort*" drawn off from a hole in the bottom, over which a bunch of straw, or a strainer, or false bottom, is placed, to prevent the malt passing out along with the liquor. During the process of mashing, a peculiar principle contained in the malt, called by chemists *diastase,* reacts upon the starch with which it is associated, and converts it first into a species of gum, ("*dextrine,*") and ultimately into a species of grape sugar. The more perfectly this is effected, the richer will be the resulting wort in sugar or "*saccharine,*" and the stronger and more alcoholic the beer produced by its fermentation. It is therefore a desideratum with the brewer to mash at the temperature which most fully promotes this important object. The best temperature for this purpose ranges between 157° and 160° Fahr. When more than one mash is made, the *first* should be something lower than the first-named temperature; the *second,* may be from 160° to 162°; and the *third,* about 165° or 170° Fahr. The common brewers, however, generally mash at higher temperatures than those just given.

The action of the *first mash* is merely to *extract* the *sugar* contained ready formed in the malt; that of the *second,* to convert the *starch* into *sugar* by the *action of the diastase;* and that of the *third* to fully complete the last-named object, as well as to carry away the remaining portion of extract left from the second mash.

In practice, as soon as the water in the copper acquires the temperature of 145°, (in summer; 167° in winter,) 45 gall. are run into the mash-tun, and 1 quarter of *crushed malt* gradually thrown. The whole is now thoroughly mixed by laborious working, and the agitation ("mashing") continued for 30 or 40 minutes, when 36 gallons of water from the boiler, at a temperature of 200°, are added, and the whole again well agitated as before. The mash-tun is now closely covered up, and allowed to stand for an hour, an hour and a half, or even longer. At the end of this time the tap is set, and the wort is "run" into the "underback." It generally amounts to about 50 gallons. The *second mash* is then made with about 60 gall. of *water,* at 200° Fahr., and the whole process repeated as before. After an hour the liquor is drawn off, and the malt drained ready for the *third mash.* This time only 35 gall. of *water* are added at 200° Fahr., and the whole is seldom allowed to "stand" longer than half an hour. It is then "run off," and the malt allowed to drain as dry as possible.

In some cases, the worts of the *first* and *second* mashes, only, are used for *strong beer;* that of the *third mashing* being kept for *table beer,* or as water to mash a fresh quantity of malt.

In operating as above, the *mean* temperature of the *first mash* is 145°, of the *second mash,* 170°, and of the *third mash,* 178° to 180° Fahr. To obtain these temperatures in winter, the water must be used 7° or 8° degrees higher than in summer, (as noticed above,) to compensate for the greater loss of heat by exposure to a cold atmosphere. Pale malt and mixtures of malt and raw grain, should be mashed for a longer time, and at a rather lower temperature than brown or high-dried malt.

It is found that about 32 gall. of the water employed in mashing remain in the grains after the wort is drawn off, for every quarter of malt.

2. (*Boiling.*) The wort is next transferred to the copper, and heated to the boiling point as soon as possible. In large breweries where several coppers are employed, the first mash is no sooner run into the underback, than it is transferred to the wort copper, and immediately boiled,

and the successive mashings added as soon as drawn off; but in private houses where there is only one copper, the boiling cannot be commenced until the water for the last mashing is removed. In some cases the worts are boiled and brewed separately, so as to produce 2 or 3 qualities of beer, as *strong ale* or *stout*, *beer*, and *table beer*, from the same batch of malt.

As soon as the boiling of the wort commences, the *hops* are added, and the boiling continued for 2 or 3 hours, or even longer. In England, 2½ hours good boiling is generally deemed sufficient for the purpose. For "mild beers" the worts are seldom boiled so long; for "strong keeping ales," sometimes a little longer. The "boiling" is known to be completed when the liquor "clears" and albuminous flocks sink to the bottom of the copper.

The hops, strained from each preceding wort, are returned into the copper with the succeeding one.

The quantity of wort lost by evaporation during "the boil," varies from the 1/10th to the ⅙th, according to circumstances.

3. (*Cooling.*) The wort is "run off" from the copper into the "*hopback*," through a strainer which keeps back the hops. It is then "pumped" into large square shallow vessels called "*coolers*," where it is freely exposed to a current of air to reduce its temperature as *quickly as possible*, in order to avoid acidity or "souring." In 6 or 7 hours the temperature should fall to about 60° Fahr. In warm weather, the depth of the liquor in the coolers should not exceed 3 or 4 inches; and in cold weather, not more than 5 or 6 inches. As soon as the temperature has fallen to about 60°, the liquor is "tunned" and "yeasted."

The loss by evaporation and condensation in the coolers, varies from 13 to 18 gall. per quarter.

4. (*Fermentation.*) The cooled wort is next run into the fermenting tuns or vessels, ("*gyle-tuns*.") In small brewings these may be casks, with one of their heads removed; but under any form they must not be more than ⅔ds filled. The yeast, previously mixed with a little wort, and kept until the whole has begun to ferment, (technically termed "*lobb*,") is now added, and after agitation, the vessel is covered up, until the fermentation is well established. During this process the temperature rises from 9° to 15°.

The quantity of yeast employed, and the temperature of the wort when it is added, differs in different breweries and for different kinds of beer. From ½ to 1% of yeast, preferably taken from a previous brewing of the same kind of beer, is the quantity usually employed. The Scotch brewers generally take only 1 gall. of yeast to fully 4 hogsheads of wort. In England, the temperature at which the yeast is added, varies from 55° to 65° Fahr. In Scotland, the common temperature is 51° to 52°. In cold weather, the heat may be 5° or 6° higher than in mild and warm weather, and a little more yeast may be added. In cold weather, *ale* is commonly *tunned* at 60°, *porter* at 64°, and *weaker beers* at 65° or 70° Fahr. In warm weather, *strong beer* should be 4° or 5°, and other *beers* 7° or 8° cooler than the "heats" just mentioned. On the *small scale*, a pint or 1¼ pint of yeast may be used to every barrel of *strong beer wort*, and ¾ pint to every barrel of *mild beer wort*.

The commencement of the fermentation is indicated by a line of small bubbles forming round the sides of the tun, and in a short time extending over the whole surface. A "crusty head" soon forms, and then a "fine rocky one," followed by a "light frothy head." At length the "head" assumes a yeasty appearance, the colour becomes yellowish-brown, and a vinous odour is developed. As soon as this last head begins to fall, the tun is skimmed continually every 2 or 3 hours until no more yeast is formed. The beer is then put into casks, or "*cleansed*." A minute attention to every stage of this process is necessary to secure a fine flavour and a brilliant beverage.

It may be regarded as a rule, that the *lower the temperature*, and the *slower*, *more regular*, and *less interrupted* the *process of fermentation*, the better will be the quality of the brewing, and the less likely to change by age. A little more yeast is required in winter than in summer. When the fermentation becomes slack in the "*gyle-tun*," a little more "lobb" is generally added, and the whole is well roused up. On the contrary, if the temperature rises considerably, or the fermentation becomes too brisk, the wort is cooled a little and skimmed, or at once "cleansed."

5. (*Cleansing.*) This consists in "running" the beer from the *gyle-tun* into casks or other vessels, set sloping, so that the yeast, as it forms, may work off the one side of the top, and fall into a vessel placed below to receive it. In small brewings, the beer is often at once transferred from the gyle-tun to the store casks, which are sloped a little until the fermentation is

over, when they are skimmed, filled, and bunged.

The process of cleansing is generally commenced as soon as the saccharine in the fermenting wort falls to about 10 *lb.* per barrel, a degree of attenuation which it usually reaches in about 48 hours. Some brewers add a little *wheat flour* or *bean flour*, (about ¼ *lb.* per barrel,) to the beer in the gyle-tun, shortly before cleansing, to quicken the discharge of yeast; but it is not clearly ascertained whether such a plan is advantageous or the contrary.

6. (*Storing.*) As soon as the fermentation is concluded, which generally takes from 6 to 8 days, or more, the clear liquor is pumped into the store casks or vats, which are then closely bunged, and deposited in a cool cellar to mature.

7. (*Ripening.*) After a period, varying from one to twelve months, or longer, according to the nature of the brewing, the liquor will have become fine, and sufficiently mature for use. During this period the casks, &c., should be occasionally examined to see that there is no leakage, and to open the vent holes, should any oozings appear at the joints. As equable a temperature as possible should be maintained in the cellar, by ventilation on the one hand, and the employment of artificial heat on the other.

8. (*Fining.*) Beer which has been badly brewed or "stored," or which from other causes may be thick or muddy, requires "fining" or "clarifying." For a barrel, about 1 pint or 1½ pint of "*brewer's finings*" (isinglass dissolved in sour beer,) is put into a bucket, and some of the beer gradually added, the whole being violently agitated with a whisk, until a frothy head is formed. The mixture is then thrown into the casks of beer, and the whole well "rummaged up," by means of a large stick shoved in at the bunghole, after which the bung is replaced, and the liquor is allowed to repose for a few days.

Sometimes the above method is found to fail with weak and "bad-conditioned" beer. When this turns out to be the case, the addition of a spoonful of *sulphuric acid*, or of *gum catechu*, dissolved in ½ a pint of *warm water*, followed by agitation, for a quarter of an hour, will generally cause the "finings" to clarify the liquor. 1 or 2 *oz.* of *tincture of catechu*, mixed with a *little water*, may be used in the same way. These additions act chemically on gelatine "finings," in the same way that *good* beer does, precipitating them along with the foul matter, and thus brightening the liquor. A *handful of hops*, previously boiled for five minutes in a little of the beer, and then added to the barrel, and the whole allowed to stand for a few days, before proceeding to clarify it, will generally have a similar effect.

Concluding Remarks. The preceding is a concise account of the system of brewing at present practised in this country. On the *large scale*, extensive and costly apparatus and machinery are employed for the purpose. On the *small scale*, various modifications, of a minor character, of the several processes herein detailed, are frequently adopted, according to the circumstances or ingenuity of the operator. The principles and practice of brewing beer are, however, essentially the same, under all the conditions here referred to. In *Scotland*, only *one mash* is made, and that at a temperature of about 180° Fahr, with *one third* of the quantity of the water required for the brewing. The mash-tun is then covered up for about half an hour, when the wort is drawn off, and a quantity of water, at the same temperature as before, sprinkled uniformly over its surface. This is performed by throwing the water into a vessel with a bottom full of holes, somewhat resembling a shower-bath, whence it descends and gets equally distributed over every portion of the malt. After an interval of about twenty minutes this wort is drawn off from several small cocks or holes, placed round the circumference of the bottom, by which means the hot water is made to percolate equally through every particle of the mass. This operation, ("*sparging*,") is repeated several times, until the density of the mixed worts becomes adapted to the quality of the ale required. Usually eight or ten "spargings" are employed; the latter ones being at about 5° or 10° cooler than the first. When a very strong wort is required, the latter "sparges" are kept separately for table beer, or as water for mashing a fresh quantity of malt. The gyle-tun is set at 50° to 52°; the fermentation being continued slowly for fifteen to twenty days; and the ale is not "cleansed" before the degree of attenuation falls to about ½ *lb.* a day, and not more than ¼th of the original gravity of the wort remains. *Scotch ale* is justly celebrated for its superior quality. Its usual gravity is 35 *lb.* to 40 *lb.* per barrel.

In *Bavaria*, a country remarkable for the excellence of its beer, the wort is made to ferment at a low temperature, until all the substances which favour acetification have been rendered insoluble, and have separated from the liquor. The fermentation is conducted in *wide, open, shallow vessels*, which afford *free* and *unlimited access to atmospheric oxygen*, and this in a situation where the *temperature does not exceed* 46° to 50° Fahr. A separation of the nitrogeneous constituents, or *exciters of acidification*, takes place simultaneously on the surface, and within the whole body of the liquid. The clearing of the fluid is the sign by which it is known that these matters have separated. The fermentation usually occupies three or four weeks, and is conducted during the cooler portions of the year only, and in a situation removed as much as possible from the influence of atmospherical changes of temperature. The sedimentary yeast, (*unterhefe*,) and not the surface yeast, (*oberhefe*,) of the Bavarian fermenting backs is employed.

"The beers of England and France, and the most part of those of Germany, become gradually sour by contact with air. This defect does not belong to the *beers of Bavaria*, which may be preserved at pleasure in *half-full* casks, as well as full ones, without alteration in the air. This precious quality must be ascribed to the peculiar process employed for fermenting the wort, called in German, '*untergährung*,' or fermentation from below; which has solved one of the finest theoretical problems." (Liebig.)

"In the ordinary fermentation of grape-juice and worts, these liquids do not furnish a quantity of alcohol equivalent to the sugar which they contain, because a certain portion of the sugar serves for the oxidation of the gluten, and is not transformed like the rest. But wherever the liquor has arrived at the second period, the product in alcohol ought to be equivalent to the quantity of sugar present, as happens in all fermentations (sedimentary) which are not accompanied with a formation, but a disappearance of the yeast." "Worts furnish in the Bavarian breweries, 10% to 20% more alcohol than they do by the ordinary process of fermentation." (Ure.)

East India Ale or *Pale Ale*, for exportation, is brewed from worts of not less sp. gr. than 1·054, in order to obtain the drawback of 5s. per barrel, allowed by the Board of Inland Revenue on ales of that strength. For the best varieties, 15 to 16 *lb.* of the *finest East Kent hops* are used to every quarter of *pale malt*. The *pale ale* or *bitter beer* of the publicans is commonly a weak liquor highly bittered with the hop, and too often with *quassia, wormwood, picric acid*, and other still more objectionable substances. The process now adopted by the great brewers of pale ale at Burton-on-Trent, combines all the most admirable points of both the Bavarian and Scotch systems of brewing.

Devonshire White Ale is prepared by boiling together 12 gallons of *pale ale-wort*, 1 handful of *hops*, and 4 or 5 *lb.* of *grouts;* and fermenting with about a quart of *yeast.* It is drunk whilst in a state of lively fermentation.

Berlin White or *Pale Beer* is brewed from *wheat malt*, mixed with about $\frac{1}{6}$th part of *barley malt*, boiled, with *hops*, $\frac{1}{2}$ *lb.* to the bushel, and slightly fermented with "top yeast," at a rather high temperature.

The desire of evading the duty on malt, led to the discovery of its being only necessary to malt $\frac{1}{3}$rd or less of the grain, this portion being sufficient to convert the starch of the other part into sugar, in the process of mashing. This plan answers well when the wort is merely intended for the production of "*grain spirit*," but beer so made is insipid and inferior in quality to that brewed wholly of malt. Inferior kinds of beer have also been made from other ingredients than barley malt, among which may be named the grain of the *cheaper cereals, bran, potatoes, turnips, beet root, carrots, parsnips, pea-shells*, and other vegetable substances abounding in starch and sugar, all of which will produce beer by being mashed with water in the common way, with about 9 or 10% of barley malt. *Brown sugar* and *treacle* have been long used in this manner.

One quarter of the best barley malt yields by skilful mashing, fully 84*lb.* of "saccharine," or soluble sweet extractive matter. This concentrated within the compass of one barrel, (36 gall.,) gives a sp. gr. of 1·234. In the process of mashing, about $\frac{4}{7}$ths of this quantity of saccharine, (or 48*lb*,) is generally carried off in the *first wort;* $\frac{2}{7}$ths, (or 24 *lb.*,) in the *second wort;* and $\frac{1}{7}$th, (or 12 *lb.*,) in the *third wort:* the strengths of the worts being to each other as 4, 2, and 1. According to certain interested parties, 107 *lb.* to 112 *lb.* of saccharine per quarter, may be obtained by *Draper's process;* but the assertion appears unsupported by evidence and experience. The average gravity obtained by the common brewers from malt of current quality, ranges from 80 to 81 *lb.* When the process of mashing has been properly conducted, the wort after leaving the cooler, should not be turned *blue* by *tincture of iodine*, or by *iodide of potassium* added along with a little acid. If it turns blue, some of the starch has escaped conversion into sugar, and is dissolved in the liquor.

By *multiplying* the *decimal part of the* *number representing the specific gravity of a wort* by 360, (the weight in pounds of a barrel of pure water,) we obtain the QUANTITY OF SACCHARINE, per barrel, corresponding to the given sp. gr.; and by *dividing* the *joint weight of saccharine and water, per barrel,* by 360, we obtain the SPECIFIC GRAVITY. Thus—

Decimal of sp. gr. ·058 × 360 = 21 *lb. per barrel,* (nearly;)

$$\frac{\textit{lb. per bar.}\ 20+360}{360}=1{\cdot}055\ \textit{specific gravity.}$$

It is usually stated in works on brewing, that certain temperatures must be reached by each variety of beer, during the progress of the fermentation, in order for the liquor to acquire its characteristic flavour. Thus, it is stated, that—*mild beer* begins to acquire flavour when the heat of fermentation arrives at 75° Fahr.; increases at 80°, and is highest at 90°, but sometimes even reaches 100°. *Old ale* is said to obtain its best flavour at a temperature not exceeding 75°; and porter at 70° Fahr. In order to reach these temperatures, the worts are directed to be set at from 10° to 15° lower, the rise being due to the heat generated during the fermentation. That these statements refer principally to the old methods of brewing is shown by the fact, that the brewers of Bavaria, Scotland, and Burton-on-Trent, produce their rich and high-flavoured liquors at temperatures vastly below those above enumerated.

The best times for brewing are the spring and autumn, as at those periods of the year the temperature of the air is such as to permit the easy cooling of worts sufficiently low, without having recourse to artificial refrigeration or the use of machinery for that purpose. Old ale cannot be conveniently brewed in summer.

Beers are *classed* by the brewers into—

Small beers,—made from worts not exceeding the sp. gr. 1·025, or 18 *lb.* per barrel.

Middlings,—made from worts of the sp. gr. 1·025 to 1·040, and averaging about 25 *lb.* per barrel.

Strong beers, — made from worts of the sp. gr. 1·040 to 1·080, extending from about 35 *lb.* per barrel upwards.

The densities of the worts employed for different kinds of beer vary considerably, as will be seen by the following table:—

TABLE *of the densities of Beers.*

Description.	Pounds per Barrel.	Specific Gravity.
Burton Ale, Class 1	40 to 43	1·111 to 1·120
Do. Class 2	35 to 40	1·097 to 1·111
Do. Class 3	28 to 33	1·077 to 1·092
Ordinary Ale . .	25 to 27	1·070 to 1·073
Common Ale . .	21	1·058
Scotch Ale, Class 1	40 to 44	1·111 to 1·122
Do. Class 2	33 to 40	1·092 to 1·111
Porter (ordinary) .	18	1·050
Do. (good) . .	18 to 21	1·050 to 1·058
Do. (double) .	20 to 22	1·055 to 1·060
Brown Stout . .	23	1·064
Do. (best)	26	1·072
Table Beer . .	12 to 14	1·033 to 1·039
Small Beer (com.)	6	1·014

For further information connected with the above subject, the reader is referred to the separate articles,—*Ale, Beer, Dextrine, Diastase, Fermentation, Malt Liquors, Porter, Saccharometer, Specific Gravity, &c.*

BREWING UTENSILS. The cleansing and preservation of brewing utensils, beer casks, &c., has frequently engaged the attention of practical men and brewer's chemists. To preserve them "sweet" they should always be thoroughly cleaned before setting them aside. Contact with soap or any greasy material should be avoided. A *scrubbing brush* and *scalding-hot water* are generally sufficient to clean them. Great care should be taken to remove every particle of yeast or "fur" on the sides and bottom; and after being well-drained, they should be stowed away in some clean and cold situation, properly exposed to the fresh air. Should they become tainted or mouldy, a *strong lye of pearlash, common salt,* or *quicklime,* may be spread over them scalding hot, with a broom or scrubbing brush. Washing them with *oil of vitriol* diluted with about 7 *or* 8 *times its weight of water,* is another excellent method. *Fresh-burnt charcoal* has also been employed for the same purpose. In each case the vessels must be subsequently thoroughly washed out with clean water, as before. *Steam* has been successfully applied to clean casks in several breweries.

Mr. Cobbett remarks,—"I am now in a farm-house where the *same* brewing utensils have been used for *forty years;* and the owner tells me, that they may last for *forty years longer.*"

BRICKS. Brickmaking scarcely comes within the province of this work. In connection with *hygiene*, however, we may call the reader's attention to the superior advantages of both *hollow* and *waterproof bricks;* the *first*, for ventilation and lightness; the *last*, for preserving the dryness and integrity of our homes under all the vicissitudes of climate, season, and weather, either on damp soils or dry ones. Workman's "*Patent Waterproof Bricks*" received a strong commendatory notice from the Commissioners of the Great Exhibition of 1851.

BRINE (for meat). *Prep.* 1. A nearly saturated solution of *common salt*, 1 *lb.*, and *saltpetre*, 1 *oz.*, in *soft water.*

2. To the last add of *sugar* or *treacle*, ½ *lb.* Bay salt is recommended when the meat is to be kept for a very long period. See *Pickling, &c.*

BRINE (Red Cabbage). From *red cabbage leaves* steeped in a *strong solution of common salt. Used* as a test for acids and alkalies.

BRINE (Violet). As the last, using the *petals of the blue violet.*

BRIOCHE PASTE. From *eggs* and *flour*, fermented with *yeast*, to which a *little salt*, a *large quantity of sugar*, and about half as much *butter* as the weight of the flour used, are afterwards added, and well worked in. *Used* as an addition to soup, casing for lobsters, patties, eggs, &c.

BRISKNESS. The natural briskness of fermented liquors depends on the evolution of carbonic acid gas within the body of the fluid, by the process of fermentation. See *Malt Liquors*, *Porter*, *Wines*, *&c.*

BRISTLES. These articles are commonly *stiffened* by immersion for a short time in alum water; and are *dyed* by steeping them for a short time in any of the common dyes used for cotton or wool.

BRITANNIA METAL. Syn. *Tutania.* This alloy is a superior species of pewter.

Prep. 1. From *plate brass, bismuth, antimony*, and *tin*, equal parts, melted together, and the resulting alloy added at discretion to *melted tin*, until it acquires the proper degree of colour and hardness.

2. To the last add ⅕th of its weight of *metallic arsenic* before mixing it with the melted tin.

3. *Antimony*, 1 part; *brass*, 4 parts; *tin*, 5 or 6 parts. This may be used at once, as Britannia metal. See *Alloys* and *Pewter.*

BRITISH GUMS. See *Gums.*

BRITISH WINES. See *Wines.*

BROCCOLO. The *qualities* and the mode of *dressing* broccoli, are similar to those of cabbages noticed elsewhere.

BROMA. *Prep.* 1. From *pure cocoa*, 1 *lb.; sugar* and *sago meal*, of each, 4 *oz.;* mix.

2. As the last, but using *wheat flour*, in lieu of *sago meal.* Made into a beverage in a similar way to cocoa.

BROMAL. A compound discovered by Löwig, and produced by the action of bromine on alcohol. It is prepared in a similar manner to chloral, which it greatly resembles in its general properties.

BROMATE. Syn. *Bromas*,—Lat. A compound of a base with bromic acid. The bromates, when *heated*, evolve oxygen, and become bromides; with *nitrate* of *silver* and the *proto-salts of mercury*, they give white precipitates; that with the former being insoluble in nitric acid, and very soluble in ammonia. A few drops of *hydrochloric acid* being added to a bromate, and the mixture shaken with a *little ether* in a glass tube, a solution of bromine is obtained.

The bromates greatly resemble the corresponding chlorates and iodates. *Bromate of potassa* may be made by agitating bromine with a concentrated solution of caustic potassa, collecting the crystalline white powder that falls down, and purifying it by solution in boiling water, and crystallization. *Bromate of baryta* is prepared in a similar manner. *Bromate of silver* is formed by adding a solution of bromate of potassa to another of nitrate of silver.

BROMIC ACID. Syn. *Acidum Bromicum*,—Lat. *Prep.* Add *sulphuric acid* to a solution of *bromate of baryta*, as long as a precipitate falls, particularly avoiding an excess of acid; then concentrate the liquor by a gentle heat, until it becomes of the consistence of a syrup.

Obs. If the evaporation is carried too far, the acid suffers decomposition. It always contains water. Its salts are called *bromates.* See *Bromine.*

BROMIDE. Syn. *Bromuret, Hydrobromate; Bromidum, Hydrobromas*,—Lat. A compound form of bromine, with a base.

The soluble bromides give white precipitates with nitrate of silver, acetate of lead, and protonitrate of mercury. That from the *first* of these is insoluble in dilute nitric acid and in ammonia water, unless concentrated; and has a *slightly* yellowish tinge, changing to a violet by exposure to the light. A few drops of liquid chlorine poured upon a bromide, and the mixture agitated with a little sulphuric ether, yields an ethereal solution of bromine.

BROMIDE OF AMMONIA. *Prep.* From a mixture of *ammoniacal gas* and *hydrobromic acid gas;* or from *liquid hydrobromic acid* and *liquor of ammonia;* or by putting *bromine* into *water of ammonia.*

Obs. This salt may be obtained by evaporation, in the form of solid white prismatic crystals. It is volatile and easily decomposed. Many of the other bromides may be prepared in a similar manner. (See the respective bases.)

BROMINE. Syn. *Brome; Bromium, Brominium,*—Lat. An elementary substance, discovered by M. Balard, of Montpellier, in 1826.

Prep. A current of *chlorine* is passed through the uncrystallizable residuum of sea-water, called *bittern,* which then assumes an orange tint, in consequence of bromine being set free from its combinations; *sulphuric ether* is then agitated with it, and the mixture is allowed to stand until the ethereal portion floats upon the surface. This is a solution of crude bromine, and for common purposes the ether may be at once evaporated by *a very gentle* heat. To render it pure, *caustic potassa* is added in excess to the *ethereal solution,* or the latter is agitated with a *solution of potassa,* by which means bromide of potassium and bromate of potash are formed. The whole is evaporated to dryness, and submitted to a dull red heat; the residuum is next powdered, mixed with pure *peroxide of manganese,* placed in a retort, and *sulphuric acid,* diluted with half its weight of water, poured in. Red vapours immediately arise, and condense into drops of bromine, which are collected by plunging the neck of the retort nearly to the bottom of a small receiver containing *cold water.* The bromine forms a stratum beneath the water, and may be collected and further purified, by distillation from *dry chloride of calcium.*

Prop., &c. A dark, reddish-coloured liquid, having an odour resembling chlorine. It freezes at —4°; boils at about 135° Fahr.; dissolves in about 35 parts of water; is very soluble in ether, and less so in alcohol; with hydrogen it forms *hydrobromic acid,* and with the bases, compounds called *bromides,* or *hydrobromates.* It is *readily recognised* by its colour, odour, and volatility, and by the colour of its vapour; by its giving a yellowish-white precipitate with nitrate of silver, which is turned violet by the action of light; and by its solutions giving an orange or yellow colour to starch, and a red tinge to solution of chloride of gold. It possesses similar medicinal properties to iodine, and has been administered in goïtre, scrofula, &c., in the form of an aqueous solution, composed of 1 part of bromine to 40 of water; 5 or 6 drops being the dose. This solution has also been used as a lotion. Bromine bleaches like chlorine, but more feebly. It is poisonous; the antidotes, &c., resemble those for iodine. See *Solutions, &c.*

BROMINE (Chloride of). Syn. *Brominii Chloridum,*—Lat. *Prep.* By transmitting a current of *dry chlorine* through *bromine,* and condensing the disengaged vapour in a receiver surrounded with ice. A volatile reddish fluid, soluble in water, without decomposition.

BROMINE (Iodide of). Syn. *Brominii Iodidum,*—Lat. *Prep.* 1. (*Neutral.*) From *iodine,* 63 parts; added gradually and cautiously to *bromine,* 40 parts; distilling the mixture. Volatile, reddish-coloured, arborescent crystals.

2. (*Biniodide.*) As the last, but using 80 parts of *bromine.* A volatile dark-coloured liquid, soluble in water.

BROMOBENZOIC ACID. A new acid, discovered by Peligot, and prepared by exposing *benzoate of silver* to the *vapours of bromine,* until they cease to be absorbed, when the acid is dissolved out with *ether* and obtained by evaporation.

BROMOFORM. A heavy volatile liquid prepared from *bromine* by a similar process to that adopted for chloroform. It is also formed when a strong *aqueous* solution of *caustic alkali* is made to act on *bromal.* It is decomposed by alkalies into bromide of potassium and formiate of potassa.

BROMOHYDRO-SALICYLIC ACID. Obtained by the action of *bromine* on *hydride of salicyle.* It forms needle-like crystals.

BROMOPHENISIC ACID. It greatly resembles, and is prepared by analogous means to those adopted for *chlorophenisic acid.*

BROMOSAMIDE. Formed by the action of *ammonia* on *bromohydro-salicylic acid.*

BRONCHITIS. This affection is an inflammation of the mucous lining of the bronchia, or smaller ramifications of the windpipe. In its milder form it is popularly called "*a cold on the chest.*" The usual symptoms are *hoarseness, dry cough,* and a slight degree of *fever,* followed by expectoration of mucus, at first thin and afterwards thick and copious. In the severer forms there is more fever, cough, and oppression at the chest, &c. It generally yields to *small* and *repeated doses* of *ipecacuanha,* and *antimonial diaphoretics;* a *light diet* and *mild purgatives* being at the same time adopted.

BRONZE. A metallic alloy composed

principally of tin and copper, remarkable for the exactness of the impressions which it takes by moulding, as well as its durability; and hence, extensively employed in the casting of busts, medals, and statues. Bell, cannon, and speculum metal are varieties of bronze. In ancient times, when the manufacture of steel was ill-understood, cutting instruments were frequently made of this alloy.

On the *small scale*, this alloy is prepared in crucibles, but for *statues* and *larger works*, on reverberatory hearths. The fusion of the mixed metals is conducted as rapidly as possible under pounded charcoal, and the melted mass is frequently stirred together to produce a perfect mixture, before casting.

The proportions of the materials so vary in different castings, that it is almost impossible to say precisely what quantities are the best. The following are given as examples:—

Prep. 1. (*For Edge-tools.*) From *copper*, 100 parts; *tin*, 14 parts. When skilfully hardened and tempered this will yield an edge nearly equal to that of steel.

2. (*For Gilding.*)—*a.* From *copper*, 82 parts; *zinc*, 18 parts; *tin*, 3 parts; *lead*, 2 parts.

b. From *copper*, 83 parts; *zinc*, 17 parts; *tin*, 2 parts; *lead*, 1 part.

3. (*For Medals.*)—*a.* From *copper*, 89 parts; *tin*, 8 parts; *zinc*, 3 parts. This alloy assumes a beautiful antique appearance by age, and takes a good impression by stamping.

b. (M. Chaudet.) *Copper*, 95 parts; *tin*, 4 or 5 parts. This is also excellent for any small castings.

4. (*For Mortars.*) From *copper*, 93 parts; *lead*, 5 parts; *tin*, 2 parts.

5. (*For Statuary.*)—*a.* From *copper*, 88 parts; *tin*, 9 parts; *zinc*, 2 parts; *lead*, 1 part.

b. From *copper*, 82½ parts; *zinc*, 10½ parts; *tin*, 5 parts; *lead*, 2 parts. These are very nearly the proportions of the celebrated statue of Louis XV.

c. From *copper*, 90 parts; *tin*, 9 parts; *lead*, 1 part.

d. From *copper*, 91 parts; *tin*, 9 parts.

Obs. Several analyses have been made of ancient cutting instruments, from which it appears that the proportion of *tin* varies from 4% to 15%, a fact which tends to prove that more depends on the exact mode of tempering the alloy, than on the relative quantities of the ingredients. Lead and zinc are inadmissible in bronze for this purpose. One or two per cent. of iron may, nevertheless, be added with advantage. The ancient bronze used for springs contained only 3% to 4% of tin. The edges and lips of bronze mortars must be carefully tempered by heating them to a cherry red, and then plunging them into cold water, as unless so treated they are very apt to be broken in use.

BRONZE POWDER. *Prep.* 1. (*Gold-coloured.*)—*a.* From *Dutch foil*, reduced to an impalpable powder by grinding. Cheap and looks well, and is very durable when varnished.

b. From *gold leaf*, as last.

c. Precipitated *powder of gold.*

d. From *verdigris*, 8 *oz.; tutty powder*, 4 *oz.; borax* and *nitre*, of each, 2 *oz.; bichloride of mercury*, ¼ *oz.*; make them into a paste with oil, and fuse them together.

2. (*Iron coloured.*) *Plumbago* in fine powder.

3. (*Red.*) *Sulphate of copper*, 100 parts; *carbonate of soda*, 60 parts; mix, and apply heat until they unite into a mass; then cool, powder, and add of *copper filings*, 15 parts; again well mix, and keep the compound at a white heat for twenty minutes; lastly, cool, powder, wash, and dry.

4. (*Silver.*) *Bismuth* and *tin*, of each, 1 *oz.*, melted together, mixed with *running quicksilver*, 1 *oz.;* and the whole cooled and powdered. All the above are used by painters, japanners, and artists.

BRONZING. The process of giving a bronze-like, or an antique metallic appearance to the surface of copper, brass, and other metals.

1. To the surface of the specimen, thoroughly cleaned and polished, apply, with a brush, the common *crocus powder*, previously made into a paste with water. When dry, place it in an iron ladle, or on a common fire-shovel, over a clear fire for about one minute; and when sufficiently cold, polish it with a plate brush. This gives a very rich appearance similar to that on tea-urns; the shade depending on the duration of the exposure to the fire.

2. By substituting *finely powdered plumbago* for crocus powder in the above process, an equally beautiful, but deeper and more permanent bronze appearance is produced.

3. As the last two, but employing mixtures of *plumbago* and *crocus* in various proportions, according to the shade desired.

4. A *dilute solution of livers of sulphur, sulphuret of potassium*, or *hydrosulphuret of ammonia*, is applied with a camel hair pencil to the medal slightly warmed; when

dry, the surface is either left rough or "brushed off." This gives the appearance of very antique bronze.

5. *Verdigris*, 2 *oz.*, and *sal ammoniac*, 1 *oz.*, are dissolved in *vinegar*, 1 pint; and the mixture is diluted with *water*, until it tastes only slightly metallic, when it is boiled for a few minutes, and filtered for use. Copper medals, &c., (thoroughly clean,) are steeped in the liquor at the boiling point, until the desired effect is produced. Care must be taken not to keep them in it too long. When taken out they are carefully washed in hot water, and dried. Effect as last.

6. *Verdigris* and *vermilion*, of each, 2 *oz.; alum* and *sal ammoniac*, of each, 5 *oz.;* (all in fine powder;) *vinegar*, q. s. to form a thin paste. This is spread over the surface of the copper, which is then uniformly warmed by the fire, and afterwards well washed and dried. The tint may be deepened by repeating the process. The addition of a *little blue vitriol* inclines the colour to a chesnut brown, and a *little borax* to a yellowish-brown. Used by the Chinese for copper tea-urns, &c.

7. *Sal ammoniac*, 1 *oz.; cream of tartar*, 3 *oz.; common salt*, 3 *oz.; hot water*, 1 pint; dissolve; then add of *nitrate of copper*, 2 *oz.*, dissolved in ½ a pint of water; mix well, and apply it repeatedly to the article, placed in a damp situation, by means of a brush moistened therewith. Produces a very antique appearance.

8. *Salt of sorrel*, 1 *oz.; sal ammoniac*, 3 *oz.; distilled vinegar*, 1 quart; dissolve. As last. Much used for bronze figures.

9. A very weak solution of *bichloride of platinum*, applied with a hair pencil, or by immersion. Used for binding screws, holders, and other small articles of copper and brass.

10. *Sulphate of iron* and *sulphate of copper*, of each, 1 oz.; *water*, 1 pint; dissolve; wash the surface of the articles with it; let them dry; then apply a solution of *verdigris*, 2 *oz.*, dissolved in *strong vinegar*, ¼ pint; when dry, polish them with a soft brush, and either *plumbago* or *colcothar*. *Used* for tin castings.

11. The articles (properly cleaned) are either immersed in, or washed over, with a solution of *sulphate of copper* or of *verdigris*. In a short time they acquire a coating of pure metallic copper. This only answers with iron and steel goods. It is admirably suited for "castings."

12. An antique appearance may be given to silver by either exposing it to the *fumes of hydrosulphuret of ammonia*, or immersing it for a very short time in a solution of *hydrosulphuret of ammonia*, or in *dilute nitric acid.*

BRONZING (Surface). This term is applied to the process of imparting to the prominent portions of the surfaces of figures of paper, wood, plaster of Paris, &c., a metallic appearance. It is done by first giving them a *coat of oil varnish* or *size*, and when this is nearly dry, applying, with a dabber of cotton or a camel-hair pencil, any of the ordinary *metallic bronze powders*. Sometimes the powder is placed in a little bag of muslin, and dusted over the surface. The articles should be afterwards varnished.

Paper is *bronzed* by mixing the *bronze powders* up with a little *gum and water*, and burnishing the surface when dry and hard.

BROOM ASHES. From *broom stalks* burnt. Sometimes used as a diuretic in dropsy.

BROOM (Salt of). Obtained by dissolving *broom ashes* in *water*, filtering and evaporating. It consists principally of carbonate of potassa. It is sometimes used in dropsy, and as an antacid, &c.

BROSSE DE CORAIL. The roots of lucerne, (*medicago sativa*,) cleaned, dried, and hammered at the end. *Used* as a toothbrush. (Beasley.)

BROTH. The liquor in which flesh is boiled. Broth is distinguished from soup by its inferior strength and quantity of seasoning, &c. It contains much of the nutriment of the meat. (See *Boiling, Soup, &c.*

BROWN DYE. Every shade of brown may be produced, as the taste of the workman may dictate, by mixtures of reds and yellows with blues and blacks, or directly, by simple dyes.

1. (*For Cotton.*)—*a.* Give a mordant made of *acetate of alumina* and *acetate of iron*, followed by a bath of *madder* or *madder and fustic.* Excess of acetate of alumina turns it on the *amarinth tint;* the acetate of iron *darkens* it.

b. First "*gall*" the goods, then turn them for a short time through a *black bath;* next give them a *mordant* of *sulphate of copper*, pass them through a *decoction of fustic*, afterwards through a *bath of madder*, and again through the solution of sulphate of copper; drain, dry, and rinse well, and finish with a boil in *soap and water.* This gives a *chesnut brown.*

c. First give a *mordant of alum*, then a *bath of madder*, and next a *bath of fustic*, to which a little green copperas has been added. This gives a *cinnamon brown.*

2. (*For Linen.*) This is the same as for cotton.

3. (*For Silk.*)—*a.* One of the above mordants is followed by a bath made by mixing *equal parts of decoctions of logwood, fustic,* and *Brazil wood.* The shade may be varied by altering the proportions of the decoctions; Brazil wood *reddening,* logwood *darkening,* and fustic *yellowing,* the tint.

b. From *annotto,* 4 *oz.,* and *pearlash,* 1 *lb.,* dissolved in *boiling water,* and the silk passed through it for two hours, then taken out, squeezed dry, and passed through a *mordant of alum,* and next through a *bath of Brazil wood,* followed by another of *logwood* to which a little green copperas has been added.

3. (*For Wool.*)—*a.* Boil the cloth in a *mordant of alum, common salt,* and *water,* then dye it in a *bath of logwood* to which a little green copperas has been added. 2 *oz.* of *alum* and 1 *oz.* of *salt,* are required for every *lb.* of wool.

b. Boil the goods in a *mordant of alum* and *sulphate of iron,* then pass them through a *bath of madder.* The more copperas the darker will be the dye. The best proportions are 2 *parts of alum* and 3 *of copperas.*

c. Give a *mordant of alum and tartar,* then pass the goods through a *madder bath;* next run them through a *bath of galls and sumach* or *logwood* to which a little *acetate* or *sulphate of iron* has been added.

d. Mordant the cloth as last, dye in a *madder bath,* remove the cloth, add a little *acetate or sulphate of iron,* and again pass it through the bath, as long as necessary.

e. Give the cloth a light blue ground with *indigo,* then give it a *mordant of alum,* rinse, and lastly run it through a *bath of madder.*

f. A *mordant of alum and tartar,* followed by, first, a *bath of madder,* and afterwards a *bath of weld or fustic* to which a little iron liquor has been previously added. In this way every shade from *mordoré* and *cinnamon* to *dark chesnut* may be dyed.

g. Boil *fustic chips,* 1 *lb.,* for 2 hours; pass the cloth through the bath for 1 hour; take it out and drain; add *green copperas,* 1¼ *oz.; good madder,* 4 *oz.;* and again pass the cloth through the bath, until the proper tint is given to it. *Bronze browns,* and every similar shade, may be thus given by varying the proportions.

4. The following are called *substantive* or *direct* browns:—

a. Decoction of oak bark. It dyes *wool* of a fast brown of various shades, according to the quantity employed. *A mordant of alum* brightens it.

b. Infusion or decoction of walnut peels. Dyes *wool* and *silk* a brown, which is brightened by alum.

c. Horse-chesnut peels. A mordant of *muriate of tin* turns it on the *bronze,* and *sugar of lead,* on the *reddish-brown.*

d. Catechu, or terra japonica. For cottons; *blue vitriol* turns it on the *bronze,* and *green copperas darkens* it, when applied as mordants. *Acetate of alumina* as a mordant brightens it. The French colour, "*carmelite,*" is given with 1 *lb.* of *catechu,* 4 *oz.* of *verdigris,* and 5 *oz.* of *sal ammoniac.*

e. Sulphate or chloride of manganese. Dissolved in water with a little tartaric acid, it gives the bronze tint called '*solitaire.*' The stuff, after being passed through the solution, is turned through a *weak lye of potash,* and afterwards through another of *chloride of lime,* to brighten and fix it.

f. Prussiate of copper. This gives a *bronze* or *yellowish-brown* to silk. A *mordant* of *blue vitriol* is commonly first given.

BROWN PIGMENTS. The principal and most useful of these are—*umber, terra di sienna,* (both burnt and raw,) *Spanish brown,* and some of the *ochres.* Brown of almost any shade may be made by the admixture of *blacks* with *reds* and *yellows,* or with *greens,* in different proportions.

BROWNING. A fluid preparation used to colour and flavour gravies, soups, &c.

Prep. 1. *Sugar,* 4 *oz.,* and *butter,* 1 *oz.,* are melted in a frying-pan or ladle with a *table-spoonful of water,* and the heat is continued until the whole has turned of a *deep brown;* the heat is then lowered a little, and *port wine,* (1 pint) is gradually poured in; the pan is now removed from the fire, and the mixture well stirred until the roasted sugar is entirely dissolved; it is then put into a bottle, and ½ *oz.* each, of *bruised pimento* and *black pepper;* 5 or 6 shalots, (cut small;) a *little mace* and *finely-grated lemon peel;* and a quarter of a pint of *mushroom catsup,* added. The bottle is shaken daily for a week, and the clear liquid, after 5 or 6 days' repose, decanted into another bottle.

2. As the last, but using *strong beer,* or *water,* instead of wine. A *glass of spirits* may be added.

3. *Sugar colouring,* 1 pint; *salt,* ¼ *lb.; mushroom catsup,* ½ pint; *spice,* q. s.

4. *Lump sugar,* (powdered,) 2½ *lb.; salad oil,* ½ *lb.;* heat as before; then add, *port wine,* 1 quart; *Cape wine,* 3 quarts; *shalots,* 6 *oz.; mixed spice,* 4 *oz.; black pepper,* 3 *oz.; mace,* 1 *oz.; salt,* 1 *lb.;*

lemon juice, ¾ pint; *catsup*, 1 quart; mix well, as before.

5. *Good spirit colouring*, or *sugar colouring*, and *mushroom catsup*, of each, 1 gall.; *Jamaica pepper*, *black pepper*, and *shalots*, of each, 4 *oz.; cloves*, *cassia*, and *mace*, bruised, of each, ¾ *oz.;* boil in a covered vessel for 5 minutes; digest for 14 days, and strain.

6. *Colouring*, 3 pints; *mushroom catsup*, 1 pint; *common salt*, ¾ *lb.; chilly vinegar*, (strongest,) ½ pint; *spice*, q. s. Half a pint of *British brandy* or *rum* may be added.

Obs. The above are excellent additions to gravies, soups, &c.; and of themselves form most admirable sauces for fish, meat, and game.

BROWNING (for Gun Barrels). *Prep.* 1. *Aquafortis* and *sweet spirits of nitre*, of each, 1 *oz.; blue vitriol*, 4 *oz.; tincture of muriate of iron*, 2 *oz.; water*, 1 quart; dissolve.

2. *Blue vitriol* and *sweet spirits of nitre*, of each, 1 *oz ; water*, 1 pint; as last.

3. *Butter of antimony* and *sweet oil*, equal parts; mix. To be applied to the iron previously warmed.

Obs. The above fluids are rubbed on the barrel, (previously well polished, and cleaned off with whiting to remove the oil;) allowed to remain on until the next day, and then rubbed off with a stiff brush. The process may be repeated, if necessary. The barrel is next washed in *pearlash* or *soda water*, and afterwards well rinsed in *clean water;* it is then polished, either with the *burnisher*, or with a *brush* and *bee's wax*. Sometimes a coat of *tough shellac varnish* is applied.

BRUCINE. Syn. *Brucia*, *Brucina*, *Canirimine*, *Vomicina*. An alkaloid, discovered by Pelletier and Caventou, in the bark of the *brucia antidysenterica*, and afterwards, combined with strychnia, in *nux vomica.*

Prep. From *nux vomica seeds*, (ground,) or the *bark of brucia antidysenterica*, boiled in *dilute sulphuric acid*, the resulting liquor mixed with *hydrate of lime*, (in excess,) the crude precipitate boiled in *alcohol*, (sp. gr. 0·850), and the tincture filtered whilst hot. A mixture of crude strychnine and brucia is deposited as the fluid cools, and may be wholly obtained by evaporation. By powdering the mass and digesting it in *cold alcohol*, the brucine is dissolved out, and may be procured separately in crystals by spontaneous evaporation. It may be further purified by crystallization from *alcohol.*

Prop., *&c.* Soluble in 850 parts of cold, and about 500 parts of boiling water; added to the dilute acids until they are neutralized, brucia forms crystallizable salts, easily obtained by evaporation. Of these, the *sulphate* and *bisulphate*, the *hydrochlorate*, *phosphate*, *nitrate* and *binitrate*, *acetate*, *oxalate*, and *some others* have been examined. Most of these are very soluble in water. It is distinguished from *strychnia* by its ready solubility in both dilute and strong alcohol, and its insolubility in ether. With *nitric acid* it gives a fine red colour, which is removed by sulphuretted hydrogen and sulphurous acid. *Iodic acid*, *chloric acid*, and *chlorine* also turn it red.

The physiological effects of brucia are similar to those of strychnia, but it appears to possess only $\frac{1}{12}$th of the strength of that alkaloid. *Dose.* ½ gr. to 2 or 3 grs. daily, in the form of pills or solution; in similar cases to those for which strychnia is prescribed. It is poisonous. The antidotes are the same as for strychnia.

BRUISES may be rubbed with a little *opodeldoc* or *soap liniment;* or, if the inflammation be considerable, they may be washed with a little *weak goulard water*, or leeches may be applied to the part,

BRUNSWICK BLACK. See *Varnishes.*

BRUNSWICK GREEN. See *Green Pigments.*

BRYONINE. A peculiar bitter principle, extracted from the root of white bryony, (*bryonia dioica*,—Jacq.) It is obtained from the dry extract of the *expressed juice* by solution in *alcohol*, filtration, and cautious evaporation. It is a drastic purgative and poisonous. It forms a yellowish-white mass. It enters into the composition of several quack medicines.

BUBBLE AND SQUEAK. This is a species of olla podrida, variously prepared as the materials and fancy may dictate.

Prep. (Rundell.) *Slices of cold meat* are fried quickly until brown, and put into a dish to keep them hot. Then clean the pan from the fat; put in it *greens* and *carrots*, (previously boiled and chopped small;) add a *little butter*, *pepper*, and *salt;* make them very hot, and put them round the beef with a *little gravy.* Cold boiled pork is a better material for bubble and squeak than beef. In either case the slices should be very thin and lightly fried.

BUGS. The common *bed-bug* is the *cimex lectularius* of Linnæus; an insect of the order *hemiptera*, (half-winged.) Its introduction to England is believed to have occurred soon after the "great Fire of London," (A.D. 1666.) Human blood appears to be its favorite food; but it will also eat grain, seed, flour, dried paste, size, soft deal, beech, ozier, &c. Cedar, mahogany, and the odorous and harder woods, are usually avoided by this insect. Aromatics, perfumes, and strong odours generally, are unfavorable to its propagation.

Various means have been proposed to drive away these enemies of "*tired nature's sweet restorer, balmy sleep.*" Among the most certain of these is thorough *cleanliness*, and *ventilation.* The furniture brokers put articles infested with these insects into a room with doors and windows fitting quite close, and subject them to the *fumes of burning sulphur* or *chlorine.* In the *small way*, poisonous mixtures are commonly resorted to, with which the articles are washed. For the latter, nothing is so effective as *chloride of zinc.* The contents of a half-pint bottle of Crew's "Disinfecting Chloride of Zinc," (price 6*d.*) diluted with *twice its weight of water*, is sufficient for two or three bedsteads; and its use is also invaluable in a hygienic point of view. (See *Chloride of Zinc.*)

The following forms have also been recommended for this purpose:—

1. *Corrosive sublimate* and *muriatic acid*, of each, 1 *oz.; water*, 4 *oz.* Dissolve, then add *oil of turpentine* and *tobacco water*, of each, ½ pint. The tobacco water is made by steeping 1 *oz. of tobacco* in ½ *pint of water.* This mixture is applied with a paint brush. This is the common "*bug-wash*" of the shops. It is a "*deadly poison!*"

2. *Rectified spirit of wine*, ½ pint; *camphor*, 1 *oz.;* dissolve, and brush it over the cracks and joints. Very cleanly and effective.

3. As the last, but substituting *oil of turpentine* for *rectified spirit.* Nearly equal to No. 2.

4. *Pyroligneous acid*, 1 pint; *camphor*, (cut small), 1 *oz.;* dissolve. Resembles the last.

5. *Crude pyroligneous acid* or *essence of smoke.*

6. *Coal-tar naphtha* and *oil of turpentine*, equal parts. This should never be used by candle light, as it is excessively inflammable.

7. *Sulphuret of potassium*, (in powder,) 6 *oz.*; *soft soap*, ½ *lb.; oil of turpentine*, ¼ pint, or q. s. to make a species of soft ointment. The odour of the last three is rather persistent and disagreeable.

8. *Strong mercurial ointment*, *soft soap*, and *oil of turpentine*, equal parts, triturated together. Greasy, dirty, and less effective than some of the others.

9. *Scotch* or *Welsh snuff*, mixed with twice its weight of *soft soap.*

Obs. Out of the above list there is ample room for selection. The following extract may be useful to persons interested in the subject:—"These pests exist only in dirty houses. A careful housewife or servant will soon completely destroy them. The surest method of destruction is to catch them individually when they attack the person in bed. When their bite is felt, instantly rise and light a candle and capture them. This may be troublesome, but if there be not a great number, a few nights will finish them. When there is a large number, and they have gained a lodgment in the timbers, take the bed in pieces, and fill in all the apertures and joints with a mixture of *soft soap* and *Scotch snuff.* A piece of wicker-work, called a *bug-trap*, placed at the head of the bed, forms a receptacle for them, and then they may be daily caught till no more are left. Oil-painting a wall is a sure means of excluding and destroying them." (Chambers' Inf. for the People.) It has been asserted that these insects are so fond of *narrow-leaved dittany* or *pepperwort*, (lepidium ruderale,) that if a bunch of it be suspended near their haunts, they will settle in it, and may be thus easily captured. It is said to be commonly used as a *bug-trap* in some of our rural districts.

BUNION. This is a swelling on the ball of the great toe, and results from pressure, and irritation by friction. The treatment recommended for corns applies also to bunions; but in consequence of the greater extension of the disease, the cure is of course more tedious. When a bunion is forming it may be effectually stopped by poulticing it, and carefully opening it with a lancet. See *Corns.*

BUNS. *Prep.* 1. (*Cross Buns.*) *Flour*, 2½ *lb.; sifted sugar*, ½ *lb.; coriander seeds*, *cassia*, and *mace*, (powdered,) q. s.; make a paste with *butter*, ½ *lb.*, dissolved in *hot milk*, ½ pint; work with three tablespoonfuls of yeast; set it before the fire for an hour to rise, then make it into buns, and again set them before the fire on a tin for half an hour; lastly, brush them over with warm milk, and bake them to a nice brown in a moderate oven.

2. (*Madeira.*) *Butter*, 8 *oz.;* 2 *eggs*; *flour*, 1 *lb.; powdered sugar*, 6 *oz.;* half a *nutmeg*, (grated;) *powdered ginger* and *caraway seeds*, of each, ½ teaspoonful; work well together, then add as much *milk* as required, and bake on tins in a quick oven.

3. (*Plain.*) *Flour*, 2 *lb.; butter* ¼ *lb.; sugar*, 6 *oz.;* a little *salt*, *caraway*, and *ginger;* make a paste with *yeast*, 4 spoonfuls,

and *warm milk*, a sufficient quantity, as before.

4. (*Penny.*) To the last add *currants*, well washed, ½ *lb.;* and *water*, stained by steeping a little *saffron* in it, q. s. to give a light yellow tinge to them.

5. (*Rich.*) *Flour*, 3 *lb.;* *sugar*, 1 *lb.;* *butter* 2 *lb.;* (melted, and beat with) *rose water*, 4 *oz.;* *currants*, 1 *lb.;* *yeast*, ¼ pint; as before.

6. (*Bath.*) As the last, but adding a little *candied lemon* and *orange peel*, and putting a little *grated peel* and a few *caraway comfits* on the top of each.

Obs. The great secret in producing good buns is, the use of sweet yeast and the best currants only, and thoroughly washing the latter, in a sieve or colander, to remove grit before adding them to the dough. The buns of most of the shops are bitter and gritty, from neglecting these precautions. An eminent London pastrycook informs us that he finds it more difficult to get a "good hand at buns" than in any other department of his trade.

BURGLARIES. The common precautions of locks and bolts, alarum bells and fire-arms, are frequently found useless in preserving houses from burglars; but a *light* in the upper part of the house, or a *small dog*, on the ground-floor, with the means of its running into a place of safety from its enemies, has been seldom known to fail. A combination of the two would therefore be doubly effective. The bark of the dog, and the fear of detection by the approach of the light, will deter rogues of common pluck and feeling.

BURNS AND SCALDS. When the injury is merely superficial, a little *creosote* may be applied to the part. If a *scald*, the vesicle should be first pierced with a needle, and the aqueous fluid gently squeezed out. When creosote is not procurable, a *liniment* formed of equal parts of *soft soap*, *basilicon ointment*, *oil of turpentine*, and *water*, may be used instead. When the part feels very hot and painful, a poultice may be applied, on the surface of which a *few drops of creosote*, or of the *liniment*, should be spread with a knife. This treatment will generally allay the pain, and may be followed by a dressing of spermaceti ointment, or any other like simple preparation. Creosote produces scarcely any smarting or pain, as is frequently asserted, whilst it rapidly removes the burning sensation, and the charred surface assumes a dry scabby appearance, which by dressing with simple ointment, soon comes off and leaves the part beneath in a sound and healthy state. If a poultice be applied it is best to keep it on until the next day. Plunging the part into *cold water* IMMEDIATELY after the receipt of an injury of this kind, will frequently prevent any further remedy being required. In all cases, cooling laxative medicines, *as castor oil*, *Epsom salts*, *&c.*, should be administered.

BURNING LENS. The following method of forming cheaply and expeditiously a burning lens of great power, will be duly appreciated by the chemical and optical experimentalist:—Take two *circular discs of plate glass*, of the requisite dimensions, and place one at each end of a shallow tube; (an inch long will be quite sufficient for any size;) keep them firmly in position by means of screw clamps, in an analogous manner to the two lenses for showing Newton's concentric coloured rings. To the tube is fitted a short tube with a stop-cock attached; to the end of which a condensing syringe is fixed, and the cavity between the glasses filled with *turpentine*, *varnish*, *bleached oil*, or any other suitable substance of a high refractive power. When the glasses have attained the requisite degree of curvature, the stopcock may be shut, the syringe screwed off, and the fluid lens (for such in reality it is) mounted for use. (Chemist, iii, 50.)

BUTTER. Syn. *Butyrum*,—Lat. Butter is, perhaps, in more general use, and subject to greater variations in quality, than any other substance employed in domestic economy. It is consumed by every grade of society, and, when *good*, appears not only to be *wholesome*, but extremely *nutritious*. Some writers inveigh against the use of butter as universally pernicious; but they might with equal reason condemn the vegetable oils, which form a considerable part of the diet in the southern climates, and seem to have been beneficially intended by nature for that purpose. That butter may be improper in some bilious constitutions, there can be little doubt; but the same objection tells against every other substance used as food; for instances are not uncommon of the most delicate and nutritious articles disagreeing with persons, under certain circumstances, or who are of peculiar idiosyncracy. To obviate all objections, it would be a commendable practice for the bilious, at breakfast, first to eat some *dry bread*, (crust is best,) and to chew it well before taking any butter. By these means such a quantity of saliva would be carried into the stomach as would be sufficient for the purpose of digesting the usual amount of oil and fatty matter taken with our food.

The *process of making butter* by the common operation of churning, is extremely simple, and is well known. The chief objects to attend to, are maintaining a proper temperature, and a certain degree of exposure to the air. Extreme cleanliness must also be observed; the churn and other utensils being frequently scalded out with water. When the butter is come, it should be put into a fresh scalded pan, or tub which has been standing in cold water, cold water poured on it, and after it has acquired some hardness, it should be well beaten with flat boards until not the least taste of the buttermilk remains, and the water, which must be often changed, becomes quite colourless and tasteless. A *little* salt may then be worked into it, after which it may be weighed and made into forms, which should then be thrown into cold water contained in an earthen pan provided with a cover. In this way nice and cool butter may be obtained in the hottest weather.

At *Dumbarton*, the newly separated butter is put into a clean vessel, and a corn sickle is drawn several times crosswise through it, to extract any hairs that may adhere to it. This operation is performed in cold spring water, and is followed by thoroughly washing it therein. 10 *oz.* of salt are now added to every stone weight of butter, and well mixed in.

In *Devonshire* the milk is scalded in copper pans over a charcoal fire, and the cream collected as soon as it rises, or when the whole has got cold. It is then churned in the usual way. On the *small scale*, the butter is commonly obtained from this cream by patiently working it with the hand in a shallow pan or tub. Without care the cream is apt to absorb some of the fumes from the charcoal, which impart a peculiar taste to the butter. This is the reason why some of the Devonshire butter has a slight "smoky" flavour. It may be removed by thorough washing in cold water.

Choice. Fresh butter has a pleasant butyraceous smell, and is of an equal colour throughout its substance. If it smells sour, the buttermilk has not been well washed out, and if it is streaked or veiny, it is probably mixed with stale butter or lard. A good way to try butter is to insert a knife into it, which should not smell rancid and unpleasant when drawn out. Rancid and stale butter is capable of producing dangerous symptoms when eaten in quantity.

Pur. The cheaper kinds of butter are frequently adulterated with *flour, oatmeal, pea flour, lard, &c.,* as well as with a large quantity of *salt*, and *water*. The trick is concocted between the Irish factors and the London dealers. The higher priced article is seldom mixed with anything beyond an excess of salt and water, notwithstanding the assertions of alarmists to the contrary. The presence of *lard* may be detected by the flavour and paleness of the colour. A little of the sample adulterated with the other substances named, if melted in a glass tube or phial, will separate into strata, which are very marked when cold.

Pres. 1. Melt the butter in well glazed earthen pans, at a heat not exceeding 180° Fahr., in a water bath, and keep it heated, skimming it from time to time, until it becomes quite transparent, then pour off the "clear" into another vessel, and cool it as quickly as possible, by placing the vessel in cold water or ice. This is the method employed by the Tartars who supply the Constantinople market. In this state it may be preserved perfectly fresh for 6 or 9 months, if kept in a close vessel and a cool place. This is the plan recommended by Thènard. Mr. Eaton states that butter melted by the "Tartarian method" and then salted by "ours" will keep good and fine-tasted for two years.

2. Mix well together 1 *oz.* each, of *saltpetre* and *white sugar*, and 2 *oz.* of the best *Spanish great salt*, all in very fine powder; add 1 *oz.* of this mixture to every *lb.* of butter, and thoroughly incorporate them together. The butter thus prepared is then to be tightly pressed into clean glazed earthenware vessels, (or casks,) so as to have no vacuities. This plan is recommended by Dr. Anderson, who declares that "butter so prepared will keep in a cool place for years; and will bear a voyage to the East Indies, if packed so as not to *melt*." It does not taste well before it has stood for a fortnight or three weeks, after which it acquires a rich marrow flavour, which no other butter ever possesses. The best method to preserve butter from the air is to fill the pots to within an inch of the top, and to lay on it common coarse grained salt, to the depth of a ¼ an inch, or ½ an inch, and then to cover each pot with any flat article, as a slate or plate. The salt by long keeping will run to brine, and form a layer on the top of the butter, which will effectually keep out the air, and may at any time be very easily removed by turning the pot on one side.

3. *Fresh butter*, 21 *lb.; salt*, 1 *lb.; saltpetre*, 1 *oz.* This is the common pro-

portions for the *best salt butter* of the shops.

4. *Fresh butter*, 18 *lb.; salt*, 1 *lb.; saltpetre*, 1½ *oz.; honey* or *fine brown sugar*, 2 *oz.* Superior to the last.

Rancid butter may be restored by melting it in a water bath with some *fresh-burnt* and *coarsely powdered animal charcoal* (which has been thoroughly freed from *dust* by sifting), and straining it through clean flannel. A better and less troublesome method is to *well wash it first* with some good *new milk*, and *next* with *cold spring water*. Butyric acid, (on the presence of which rancidity depends,) is freely soluble in fresh milk.

The *turnip-flavour*, arising from the cows being fed on turnips or cabbages, is said to be removed by one or other of the following methods:—1. When the *milk* is strained into the pans, put to every 6 gall., 1 gall. of *boiling water*.—2. Dissolve 1 *oz.* of *nitre* in a pint of *spring water*, and put a ½ pint of the solution to every 15 gall. of *milk*. — 3. Keep back a ¼ pint of the *sour cream* when you churn, and put it into a well-scalded pot, into which you are to gather the next cream; stir that well, and do so with every fresh addition.

Obs. We have been less diffuse on the subject of butter-making in this edition than in the last, in consequence of most dairy farmers now using one or other of the "patent churns," to every purchaser of which ample printed directions of the most reliable character are always given.

BUTTER (Anchovy). From *anchovies*, (boned and beaten to a paste,) 1 part; *butter*, 2 parts; *spice*, q. s.; thoroughly incorporated together.

BUTTER (Clarified). *Fresh butter* melted in a *water bath*, allowed to settle and the clear poured into an earthenware basin or pot, set in cold water, to cool it as quickly as possible, without letting it crystallize. It keeps a long time without becoming rank. (See *above.*)

BUTTER (Honey). *Prep.* From the finest *Narbonne honey*, 2 *oz.;* with *good butter*, 1 *lb.* *Used* as a delicacy for children, and sick or aged persons.

BUTTER (Melted). *Prep.* Beat up about 1 *oz.* of *flour* with 4 *oz.* of *butter*, in the cold, until it is evenly and thoroughly mixed, then add 4 or 5 tablespoonfuls of hot *milk*, put the whole into a small saucepan, and continue shaking it, all in one direction, until it *gently* simmers; then remove it from the fire for use.

BUTTER (Orange). *Prep.* 1. From 6 *eggs*, 2 *oz.* of *powdered sugar*, and 4 *oz.* of *butter*, beaten together with a little *orange flower water*. Sometimes 1 or 2 *oz.* of *blanched almonds* or *almond paste* are added.

2. From *butter*, 1 *lb.; syrup of orange peel*, 4 *oz.* Both are eaten as a delicacy. *Lemon butter* is made in a similar manner.

BUTTER OF CACAO. Syn. *Cocoa-nut oil.* From the nut, by bruising it and boiling it in water; the oil floats, and is skimmed off when the water has cooled. It is much used in perfumery and for burning in lamps. When mixed with a little *caoutchoucine*, (the distilled spirit of Indian rubber,) it loses its concrete form, and assumes the fluidity of common oil, at the same time that its illuminating power is vastly increased.

BUTTER OF NUTMEGS. Collected from the surface of the water in the still, after the distillation of the essential oil of nutmegs.

BUTTER OF ROSES. *Prep.* By distilling damask roses. It separates slowly from the water in the receiver. It has little smell, and is hence used to dilute the odour of musk, ambergris, and civet.

BUTTER OF WAX. Prepared by distilling bees' wax. A factitious kind is made.

BUTTERMILK. Buttermilk left from butter prepared from sweet cream is not only very delicious, but exceedingly wholesome and nutritious. It is eaten with fruit, puddings, and cakes, and is said to possess the property of allaying the nervous irritability induced by excessive tea-drinking.

BUTTONS. See *Brass* and *Gilding.*

BUTYLAMINE. See *Petinine.*

BUTYLE, Syn. *Valyl.* An ethereal liquid boiling at about 226° Fahr.; formed along with *butylene* and other substances during the electrolysis of *valerianic acid*, and the *valerianates.*

BUTYLENE. See *Butyle.*

BUTYRATE OF BARYTA. *Prep.* Saponify *butter* with *boiling caustic alkali*, and decompose it by adding a solution of *tartaric acid*; filter and distil, neutralize the distilled liquor, by adding *hydrate of baryta*, and evaporate; the *first* crystals that form are *caprate of baryta; the next, caproate of baryta*; and the *last, butyrate of baryta.* This salt is very soluble in water, and hence is easily separated from the others. *Used* for making butyric acid.

BUTYRIC ACID. An oily acid obtained by Chevreul from butter.

Prep. From *butyrate of baryta* or of *magnesia*, by adding a little *sulphuric* *acid,* in quantity not quite sufficient to decompose the whole of the salt; the clear liquor, filtered and distilled, yields butyric acid, from which the water may be removed by *chloride of calcium.* A thin colourless liquid, of pungent rancid odour, and sour taste, miscible with water and alcohol; boiling at 327° Fahr.; sp. gr. 0·963.

BUTYRIC ACID (Anhydrous). A colourless liquid somewhat resembling butyric ether, boiling at 320° Fahr. Its salts are called *butyrates.* See *Acids.*

BUTYRINE. An oily substance obtained by Chevreul from butter, of which it forms the characteristic portion.

Prep. Keep *clarified butter* in a porcelain vessel, at a heat of 66° for some days; carefully collect the oily portion which separates, and agitate it with an equal weight of *alcohol* of 0·796 for 24 hours; next pour off the clear portion and evaporate; treat the oily residuum with a little *carbonate of magnesia,* to remove any free acid, and wash off the *butyrate of magnesia* thus formed with water; lastly, heat the remaining fatty matter in *alcohol,* filter and evaporate.

BUXINE. An alkaline substance detected by M. Faure in the *buxus sempervirens,* or common box tree.

CABBAGE. This common esculent and its varieties, are cultivated specimens of the *brassica oleracea,* (Linn.,) and belong to an extensive and valuable genus of plants, of the natural order *cruciferæ.* After the potato, the cabbage is doubtless more extensively used by the masses of the people, than any other fresh vegetable. When young and properly dressed, it forms an agreeable and wholesome addition to animal food, the grossness of which, it is said, it tends to correct. It has, however, a greater tendency to putrefaction than most other vegetable substances, and emits, whilst in this state, a very disagreeable effluvium, strongly resembling that from animal matter in a state of decomposition. It should therefore be eaten *only* when freshly gathered and cooked; and the unconsumed portion, as well as the water in which it has been boiled, should be at once thrown away. The "concentrated perfume of cabbage water," is aptly alluded to by a celebrated novelist as symbolical of a fetor of the worst class. So far, however, from inducing a putrid disposition in the body, cabbages and similar vegetables have the very opposite effect. Nevertheless, persons troubled with weak digestion, or who have a tendency to flatulence, diarrhœa, or worms, would do well to avoid them. On the other hand, their use is particularly serviceable in scurvy, and several skin diseases.

It has been asserted that *cabbages, cauliflowers, broccoli, celery,* and some other culinary vegetables, may be *preserved* in a *fresh state* for some time, by cutting them so that they may have about two inches of stem left below the leaves, scooping out the pith as far down as a small knife will reach, and then suspending them perpendicularly by means of a cord, in an inverted position, in some cool situation, and daily filling up the bottom part of the stem with clean cold water. By this method it is stated that a supply of green vegetables may be readily obtained during a severe winter, and on ship-board.

Cabbages, broccoli, &c., are dressed by simply throwing them into *boiling water,* and boiling them until tender. A few minutes is sufficient for this purpose. A pinch of *salt of tartar,* or *carbonate of soda,* is commonly added to the water to preserve the green colour of the vegetables.

CACHOU AROMATISE. Mouth lozenges intended to deodorize and perfume the breath. They are much used by smokers and bacchanals. The form under which they are generally prepared for sale, is that of *one grain,* or 1½ *grain pills,* neatly silvered. Originally they were composed chiefly of *catechu* and *sugar,* flavoured and perfumed with the *stronger aromatics;* but at the present day the catechu, from which they derive their name is not unfrequently omitted. For their preparation, see *Pills* and *Lozenges.*

CADMIUM. Syn. *Klaprothium, Melinum.* A metal discovered by Stromeyer and Hermann in the ores of zinc.

Prep. 1. (Stromeyer.) The *cadmo-zincic ore* is dissolved in an excess of *dilute sulphuric* or *hydrochloric acid,* by heat; a stream of *sulphuretted hydrogen* is passed through the solution, the resulting precipitate (*sulphuret of cadmium*) dissolved in *nitric acid,* and the solution evaporated to dryness; the residuum is dissolved in *water,* the solution precipitated with *carbonate of ammonia,* in excess, and the precipitate (*carbonate of cadmium*) collected, mixed with *charcoal,* and heated to redness in a crucible apparatus, so arranged as to condense the fumes. *Metallic cadmium* sublimes.

2. (Wollaston.) A solution of the ore, obtained as above, is placed in a *platinum capsule,* and a piece of *metallic zinc* is plunged into it. In a short time the *cad-*

mium is precipitated, and attaches itself to the sides of the capsule, when it is collected, washed, and dried.

3. (Herapath.) When zinc is obtained by distilling its ores, *per descensum*, the first portion of the *metallic fumes* evolved burn with a brownish flame, and deposit *oxide of cadmium*, which is subsequently reduced by distillation with *charcoal.* Thousands of pounds of cadmium are yearly wasted at the zinc works which might be easily collected in a similar manner.

Prop., &c. Cadmium greatly resembles tin in appearance, but it is harder than that metal; it is very malleable; melts a little below 500° Fahr.; and is about as volatile as mercury. Dilute sulphuric acid, and dilute hydrochloric acid, have little action on it in the cold; nitric acid rapidly oxidizes and dissolves it. Sp. gr. 8·7. With oxygen it forms an oxide.

Cadmium and its ores and salts, are recognised as follows:—1. Mixed with carbonate of soda, and exposed on a *charcoal support* to the *reducing flame* of the blowpipe, the charcoal becomes almost instantly covered with a reddish-yellow incrustation of oxide of cadmium, commonly forming a circle or zone.—2. Caustic soda and potassa give a white precipitate (*hydrated oxide*) in solutions containing cadmium, *insoluble* in excess of the precipitant.—3. Ammonia gives a similar white precipitate, freely *soluble* in excess.—4. The alkaline carbonates (ammonia, potassa, soda,) give white precipitates, (*carbonate of cadmium*,) insoluble in excess.—5. Sulphuretted hydrogen, and hydrosulphuret of ammonia, give a bright yellow precipitate, (*sulphuret of cadmium*,) which is insoluble in dilute acid, alkalies, sulphurets, and cyanide of potassium, but readily soluble in both hydrochloric acid, and nitric acid, especially with heat.—6. The salts of cadmium are readily distinguished from those of arsenic, by the precipitated sulphuret (see 5) being *insoluble* in ammonia, and *soluble* in hydrochloric acid, and being capable of sustaining a white heat without subliming.

The *salts of cadmium* greatly resemble the corresponding salts of zinc, but they are more energetic in their action. The only one used in medicine is the sulphate. They are nearly all readily formed by dissolving the *hydrated oxide* or *carbonate* in the given acid, and evaporating and crystallizing the solution. Some may be obtained by double decomposition.

CADMIUM (Carbonate of). Syn. *Cadmii Carbonas*,—Lat. From a solution of *sulphate* or *chloride of cadmium*, and an *alkaline carbonate;* the precipitate being collected, washed, and dried by a gentle heat. A white powder.

CADMIUM (Chloride of). Syn. *Hydrochlorate of Cadmium; Cadmii Chloridum, Cadmii Hydrochloras*, — Lat. *Prep.* 1. (Pure.) By dissolving *carbonate* or *oxide of cadmium* in *hydrochloric acid*, and crystallizing by gentle evaporation. Prismatic crystals; very soluble in water.

2. (Turner.) By exposing the product of the last process to heat. Amorphous.

3. From *crude cadmium* or its *oxide*, and *hydrochloric acid*, as last.

CADMIUM (Iodide of). Syn. *Hydriodate of Cadmium; Cadmii Iodidum, C. Hydriodas*,—Lat. From *cadmium* and *iodine*, as iodide of zinc.

CADMIUM (Oxide of). Syn. *Protoxide of Cadmium; Cadmii Oxydum*,—Lat. *Prep.* 1. (Hydrated.) From *sulphate* or *hydrochlorate of cadmium*, and a *solution of caustic alkali;* observing to well wash and dry the precipitate. A white powder, freely soluble in acids.

2. (Anhydrous.) By igniting the *hydrated oxide*, or the *carbonate* or *nitrate of cadmium.* That from the first two has a pale-brown colour; that from the nitrate has a dark-brown tint and a semi-crystalline appearance. The former have been proposed to be used as pigments.

CADMIUM (Phosphuret of). By direct union of the elements by heat.

CADMIUM (Sulphate of). Syn. *Cadmii Sulphas, Cadmium Sulphuricum, Klaprothrium Sulphuricum*, — Lat. *Prep.* 1. From *carbonate* or *oxide of cadmium* and *dilute sulphuric acid*, as the chloride.

2. (Cottereau.) *Oxide of cadmium*, 1 *oz.; sulphuric acid*, q. s.; dissolve, evaporate, and crystallize.

3. (Pereira.) *Sulphuric acid*, 6½ parts; *water*, 15 parts; mix; add *cadmium*, 7 parts; dissolve, evaporate to dryness, redissolve in water, filter, and evaporate by a gentle heat, so that crystals may form.

Prop., &c. Efflorescent, rectangular, prismatic crystals; very soluble in water; tastes astringent. It is about 4 times as strong as sulphate of zinc, and is used in similar cases. *Dose.* 3 to 10 gr. *Externally*, (½ to 3 or 4 gr. to *water*, 1 oz.;) in specks of the eye, opacity of the cornea, chronic ophthalmia, &c. As an ointment, 10 to 12 gr. to *lard*, 1 oz.

CADMIUM (Sulphuret of). This occurs native in zinc-blende. It may be prepared artificially, either by fusing its elements together, only passing *a stream of sulphuretted hydrogen* through a *solution* of the *chloride*, *nitrate*, or *sulphate*. As prepared by precipitation, it has a rich yellow or orange colour, and is fusible at a high temperature. It has been recommended for use as an orange-red pigment.

CAFFEIC ACID. *Chlorogenic Acid.* A white powder, discovered by Runge in coffee, in which it exists in combination with potassa, (*caffeiate of potassa*,) and caffeine, and is then very soluble in alcohol. Pfaff declares that the aroma of coffee is dependent on the volatilization, or rather, the decomposition of this acid.

CAFFEIN. Syn. *Caffeine*, *Caffeina*, *Theine*, *Guaranine*. A peculiar nitrogenized principle, discovered by Robiquet in coffee.

Prep. 1. Coarsely powdered *raw* or *unroasted coffee*, is boiled in *water*, and *acetate of lead* added to the filtered decoction to throw down the extractive and colouring matter; the excess of lead is next precipitated with *sulphuretted hydrogen*, and the liquid filtered and evaporated by a gentle heat; the residuum is dissolved in boiling water, the solution agitated with *freshly-burnt animal charcoal*, filtered, evaporated, and crystallized. By redissolving the product in *hot alcohol*, it may be obtained in white, shining, silky filaments, as the solution cools.

2. (H. J. Versman.) *Quicklime*, 2 *lb.*; *water*, q. s. to form a hydrate; *raw coffee*, (bruised,) 10 *lb.*; mix, put it into a displacement apparatus, and cause *alcohol* of 80$^0_0$ to percolate through the mixture, until the fluid obtained no longer contains caffeine; the mass in the percolator is then roughly ground to powder, mixed with a fresh quantity of *quicklime*, and the process of percolation repeated with fresh *alcohol*, as before. The spirit is next distilled from the mixed tinctures in a retort, and the residuum washed with a little *warm water* to remove the oil; the evaporation is then gently conducted until a crystalline mass is obtained, which is further freed from adhering oil by pressure between folds of blotting paper. It is purified by redissolving it in boiling water or hot alcohol, &c., as before.

Prop., *&c.* Soluble in 100 parts of cold water; freely soluble in hot water, and in water acidulated with an acid; slightly soluble in cold alcohol; it tastes slightly bitter, and possesses feeble basic properties. With the sulphuric and hydrochloric acids it forms crystallizable compounds. The salts of caffeine may be made by dissolving it, to saturation, in the dilute acid, and evaporating the solution by a very gentle heat. It forms splendid double salts with bichloride of platinum and terchloride of gold.

Remarks. Caffeine was originally thought to be a principle peculiar to *coffee*, but the researches of Pfaff and Liebig have shown that it also occurs in *tea*, and in the leaves of the *guarana officinalis*, and the *ilex paraguayensis*. It is a remarkable fact that both tea and coffee contain this substance, and that both of them are used by whole nations as beverages. Liebig has shown the similarity of composition between caffeine, and taurine, one of the constituents of bile. He believes that the former assists in the production of the latter, and thus facilitates the process of respiration.

The quantity of caffeine in good coffee varies from ½ to ¾ per cent.

Caffeine has been recommended in those pains that affect only one side of the head, (*hemicrania*;) in *doses* of 1 to 3 gr. Its physiological action is very trifling, notwithstanding all that has been said to the contrary. We took 20 gr. daily, of *pure caffeine*, for above a month, without experiencing any other effect than a *very slight* elevation of spirits after each dose, similar to that produced by a small quantity of spirits of sal volatile.

CAFFEIN-MUREXIDE. Formed by treating *amalic acid* with *ammonia*, in a similar manner to that by which ordinary murexide is obtained from alloxantin. It forms crystals possessing a green metallic lustre, and yielding deep crimson solutions.

CAFFEONE. A brown aromatic oil formed during the roasting of coffee.

CAINCIC ACID. An acid principle, discovered by Pelletier and Caventou in the bark of the cainca root of Brazil. It is extracted by alcohol, has a bitter taste, and is crystallizable.

CAKES. A species of fancy bread or trifle familiar to every one.

Before proceeding to the actual operation of cake-making, the various materials which are to enter into their composition undergo a certain amount of preparation. For this purpose every article is got ready about an hour previously to its being wanted, and is placed before the fire, or upon a stove, that it may become *gently* heated. Without these precautions it is impossible to produce good cakes. The *flour* is thoroughly dried, and warmed. The *currants* are nicely washed in a hair sieve, wiped dry in a cloth, and then set before the fire. Before use, they are dusted over with a little flour. The *sugar* is rubbed to a fine powder, and passed through a sieve. The *eggs* are well beaten in a basin, and strained. The *butter* is melted by being placed in a basin set in hot water, and is afterwards well beaten up with a little warm milk. The *lemon-peel* is cut very thin, and beaten in a mortar to a paste or powder, with lump sugar; or for common purposes, it is grated. The *caraways*, *ginger*, and other flavouring ingredients, are preferred in the form of *fine powder*, or are made into an essence, by digesting them in *spirit of wine;* the first is the most common method. The *milk and water* is made lukewarm. When all these things are ready and have stood a sufficient time, they are put into a pan, one after another, in the proper order, and well beaten together, by which the lightness of the cakes is considerably increased.

In *plum-cakes*, as well as in some other varieties, a *little yeast* may be added after the *butter*, and the mass allowed to rise a little, and then again well kneaded, by which not only less butter and eggs may be used, but the products will be both lighter and more wholesome. Good *stale bread*, well soaked in *hot milk* or *water*, and then beaten to a paste, and passed through a fine sieve, forms an excellent thing to mix up the ingredients with, and produces a very light and nutritious cake. A better plan, however, than either of the preceding, is to use Jones' "patent flour," either entirely, or mixed with other flour, by which all the effects of fermentation with yeast may be instantly produced to perfection. Indeed the results are truly astonishing, and are absolutely invaluable to the cook and housewife. Cakes "wetted up" with milk are "richer," but do not keep so well as those without it; they get stale sooner, and when in that state are far from agreeable to the palate.

Cakes are preferably *baked* on flat tins or in little "tin shapes," which should be first well buttered.

Cakes should be *kept for store* in *tin canisters;* wooden boxes, unless very well seasoned, are apt to give them an unpleasant taste. Brown paper linings and wrappers should be avoided for the same reason. See *Biscuits*, *Bread*, *Icing*, *Stains*, *&c.*

CAKES (Almond). *Prep.* 1. From *sweet almonds*, (blanched and beaten to a smooth paste,) *flour* and *powdered sugar*, of each, ½ *lb.;* 7 *eggs*, and the *outside peel of* 4 *lemons*, (shredded small.) The almonds, sugar, lemon-peel, and eggs, are beaten together, until as white as sponge paste; the flour next worked in, and the paste put into buttered moulds, and baked in a slack oven, with 8 or 10 thicknesses of white paper under them and one or two over them.

2. *Almonds*, 1 *lb.; sugar*, ½ *lb.; rose water* or *orange-flower water*, ¼ pint; *flour*, ¾ *lb.;* 3 eggs; as above. Some persons ice these cakes.

CAKES (Banbury). From *butter* and *dough fermented for white bread*, of each, 1 *lb.*, as in making puff paste, then rolled out very thin, and cut it into oval or triangular pieces, or other shapes. On these are placed a mixture of *currants* and *moist sugar*, equal parts, wetted with a little *wine* or *brandy*, and the paste being closed up, they are placed on a tin with the closed side downwards, and baked. A little *powdered sugar*, flavoured with *candied peel*, (grated,) or *essence of lemon*, is sifted over them as soon as they come out of the oven. In the common cakes of the shops, the brandy is omitted, and lard is used for butter, and less of it.

CAKES (Bath). *Prep.* From *butter*, ½ *lb.*, *flour*, 1 *lb.*, 5 *eggs*, and a *cupful of yeast;* when risen, add *powdered sugar*, 4 *oz.*, and *caraways*, 1 *oz.* Bake them on tins.

CAKES (Cheese). *Prep.* 1. Curdle some warm *new milk* with rennet, drain the curd in a linen bag, and add ¼ of its weight, each, of *sugar* and *butter*, 6 *eggs*, some *grated nutmeg*, and a *little orange-flower* or *rose water*.

2. (*Almond Cheese Cakes.*) To the above add as much *blanched almonds*, beaten to a smooth paste, as there is butter, and an equal weight of *macaroni*.

3. (*Lemon Cheese Cakes.*) To the first form add *lemon peel*, (grated fine,) or *essence of lemon*, q. s.

CAKES (Diet). Syn. *Diet Bread. Prep.* 1. Dissolve *sugar*, 1 *lb.*, in *milk*, ½ pint; add 6 *eggs*, and whisk the mixture to a full froth, then cautiously stir in *flour*, 1 *lb.*, beat it for ¾ hour, and immediately bake it in a quick oven. It may be baked whole or divided into small cakes.

2. From *fine flour* and *powdered sugar*, equal parts; 6 eggs; and the *juice* and *rind* (grated) *of* 1 *lemon*.

CAKES (Drop). *Eggs*, 1 dozen; *rose-water*, 1 tablespoonful; *powdered sugar*, ½ *lb.; fine flour*, ½ *lb.;* and *caraways*, ½ *oz.* Drop it on wafer paper, and bake as before.

CAKES (Ginger). *Sugar*, 1 *lb.; powdered ginger*, 4 *oz.; flour*, 2 *lb.; water*, 1 pint; butter, ½ *lb.; candied orange peel*, 8 caps, (grated.)

CAKES (Lemon). *Prep. Flour* and *sugar*, of each, 1 *lb.; eggs*, 1 dozen; *grated peel* and *juice of* 4 *lemons;* whisk the eggs to a bright froth, then gradually add the rest.

CAKES (Marlborough). *Prep.* Beat

8 *eggs* and 1 *lb.* of *pounded sugar* ¾ hour; then add *fine flour*, 1 *lb.;* and *caraway seeds*, 2 *oz.*

CAKES (Plain). *Prep.* 1. From *flour*, 4 *lb.*; *currants*, 2 *lb.*; *butter*, ½ *lb.; caraway seeds*, ¼ *oz; candied lemon peel*, (grated,) 1 *oz.; yeast*, ¼ pint; *milk*, q. s. Let it rise well before baking.

2. *Baker's dough*, 2 *lb.*; *currants*, 1 *lb.; butter*, ¼ *lb.;* 3 *eggs; milk* (hot), ¼ pint.

3. (Rundell.) *Baker's dough*, 4 *lb.; butter* and *moist sugar*, of each, ¼ *lb.; caraway seeds*, a small handful. Well work it together, pull it into pieces the size of a golden pippin, and work it together again. This must be done *three* times, or it will be in lumps, and heavy when baked.

4. (*Rich.*) Equal weights of *flour*, *butter*, *sultana raisins*, *eggs*, *currants*, and *brown sugar*, mixed up with *milk*, and seasoned with *candied peel*, *nutmeg*, *&c.*, and baked in a quick oven. This resembles "pound cake."

CAKES (Plum). *Prep.* 1. (*Good.*) From *butter*, ½ *lb.; dry flour*, 3 *lb.; Lisbon sugar*, 8 *oz.; plums* and *currants*, of each, ¾ *lb.;* and some *pimento*, finely powdered; to be "wetted up" with 3 spoonfuls of *yeast*, and a Winchester pint of *new milk* (warmed); bake on a floured tin half an hour.

2. (*Excellent.*) From *fresh butter*, *sifted sugar*, *flour*, and *currants*, of each, 1 *lb.;* 18 *eggs; powdered spices*, 2 *oz.*, (viz., *cloves*, *mace*, *cinnamon*, *nutmeg*, and *allspice;*) *sliced almonds*, 4 *oz.; raisins*, (stoned and chopped,) ½ *lb.;* and a *large glass of brandy;* bake in a hot oven. When sufficiently baked, let the oven cool, and afterwards put in the cake and allow it to remain for several hours to dry. (Rundell.)

3. (*Rich.*) Take *fresh butter* and *sugar*, of each, 1 *lb.; flour*, 1½ *lb.; currants*, 2 *lb.;* a *glass of brandy; sweetmeats* and *peels*, 1 *lb.; sweet almonds*, 2 *oz.;* 10 *eggs; allspice* and *cinnamon*, of each, ¼ *oz.;* bake in a *tin hoop* in a hot oven for 3 hours, and put 12 sheets of paper under it to keep it from burning. (Mackenzie.)

CAKES (Portugal). From *flour*, *powdered sugar*, and *fresh butter*, of each, 1 *lb.;* 10 *eggs; currants*, ½ *lb.*; and a little *white wine;* bake in small tins only half filled.

CAKE (Pound). *Prep.* 1. As *plum cake;* but using 1 *lb. each* of *all* the ingredients, except the spices.

2. Using equal parts of *sugar*, *flour*, *currants*, and *sultana raisins*, and half that quantity each of *butter*, *brandy*, and *candied peel*, with *spices* as required.

CAKES (Queen). From about 1 *lb.* each of *dried flour*, *sifted sugar*, *washed currants*, and *butter*, with 8 *eggs;* the whole beaten for an hour, made into a batter, and baked in little tins, teacups, or saucers, only half filled. A little *fine sugar* is frequently sifted over them. *Nutmeg*, *mace*, and *cinnamon* are also sometimes added.

CAKES (Ratifia). *Prep.* Beat ½ *lb.* of *sweet*, and 1 *oz.* of *bitter almonds*, in fine *orange*, *rose*, or *ratifia water;* mix in ½ *lb.* of *pounded sugar;* add the *whites of* 4 *eggs*, (well beaten;) set it over a moderate fire in a preserving-pan; stir it one way until it is pretty hot, and when a little cool, form it into small rolls, and cut it into thin cakes; shake *some flour* lightly on them, give each a light tap, put them on *sugar papers*, sift a *little sugar* on them, and put them into a very slack oven.

CAKES (Rout). From *flour*, 2 *lb.; butter*, *sugar*, and *currants*, of each, 1 *lb.;* 3 *eggs;* ½ pint of *milk;* 2 glasses of *white wine;* and 1 glass of *brandy;* drop them on a tin plate, and bake them.

CAKES (Savoy). *Prep.* From *flour* and *sifted sugar*, of each, 1 *lb.;* 10 *eggs;* and the *rind of a lemon*, (grated;) form a batter by degrees, put it into moulds, and bake in a slack oven.

CAKE (Seed). *Prep.* 1. (*Plain.*) From *flour*, ¼ peck; *sugar*, ½ *lb.; allspice*, ¼ *oz.; melted butter*, ½ *lb.;* a little *ginger; milk*, ½ pint; *yeast*, ¼ pint; add *seeds* or *currants;* and bake an hour and a half.

2. (*Good.*) To the preceding add of *butter* and *sugar*, of each, ½ *lb.*, and wet it up with *milk* previously mixed with 6 *eggs.*

3. (*Rich.*) Take of *flour*, 1½ *lb; butter* and *sugar*, of each, 1 *lb.;* 8 *eggs;* 2 *oz.* of *caraway seeds*, 1 grated *nutmeg*, and its weight in *cinnamon.* Bake 2 hours in a quick oven.

4. (*Scotch.*) Nine *eggs; sugar* and *butter*, of each, ½ *lb.;* mix well together, then add a little *cinnamon*, *nutmeg*, and *cloves;* ¼ *oz.* of *caraway seeds;* ½ *lb.* of *candied citron;* ¼ *lb.* of *candied orange peel;* ½ *lb.* of *blanched almonds*, (pounded fine;) *flour*, 3 *lb.;* and *brandy*, ¼ pint.

CAKES (Shrewsbury). From *flour*, 3 *lb.; sugar*, 1 *lb.;* a little *cinnamon* and *nutmeg;* 3 *eggs;* a little *rose water;* and *melted butter* enough to make it into a dough.

CAKES (Soda). *Prep.* 1. From *flour*, 1 *lb.; bicarbonate of soda*, ¼ *oz.; sugar* and *butter*, of each, ½ *lb.;* make a paste with *milk*, and add candied *orange*, *lemon*, or *citron peel*, or the *fresh peels grated*, q. s. to flavour.

2. To *flour*, 1 *lb.; sugar* and *butter*, of each, 2 *oz.; candied peel*, ½ *oz.; sesquicarbonate of soda*, 3 *dr.; milk*, q. s.

Obs. An equal weight of *carbonate of magnesia*, used instead of the soda, also makes good cakes. Both are suitable to delicate stomachs, especially in dyspepsia, with acidity.

CAKE (Sponge). *Prep.* From 8 *eggs; lump sugar*, ¾ *lb.; flour*, ½ *lb.; water*, ¼ pint; the *yellow peel of a lemon;* mix as follows:—Put the lemon peel into the water; when about to make the cake, put the sugar into a saucepan, pour the water and peel on it, and let it stand by the fire to get hot. Break the eggs into a deep earthen vessel that has been made quite hot; remove from the heat, whisk for a few minutes; make the sugar and water boil up, and pour it very gradually boiling-hot over the eggs; continue to whisk them briskly until they become thick and white; add the *flour*, (quite warm,) stir it lightly in, put the paste into tins lined with white paper, and bake them immediately in a moderately hot oven.

CAKES (Tea). Syn. *Benton Cakes.* From *flour*, 1 *lb.; butter*, 4 *oz.;* and *milk*, q. s.; bake on a hot hearth or slow oven plate.

2. To the last, add 2 tablespoonfuls of *yeast.*

CAKES (Tipsy). Small *sponge cakes* steeped in *brandy*, and then covered with *grated almonds* and *candied peel;* or *almonds* (cut into spikes) are stuck in them. They are commonly piled on a dish, surrounded with a *custard*, and covered with *preserves* drained as dry as possible.

CAKES (Wigg). From ½ pint of *warm milk;* ¾ *lb.* of *fine flour;* and 2 or 3 spoonfuls of *light yeast.* Afterwards work in 4 *oz.* each of *sugar* and *butter;* make it into cakes, or wiggs, with as little *flour* as possible, add a few *caraway seeds*, and bake them quickly.

CAKES. (In Medicine.) Cakes have been used as a form of administering medicinal substances to children, but have not been extensively employed in this country for the purpose, unless by quacks, and in domestic practice. In preparing them, the active ingredients are added in such proportions to the common materials of a sweet cake, that *one* or *two*, as the case may be, are sufficient for a dose. See *Gingerbread, Worm-cakes, &c.*

CALAMINE. Syn. *Native Carbonate of Zinc; Calamina, Lapis Calaminaris, Zinci Carbonas Impurum*,—Lat. For medicinal purposes this substance is ground to fine powder in mills, and then submitted to the process of elutriation, or washing over, as in the preparation of chalk. The London College orders it to be burnt before grinding it. In this state it constitutes the *Calamina præparata*,—Ph. L.

Prop., &c. Calamine is drying and astringent, and is hence frequently used as a dusting powder for children, and for excoriations and ulcers. It forms the principal ingredient in *calamine cerate*, better known as *Turner's cerate.* It is also largely used in metallurgy to furnish zinc and to make brass.

Recent analysis has shown that the lapis calaminaris of the shops does not generally contain a particle of this substance. It is a factitious compound consisting of heavy sulphate of baryta (cawk) and chalk, coloured with Armenian bole. Mr. Brett found it to contain 75% to 87·5% of sulphate of baryta. Out of 5 samples obtained by Mr. Moore from the leading druggists, examined in the laboratory of the Pharmaceutical Society, the quantity of sulphate of baryta which they contained was respectively, 82·8%, 84·8%, 85·2%, 89·3%, and 90·8%; without a particle of any compound of zinc in them.

Pure lapis calaminaris is "almost entirely dissolved in dilute sulphuric acid, emitting very few or no bubbles of carbonic acid," (when it has been roasted.) "The solution, on the addition of ammonia or potassa, throws down a precipitate which is redissolved by the addition of either alkali in excess." (Ph. L.)

CALCINATION. The process of burning or exposing any substance to a high degree of heat, is called calcination, and the residuum or cinder was formerly called the *calx*, or *calces.* Thus,—*chalk*, by burning, is converted into *lime; gypsum*, into *plaster of Paris; wood*, into *charcoal;* and *bones*, into *ivory black.*

The method of conducting the process of calcination depends on the nature of the body operated on. Many substances, for delicate experiments, are calcined over a spirit lamp in a *platinum spoon* or *crucible;* others, in *iron vessels* or *earthen crucibles*, placed in a common furnace. When the action of the air proves injurious, as in the manufacture of charcoal, the process is performed in close vessels or chambers. In some cases, the fuel is mixed with the articles, and they are both burnt together, as in the *manufacture of lime*, the *roasting of ores, &c.* The process of *drying salts*, or driving off their water of crystallization by heat, is also frequently called calcination; thus we have *calcined copperas, alum, &c.*

CALCIUM is the metallic base of lime. It was discovered by Sir H. Davy, and is prepared in a similar way to that employed for barium. It is a whiter metal than either barium or strontium, and is extremely oxidable. Its *protoxide* is quicklime. It also forms a *binoxide* or *peroxide* with an additional dose of oxygen, which may be made in the same way as peroxide of barium, which it resembles in its general properties. With bromine it forms a *bromide;* with fluorine, a *fluoride;* with iodine, an *iodide;* and with phosphorus, a *phosphuret of calcium.*

CALCIUM (Bromide of). Syn. *Calcii Bromidum,*—Lat. *Prep.* (Magendie.) To a *solution of bromide of iron* add *hydrate of lime,* in slight excess; filter, evaporate to dryness, redissolve in water, and again filter, and evaporate.

CALCIUM (Chloride of). Syn. *Hydrochlorate of Lime, Muriate of do.; Calcii Chloridum,*—Ph. L. & D. *Calcis Hydrochloras; Calcis Murias,*—Ph. E. *Prep.* 1. To *hydrochloric acid,* diluted with an equal weight of *water,* add *powdered chalk* or *white marble,* (in small fragments,) until effervescence entirely ceases, and the liquid no longer reddens blue litmus paper; filter, evaporate to one half, and set the liquid aside to crystallize; lastly, collect the crystals, dry them by pressure between the folds of bibulous paper, and preserve them in a stoppered bottle. The mother-liquor will yield more crystals by evaporation.

2. (Ph. L. 1836.) *Hydrochloric acid* and *water,* of each, 10 fl. oz.; *chalk,* 5 *oz.;* as the last, but evaporating to dryness, and fusing the residuum, instead of crystallizing.

3. (Ph. L. 1851.) Merely included in the list of materia medica.

4. (Ph. D.) *Hydrochloric acid,* 2½ pints; *water,* 6 pints; *chalk,* 2 *lb.;* as the Ph. L. 1836.

5. (Ph. D. 1826.) The *residual liquor* from the preparation of *liquor of ammonia,* filtered and evaporated to dryness.

6. (Ph. E.) *Commercial muriatic acid* and *water,* of each, 1 pint; *white marble,* in fragments, 10 oz.; as No. 1.

Prop., &c. Colourless, prismatic, highly deliquescent crystals, containing nearly half their weight of water, which they lose by heat; strongly ignited the salt fuses; it is freely soluble in alcohol, and dissolves in about ¼th its weight of cold water, and less of hot water. Left for a short time in damp air, it absorbs water and assumes the liquid form, (*oil of lime; oleum calcis.*) In the fused state, (*calcii chloridum fusum,*) reduced to coarse powder, it is much used for *drying gases* and *absorbing the water* from ethereal and oily liquids in *organic analysis,* and in the process of distillation. In its hydrous or crystallized form, it is much used in the preparation of freezing mixtures with snow. For this purpose, the evaporation need only be conducted so far that the whole becomes a solid mass on removal from the fire, as it is used in the form of powder. As a test for sulphuric acid, it produces a characteristic white precipitate insoluble in nitric acid. In the rectification of alcohol, and for forming a water-bath with a high boiling point, it is invaluable. As a *medicine,* it has been given in some scrofulous and glandular diseases, and has also been used as a bath in the same cases.

Fused chloride of calcium is "free from colour; slightly translucent; hard and friable; *totally* (and readily) soluble in water: the solution gives no precipitate with either ammonia or chloride of barium, nor, when much diluted, with ferrocyanide of potassium." (Ph. L. 1836.) In the *crystalline form,* it is "extremely deliquescent. A solution of 76 grains, in a fluid ounce of distilled water, precipitated with 49 grains of oxalate of ammonia, remains *precipitable* by *more* of the test." (Ph. E.) See *Solutions.*

CALCIUM (Fluoride of). Syn. *Hydrofluorate of Lime.* This is the well known native mineral called *fluor spar.*

CALCIUM (Iodide of). Syn. *Hydriodate of Lime*; *Calcii Iodidum, Calcis Hydriodas,* —Lat. *Prep.* (Magendie.) From a solution of *iodide of iron* and *hydrate of lime,* as directed under iodide of barium. It has been given in chronic bronchitis and tubercular consumption.

CALCIUM (Oxides of). See *Lime* and *Calcium.*

CALCIUM (Phosphuret of). Syn. *Phosphuret of Lime, Phosphide of Calcium; Calcii Phosphuretum, C. Phosphidum,*—Lat. *Prep.* By passing the *vapour of phosphorus* over *lime* (in small fragments) heated to redness in a *porcelain tube.* A brownish substance, supposed to be a mere mechanical mixture of phosphuret of calcium and phosphate of lime. Thrown into water, it suffers instant decomposition, and *phosphuretted hydrogen gas* escapes.

CALCIUM (Sulphuret of). Syn. *Sulphuret of Lime, Sulphide of Calcium; Calcii Sulphuretum,*—Lat. Calcium forms with *sulphur* at least three different compounds:—

1. (*Protosulphuret of Calcium, Protosul-*

phide of do.; P. of Lime.)—*a.* From *sulphate of lime,* exposed at a high temperature to a *stream of hydrogen gas.*—*b.* From *dried gypsum,* 25 parts; *lamp black* or *finely powdered charcoal,* 4 parts; calcined together at a strong heat in a covered crucible.

2. (*Bisulphuret of Calcium.*) From *sulphur* and *quicklime,* equal parts; *water,* q. s.; slake the lime, add the sulphur, and boil until a solution is obtained, which on cooling deposits crystals.

3. (*Pentasulphuret of Calcium.*) As the last, but increasing the quantity of *sulphur,* and continuing the boiling for a longer period. Little is known about it.

4. (*Commercial* and *Pharmacopœial.*)—*a.* As 1, *b,* (above.)

b. (P. C.) *Sulphur,* 1 part; *hydrate of lime,* 3 parts; *water,* 2½ pints; boil until it solidifies on cooling, then pour it out on a cold marble slab, and when solid, break it into pieces and preserve it in a well-corked bottle.

c. (Guibourt.) *Quicklime,* 7 parts; *sulphur,* 4 parts; mix, and heat the compound for about 2 hours in a covered crucible.

d. (Cottereau.) *Quicklime,* 2 parts; *sulphur,* 1 part; *water,* 5 parts; as 4, *b,* (above.)

Obs. The precise composition of the last three preparations is uncertain. They are acrid, caustic, stimulant, diaphoretic, and detergent. *Dose.* 1 to 3 gr. Made into an embrocation, sulphuret of lime has been strongly recommended in gout, scabies, &c. Its solution yields pure sulphur on the addition of hydrochloric acid.

CALCULATIONS (Useful). 1. *To find the Value of a Dozen Articles.* Take the price in *pence* as *shillings,* and if there are any *farthings* in the price, add threepence for each. Thus 2*s.* 8*d.*, or 32 pence per yard, is 1*l.* 12*s.* per dozen.

2. *To find the Value of One Hundred Articles.* For every *farthing* take as *many pence* and *twice as many shillings.* Thus, 1¼*d.* each, is—5*d.*, and 10*s.*=10*s.* 5*d.* per hundred.

3. *To find the Value of a pound at any price per ounce.* Take the price in *farthings* as *shillings,* and divide by three. Thus, 5¼*d.* per ounce, is 21 farthings; taken as shillings, 21 ÷ 3 = 7*s.* per pound.

4. *To find the Value of an ounce at any price per pound.* Take the *shillings* as *farthings,* and multiply by three. Thus, at 6*s.*—6 × 3 = 18 farthings, or 4½*d.* per ounce.

Obs. By reversing Nos. 1 and 2, the price of a single article or pound may be found from the price per dozen or hundred. For several other calculations, useful in domestic economy, chemistry, &c., see *Brewing, Decimals, &c.*

CALICO PRINTING. The art of producing figured patterns upon calico, by means of *dyes* and *mordants* topically applied by wooden blocks, copper-plates, or engraved cylinders, by which the goods are either directly printed in colour, or receive their patterns, by being run through a *colouring bath* or *mordant,* when the dye is only produced upon that portion of the ground previously prepared for it. Of late this system of dyeing has been extended to silks and woollens.

The mordants are thickened with some glutinous substance, as *flour, starch,* or *gum,* to render them adhesive and to prevent their spreading.

There are eight principal styles of calico-printing, each requiring a different method of manipulation:—

In the *madder* or *chintz style* the *mordants* are applied to the *white cloth,* and the *colours* are brought out in the dye-bath. This is the method commonly followed for "permanent prints."

In the *padding* or *plaquage style,* the *whole cloth* is passed through a *bath of some particular mordant,* and different mordants are afterwards printed on it before submitting it to the *dye-bath.* By this means the colour of the ground and pattern is varied. Like the last, it is much used for gown pieces, &c.

In the *reserve style,* white or coloured spots are produced on a blue ground, by covering those parts with a composition called *resist paste,* before passing the goods through the *dye-bath,* which is usually done cold.

The *discharge,* or *rongeant style,* is the reverse of the preceding; it exhibits bright figures on a dark ground, and is produced by printing with *acidulous* or *discharge mordants* before the cloth is passed through the *colouring-bath.*

China blue, is a style resembling that on blue stone-ware.

The *decolouring* or *enlavage style. Chlorine* or *chromic acid* is topically applied to the surface of the goods previously dyed, by which the colour is discharged.

Steam-colour printing, consists in printing the calico with a *mixture of dye extracts* and *mordants,* and afterwards exposing it to the *action of steam.*

Spirit-colour printing, is a method by which brilliant colours are produced by a mixture of *dye-extracts* and *solution of tin,* called by the dyers "*spirits of tin.*"

For further information on this subject, the reader is referred to Ure's '*Dictionary of Arts, Manufactures, and Mines,*' where he will find the several processes of calico-printing fully treated on, and most ably and accurately described. To enter largely into the subject in this work might amuse the reader, but would be of no practical value; as calico-printing, unlike dyeing, is an art only practised on the large scale, and by men who obtain their whole knowledge of it in the laboratories and printing rooms of the factories.

CALOMEL. See *Mercury* (Chlorides).

CALUMBIN. Syn. *Calombine, Calumbina.* A bitter substance discovered by Wittstock in calumba root.

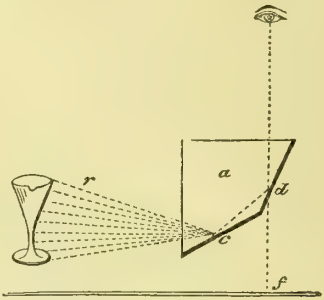
Prep. 1. Digest *calumba root* (in coarse powder) in *water acidulated with acetic acid;* express, filter, boil to one half, again filter, add *carbonate of lime,* in slight excess, and evaporate to dryness in a water bath; reduce the residuum to powder, and digest it in boiling alcohol; the latter will deposit crystals of calumbine on cooling.

2. (Wittstock.) Evaporate *tincture of calumba root* (made with rectified spirit) to dryness; dissolve the residuum in *water,* and agitate the solution with an equal bulk of *ether;* after repose for a short time, decant the ethereal portion, distil off most of the ether, and set the liquid aside to crystallize.

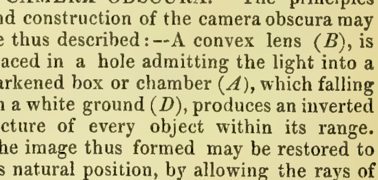
Obs. Impure calumbine occurs as a yellow-brown mass; when pure it forms rhombic prismatic crystals, or delicate white needles; it is only slightly soluble in alcohol, ether, and water; 40 parts of boiling rectified spirit take up only 1 part of calumbine. Its best solvent is acetic acid; it is also soluble in acidulated and alkalized water. Neither nut-galls nor metallic salts affect its solution. Concentrated sulphuric acid dissolves it, and assumes first a yellow, and then a red colour. Its properties indicate that weak vinegar or sour wine, would be the best menstruum for extracting the medicinal virtues of calumba root. *Dose.* 1 to 3 gr. twice a day as a tonic and stomachic, in dyspepsia, debilitated stomach, bilious vomiting, &c.; and in the later periods of dysentery and diarrhœa.

CALX. Lime. This term was formerly applied to the residuum of the combustion of any substance; or to any substance which had been exposed to a strong heat. See *Antimony, Calcination, &c.*

CAMERA LUCIDA. When a ray of light (*r*) falls upon a quadrangular glass prism (*a*), it is bent by two reflections (at *c & d*), and thrown upwards where it may be received by the eye, to which it will appear described on the table or sheet of paper (*f*), placed to receive it. The point of a pencil used to trace any object on the paper can also be seen, and by its means the picture may be easily copied. When the prism is mounted on a stand, and a thin brass plate with a small hole through it for the eyepiece adjusted thereto, it forms the instrument sold by the opticians. The image may be magnified or lessened by placing a lens, so as either to intercept the rays before they strike the prism, or before they reach the eye. An ingenious person will readily be able to set up this instrument, than which a more useful one cannot exist.



CAMERA OBSCURA. The principles and construction of the camera obscura may be thus described:—A convex lens (*B*), is placed in a hole admitting the light into a darkened box or chamber (*A*), which falling on a white ground (*D*), produces an inverted picture of every object within its range. The image thus formed may be restored to its natural position, by allowing the rays of light to pass through two lenses instead of one, or by receiving the rays on a mirror placed at an angle of 45°, when the image will be thrown on the floor in its original position. The picture may be viewed through an oblong aperture cut in the box, or the experiment may be performed in a darkened room, by placing the lens in a hole in the shutter, and allowing the image to fall on the wall, or on a sheet of white paper stretched to receive it.



In the simplest form, when intended for taking views or portraits, the image is thrown upon a mirror placed at an angle of 45°, and resting on the bottom of the box, by which means it is thrown upwards against a plate of glass, also placed at a similar angle. On this is laid a piece of semitransparent tracing paper, on which the object is distinctly seen painted, and may be traced out with a pencil. When the camera is used in photography, slides are provided to retain the sensitive paper in the proper position in the box or dark chamber to receive the image, and the whole apparatus is adjusted with screws, and slides of the most delicate description. Achromatic glasses are also employed. See *Photography, &c.*

CAMPHENE. Syn. *Camphine.* The name given by "the trade" to *rectified oil of turpentine* when sold for burning in lamps, in order that purchasers may not be aware of the inflammable character of the liquid. The term *camphene* is applied by chemists to a hypothetical substance, which is supposed to exist in the artificial camphor prepared by the action of hydrochloric acid on oil of turpentine.

CAMPHOGEN. Syn. *Cymol.* A hydrocarbon formed by *distilling camphor* with *anhydrous phosphoric acid.* It is a colourless, volatile, highly odorous liquid, which can only be distilled in an atmosphere of carbonic acid gas or a vacuum, as contact with the air rapidly destroys it.

CAMPHOLENE. A volatile hydrocarbon obtained by distilling a mixture of *campholic acid* and *anhydrous phosphoric acid.*

CAMPHOLIC ACID. A white, crystalline, acid substance, obtained by passing the *vapour of camphor* over a mixture of *hydrate of potassa and quicklime,* strongly heated in a porcelain tube. It is only sparingly soluble in water. With the bases it forms *campholates.* No gas is evolved during the process.

CAMPHOR. Syn. *Camphire, Laurel Camphor; Camphora,*—Ph. L. E. & D. The camphor of commerce is principally extracted from the *laurus camphora,*(Linn.,) or *laurel camphor tree* of China and Japan. It is also found in several other members of the vegetable kingdom. The Chinese and Japanese extract the camphor by cutting the wood into small pieces and boiling it with water in iron vessels, which are covered with large earthen capitals or domes, lined with rice straw. As the water boils, the camphor is volatilized along with the steam, and condenses on the straw, under the form of grayish granulations. In this state (*crude camphor; camphora cruda;*) it is collected and transported to Europe.

Refined camphor, (*camphora raffinata, c. elaborata; camphora,*—Ph. L. E. & D.,) or the *white camphor* of the shops, is prepared as follows:—100 parts of *crude camphor* are mixed with 2 parts each of *quicklime* and *animal charcoal,* both in powder, and the mixture is placed in a thin globular glass vessel, sunk in a sand bath. The heat is then cautiously applied, and the vessel gradually and carefully raised out of the sand as the sublimation goes on. When the process is complete, the subliming vessel is removed and allowed to cool.

Obs. The whole process of refining camphor requires great care and experience to ensure its success. If conducted too slowly, or at a heat under 375° Fahr., the product is found to be *flaky,* and consequently unsaleable, without remelting or subliming. An improvement on the common method, is simply to sublime the above mixture in any convenient vessel furnished with a large and well-cooled receiver, and to remelt the product in close vessels *under pressure,* and to cool the liquid mass as rapidly as possible.

Prop., &c. A white semi-crystalline solid, very volatile at common temperatures; freely soluble in alcohol, ether, bisulphuret of carbon, benzole, oils, and acetic acid, and sufficiently so in water (about 1¼ grs. to 1 oz.,) to impart its characteristic smell and taste; 100 parts of alcohol (sp. gr. 0·806) dissolve 120 parts of camphor; concentrated acetic acid dissolves twice its weight of camphor; average sp. gr. 0·990. It fuses at 347° and boils at 400° Fahr.

Uses, &c. Camphor is sedative, narcotic, anodyne, diaphoretic, and anaphrodisiac. *Dose.* 2 to 10 gr. in the form of pill or bolus, or made into an emulsion with yelk of egg, mucilage, or almonds. In overdoses it is poisonous. The best antidote is opium or wine, preceded by an emetic. It is also used externally in ointments, liniments, and embrocations.

Camphor is frequently put into wardrobes and clothes-trunks, to keep away insects; it is used to make the white stars and fire of the pyrotechnist; and by the varnish maker to increase the solubility of copal and other gums. Mixed with 6 times its weight of clay, and distilled, it suffers decomposition, and yields a yellow aromatic volatile oil, smelling strongly of thyme and rosemary, which is much used by the wholesale druggists and perfumers to adulterate some of the more costly essential oils, and by the fancy soap makers to scent their soaps.

Camphor may be beaten in a mortar for some time, without being reduced to powder, but if it be first broken with the pestle, and then sprinkled with a *few drops* of *rectified spirit of wine*, it may be readily pulverized. By adding *water* to an *alcoholic* or *ethereal solution of camphor*, this drug is precipitated under the form of an impalpable powder of exquisite whiteness.

Pure camphor is ENTIRELY soluble in rectified spirit, oils, and strong acetic acid; a fragment placed on a heated spoon or in a warm situation, will *wholly* disappear, and the evolved fumes will be highly fragrant (*camphoraceous*), and be free from an acid or terebinthinate odour.

CAMPHOR (Amber). Syn. *Crystalline Pyrĕtine, Volatile Resin of Amber.* The yellowish light sublimate which forms towards the end of the process of the destructive distillation of amber in close vessels; it comes over after the last portion of the oil, and is found in the neck of the retort.

CAMPHOR (Borneo). Syn. *Sumatra Camphor, Dragon's Brain Perfume.* From the *dryobalanops aromatica* or *camphora ;* a tree growing in Borneo and Sumatra. It is found in natural fissures or crevices of the wood. The same tree yields a species of fluid camphor, (*liquid camphor, camphor oil; oleum camphoræ ;*) by incision. The latter has a mixed odour of cajeput, camphor, and cardamoms. It is chiefly employed to scent fancy soaps.

CAMPHOR (Factitious). Syn. *Hydrochlorate of Oil of Turpentine, Kind's Artificial Camphor.* Prepared by passing *hydrochloric acid gas* into pure *oil of turpentine*, cooled by a freezing mixture or pounded ice. After a time a white crystalline mass is formed, which must be drained, and dried by pressure between folds of bibulous paper. It may be purified by solution in alcohol.

Prop., &c. It has a camphoraceous taste and odour; burns with a greenish sooty flame, and when blown out evolves a terebinthinate odour; heated a little above the boiling-point of water, slight fumes of hydrochloric acid gas are perceptible; distilled with quicklime, chloride of calcium, water, and *camphilene* are formed.

Obs. It is found that several of the *essential oils*, by carefully distilling off about ⅓d their volume, yield a species of camphor. By collecting this, and redistilling the remainder of the oil 2 or 3 times, a further quantity of camphor may be obtained. *Oil of rosemary*, treated in this way, yields about 10% of camphor; *oil of sweet marjoram* the same; *oil of sage* yields 13%; *oil of lavender*, 25%. By keeping the oils loosely corked, and in a cool place, they produce a larger portion of this pseudo-camphor. *Aniseed camphor* is the congealable portion of oil of aniseed, separated from the liquid oil, which it resembles in odour and flavour.

CAMPHOR (Hydrochlorate of). Syn. *Muriate of Camphor; Camphoræ Hydrochloras,*—Lat. By passing *hydrochloric acid gas* over *camphor*, in small fragments, until it ceases to be absorbed.

CAMPHOR (Nitrate of). Syn. *Camphor Oil; Oleum Camphoræ Factitium,*—Lat. Prepared by dissolving *camphor* in *nitric acid*, in the cold.

CAMPHOR (Sulphite of). From *camphor* and *sulphurous acid gas*, as hydrochlorate of camphor.

CAMPHOR CAKES. *Prep.* 1. *Camphor liniment*, (P.L.,) 1 *oz.; melted spermaceti*, 1½ dr.; mix.

2. *White almond oil*, 4 *oz.; spermaceti*, 1 *oz.;* melt, add *camphor*, (cut small,) ¾ *oz.;* stir until melted, then pour it into small gallipots or bottles, and allow it to crystallize. *Used* for chaps and chilblains. See *Camphor Balls.*

CAMPHORIC ACID. Syn. *Acidum Camphoricum,*—Lat. *Prep.* From *camphor*, 1 part; and *nitric acid*, (sp. gr. 1·33,) 4 parts; distilled together in a glass retort, with a gradually increasing heat, until vapours cease to be evolved; the camphor that has volatilized is then added to that in the retort, along with 4 or 5 parts more of *nitric acid*, and the process repeated again and again, until 20 *parts of acid* have been consumed, when *crude camphoric acid* crystallizes out of the remaining liquor, on cooling. The crystals are purified by washing with *cold distilled water*, solution in *boiling water*, and evaporating the solution until a pellicle forms; crystals of *pure camphoric acid* are formed as the liquid cools.

Prop., &c. Small colourless needles; acid; bitter; fusible; sparingly soluble in water; soluble in alcohol; alcoholic solution not precipitated by water, which distinguishes *camphoric acid* from *benzoic acid.* Its salts are called *camphorates.* The *soluble camphorates* may be made by digesting the carbonate or hydrate of the base in a hot solution of the acid, and the *insoluble camphorates* by double decomposition. By distillation, camphoric acid yields a colourless crystalline neutral substance, which has been improperly called *anhydrous camphoric acid.*

CAMPHRONE. Syn. *Camphorone.* A light oily liquid obtained along with a species of naphthaline, when the *vapour of camphor* is passed over *small fragments of quicklime* heated to redness. It is also formed when *camphorate of lime* is submitted to distillation.

CAMPHYLENE. See *Camphogen.*

CAMWOOD. This dye-stuff resembles Brazil wood in its properties, and is used in a similar manner.

CANADA BALSAM. Syn. *Balsamum Canadense*, *Terebinthina Canadensis,*—Lat. From the *abies balsamea,* (Lindley,) a tree of common growth in Canada and the State of Maine. When *pure,* it is perfectly transparent, has an agreeable odour (not *terebinthinate,*) and is *wholly* soluble in rectified oil of turpentine, with which it forms a beautiful glassy and colourless varnish, much used for preparing a semi-transparent copying paper.

CANADA BALSAM (Factitious). Syn. *Balsamum Canadense Factitium,* — Lat. *Prep.* 1. *Yellow resin,* 3 *lb.; oil of turpentine,* 1 gall.; dissolve, and add *essence of lemon,* 2 dr.; *oil of rosemary,* 1½ dr.

2. To the last add of *nut oil,* 1 pint. Both are sold in the shops for Canada balsam.

CANCER. Syn. *Carcinoma,*—Lat. A malignant disease attacking the glands, consisting of an indolent scirrhous tumour, terminating in an ill-conditioned ulcer, generally accompanied with excruciating pain, more especially in the later stages. Various modes of treating cancer have been, at different times, recommended by the faculty and empirics. Among these extirpation with the knife appears to be most in favour with the former, when practicable. The removal of the tumour does not, however, destroy the constitutional taint, although it may lessen its intensity, and render the subsequent treatment of the disease less difficult. Recently, the application of *intense cold* has been highly recommended in cancerous affections of the glands. A little *pounded ice* is tied up in the corner of a thin silk handkerchief or a piece of bladder, and the "pad" thus formed, pressed gently against the tumour and the parts immediately adjacent for a short time, once or twice a day. The degree of cold may be increased by mixing an equal weight of *common salt* with the *pounded ice*, by which the benumbing effect of the application will be greatly augmented. *Electricity* and *galvanism* have also been occasionally found useful. Among *special remedies* for cancer, the following are those which deserve the most attention:—*Hemlock* (combined with alkalies, tonics, and stomachics,) *belladonna,* (as the last,) *arsenic,* (especially in the ulcerated stages; the basis of nearly all the quack nostrums for cancer;) *bichloride of mercury,* (in small and frequently repeated doses,) *iodine,* (as the last, either alone or combined with hemlock or opium; it is one of the best remedies in all stages;) *iodide of iron, phosphate of iron,* (combined with hydrochlorate of ammonia or aloes,) *common salt.* The last has been lately prominently brought before the public by Col. Ussory, of De Soto, who says he learnt the secret of a Spanish woman, a native of the country. His mode of using this remedy is as follows:—Take an egg and break it, pour out the white, retaining the yolk in the shell, put in salt, mix it with the yolk as long as it will receive it, and stir them together until a salve is formed; put a portion of this on a piece of sticking plaster, and apply it to the cancer twice or thrice a day. He says that he has tried the remedy twice in his own family, with complete success. The doses, &c., of the other substances referred to, will be found under their respective heads.

It may be right, perhaps, to mention, that the above remarks are *solely* intended for those who are either unable, or unwilling, to seek medical advice. To all others afflicted with cancer, our most earnest recommendation is for them to consult a duly qualified practitioner as soon as possible.

CANDIES. When the object is simply to form a confection or sweetmeat, imbued with the aroma, flavour, or medicinal property of any substance, candies are generally prepared by simply boiling *lump sugar* with a sufficient quantity of the *infusion, decoction, tincture, expressed juice,* and sometimes even the *powder* of the particular article, until a portion taken out and cooled becomes quite solid, when it is either poured out on a marble slab, or into tin, marble, or paper moulds, dusted with *powdered lump sugar.*

When the object is to preserve the form and character of the vegetable in the candy, the substance is boiled in *water* until soft, and then suspended in *concentrated syrup,* (in the cold,) until they become transparent; after which they are either dried in a current of warm air, or in a stove, at a heat not exceeding 120° Fahr. The syrup must be kept *fully saturated* with sugar by reboiling it once or twice during the process.

Another method occasionally employed by confectioners for almonds and the like, is to put the substances into *syrup boiled to a thread*, and to stir the whole until nearly set. See *Candy* and *Sugar Boiling*.

CANDLES. The "*wicks*" of the best candles are made of the rovings of Turkey skein-cotton, 4 or more of which, according to the intended thickness of the wick, are wound on a reel, from which they are again run off, and cut of the proper lengths. For *dip candles* they are then immersed in *melted tallow*, and after rubbing with the hands, are placed straight and allowed to harden, after which they are arranged upon the "broaches" ready for "dipping." For *mould candles*, the last operation is omitted. Great care is taken to select a cotton that yields the least possible quantity of ash after burning.

In the process of "*dipping*," the "*dipping cistern*" being filled with tallow of a proper temperature from the boiler, one of the broaches covered with wicks is placed upon the end of the "*dipping beam*," and pressed down gently into the melted fat; it is then withdrawn, the bottoms of the candles just touched against a board placed on one side of the cistern for the purpose, and the frame removed to the rack. This operation is repeated until the candles acquire a sufficient size, when they are finally cooled, sorted, weighed, and strung in pounds for sale.

The best *mould candles* are made of the finer kinds of tallow only. A mixture of 3 parts of *sheep*, with 1 part of *ox suet*, is preferred. The *moulds* are commonly made of pewter; the part answering to the bottom of the candle being left open, and a small hole at the top also left for the wick: eight or more of these moulds are fitted into a stool, the upper surface of which forms a kind of trough, the bottom part of the mould being upwards. The wicks are then introduced and a wire is run through the loop of each, and then allowed to rest on the top of the moulds; the protruding portion at the bottom being pulled tight, so as properly to arrange them in the centres of the moulds. The *melted tallow* is now poured into the trough-like part of the stool, until the moulds are all full, when the wicks are again pulled tight, and the whole allowed to cool. When *quite cold*, the wires are withdrawn, and the candles pulled out one by one, by inserting a bodkin into the loop of the wick. They are then bleached by either exposing them to the dew and air for a few days, or by keeping them for a few weeks before sale.

Composition candles are generally made of a mixture of *spermaceti* and *hard white tallow*, to which a little *bleached rosin* is commonly added. The application of the term "*composite*" or "*composition*" to candles, originated with a manufacturer who had a large stock of spermaceti candles on hand, which were unsaleable, from being of a dirty hue, and who advertised them under the above name, when they were soon disposed of, from the supposition that they were composed of some new combination of materials.

Spermaceti candles. From *spermaceti*, either alone, or combined with *hard white tallow*. They burn well, but will not bear carrying about in the hand without "guttering."

Stearine candles are made of the stearine or *stearic acid* obtained from tallow, in the same way as other moulds. They furnish a superior light, and burn a long time. Formerly it was a general practice for the manufacturer to add a little arsenious acid (*white arsenic*) in his stearine, to prevent it crystallizing, and thus spoiling the appearance of the candle; but owing to the spirited way in which this rascality was exposed by the press, it is now *nearly* discontinued. "When the blocks of stearine are broken, they display a highly crystalline texture, which would render them unfit for making candles. This texture is therefore broken down or comminuted in a plated copper pan, along with *one thousandth part of pulverized arsenious acid*, after which it is ready to be cast into candles in appropriate moulds." (*Dict. Arts, Manuf. and Mines;* 1843.) The atmosphere of a room in which two such candles (4 to the *lb.*) are burnt, would thus become contaminated with 3½ gr. of *white arsenic* in the short space of about 8 or 9 hours; the influence of which upon the health of those who inhale it, could not fail to be highly pernicious. *Margarine candles* are similar to those made of stearine.

Wax candles were formerly wholly made by either pouring *melted wax* over the wicks, or by applying the wax in a soft state with the hands, and afterwards rolling it smooth with a small slab of *polished glass* or *boxwood*, upon a table formed of *polished marble* or *walnut wood.* They are now more commonly moulded.

Concluding Remarks. Of late years the best candles are made in such a manner that they do not require snuffing. The simplest way of effecting this is to make the wick with one of the outside strands of the cotton *loosely twisted*, which being slightly stretched during the manufacture of the candle, contracts again on its burning removing the force that kept it extended. By this means the wick is drawn into a curved form, and thus its upper part is exposed to the outer portion of the flame, as well as to the atmosphere, and undergoes gradual combustion. *Plaiting* the cotton, *winding* it round wires, (which are withdrawn after the candle is made,) and *steeping* it in *metallic solutions*, have also been adopted for a like purpose. The same effect may be produced with a common candle, by placing it at an angle of about 45°; but this plan, besides being unsightly, is liable to the risk of the tallow dropping beyond the candlestick. In the candles manufactured by *Price's Patent Candle Company*, at the Belmont Works, Vauxhall, all the most recent improvements are combined. These candles are, indeed, not merely the most economical and sightly, but also possess the highest illuminative power of any in the market.

CANDLES (Medicated). These have been prepared as a convenient means of diffusing the active principles of certain volatile substances through the atmosphere, and for complete and partial fumigations. They are seldom employed in England.

CANDLES (Mercurial). From the *red sulphuret* or the *gray oxide of mercury* mixed with *wax*, and a *wick of cotton* inserted therein. Recommended by Mr. Colles for partial mercurial fumigation. They are burnt under a glass funnel with a curved neck, the upper orifice of which is directed to the diseased part.

CANDLESTICKS. Metallic, earthenware, and porcelain *candlesticks*, *snuffers*, and *snuffer-stands*, are recommended to be cleaned by pouring *boiling hot water* on them, (previously placed in an earthen pan,) and, after wiping them quite dry with a cloth, to clean them with a piece of "*wash leather*;" those made of *silver*, or of *copper-plated*, may be finally polished with a little *plate powder;* those of *white metal*, with a little *whiting* or *fine chalk*, and those of *brass*, with a little *rotten-stone* or one of the *polishing pastes* noticed at p. 158. For articles of this kind, made of *bronze* and *papier maché*, the water should be used only hot enough to melt the tallow, and they should be only gently dabbed or rubbed off with a *very soft* cloth or leather. The common practice of placing *candlesticks* before the fire to melt off the grease is injudicious, as the solder or japan about them is almost certain to be injured. Hence the common annoyanee of damaged or "crippled" candlesticks in houses where there are careless servants.

CANDY. Syn. *Conditum*,—Lat. The process of converting substances into *candies* has been already noticed. The following are the principal articles of this kind kept in the shops:—

Candied Almonds. From blanched almonds, roasted and halved.

Candied Angelica. See *Angelica.*

Candied Apricots. From the fruit, scarcely ripe, either whole or cut into quarters, immersed in the syrup, (hot) without any further preparation.

Candied Citrons. From the peels.

Candied Eringo. From the roots, slit and washed.

Candied Ginger. From the roots of green ginger.

Candied Horehound. From a strong decoction or infusion of the root, and lump sugar.

Candied Lemon Peel. As *candied citron.*

Candied Orange Flowers. From the flowers deprived of their cups, stamina, and pistils, (2 *oz.* to each *lb.* of sugar,) as *candied almonds*, but poured out on a slab.

Candied Orange Peel. From the peel of the Seville orange, or common orange, as *candied citron.* In the Ph. Suecica, 1845, the "white inner surface" is ordered to be removed, before suspending the peel in the syrup. The Ph. L. 1746, orders the "fresh peel of Seville oranges."

Candied Sugar. See *Sugar Boiling.*

CANDY (Caraway). 1. From *caraway seeds* (in fine powder), ½ *oz.; sugar*, 1 *lb.*

2. *Oil of caraway*, 1 dr.; *sugar*, 1 *lb.*

CANDY (Digestive). Syn. *Live-long Candy. Prep.* 1. *Rhubarb* and *bicarbonate of soda*, of each, 1 dr.; *ginger*, ½ dr.; *cinnamon*, 20 gr.; (all in fine powder;) *heavy magnesia*, 1 oz.; *powdered sugar*, 2 oz.; *mucilage of tragacanth*, q. s., to form a lozenge mass; to be divided into small squares of 18 or 20 gr. each.

2. As the last, but adding *finely powdered caraways*, 1 dr.; *oil of caraway*, 15 drops; and *sugar*, 1 oz. Both are used as heartburn and digestive lozenges.

CANDY (Ginger). *Prep.* 1. From *ginger* (in coarse powder), 3 *oz.; boiling water*, 1¼ pint; macerate in a warm place for 2 hours, strain, add *lump* and *moist sugar*, of each, 5 *lb.*, and boil to a candy.

2. *Ginger* (in very fine powder), 1 *oz.; powdered sugar*, 2 *lb.; syrup*, q. s. to make a paste. Stomachic and carminative.

CANELLIN. A crystallizable substance, found by Petroz and Robinet, in the bark of *canella alba*, (canella bark.) It greatly resembles mannite.

CANIRAMINE. See *Brucia*.

CANNABINE. Syn. *Cannabinum*. The resinous exudation of the *cannabis sativa Indica*, or India hemp, purified by solution in *alcohol*, or *rectified spirit*, and the evaporation of the tincture to dryness.

CANNON METAL. Syn. *Gun Metal.* A variety of bronze in which the proportion of tin varies from 8 to 14 per cent. From the experiments of the Comte Lamartilliere, made at Douay, it appears that never less than 8%, or more than 11%, of this metal should be used, the remaining 89 or 92% being pure copper.

CANTHARIDES. Syn. *Spanish Flies, Blistering ditto. Lyttæ; Cantharis*,—Ph. L. E. & D. The *cantharis vesicatoria* of Latreille. They are frequently adulterated with the melontha vitis, an insect which is wholly destitute of vesicating power. The lattermay be distinguished by its *squarer form*, and also by having black feet.

Pur., &c. These insects should be *preserved* in well-closed bottles or tin canisters. The addition of a few drops of *oil of cloves*, or of *strong acetic acid*, or even a *few cloves* in substance, will preserve them unchanged for a length of time in close vessels. The best proof of their goodness is the smell. The powder is constantly adulterated. The plan of the wholesale druggists is to sort out the most worthless flies for powdering, and to compensate for their deficiency of vesicating power, by adding 1*lb.* of *euphorbium* to every 12 or 13 *lb.* of *flies.* When a *superior* article is required, *liquorice powder* is added, (4 or 5*lb.* to every 14*lb.*,) along with about 1 *lb.* of *euphorbium*, and sufficient *blue black* or *charcoal* to turn the yellow of the liquorice to a greenish colour. The best method of detecting this adulteration is by the microscope.

Ant. An emetic of *sulphate of zinc*, followed by the stomach pump, if necessary. The vomiting may be promoted by copiously drinking warm bland diluents, such as broth, linseed tea, milk, &c. Friction on the spine, with volatile liniment and laudanum, and the subsequent administration of draughts containing musk, opium, and camphorated emulsion, have been strongly recommended.

Tests. By the microscope, very minute particles may be discovered in the stomach and intestines, on a post-mortem examination. Orfila thus found particles of cantharides. in a body that had been interred 9 months.

Uses, &c. Spanish flies are used *externally*, to raise blisters, and *internally* as a stimulant and diuretic, generally in the form of tincture. In excess they produce strangury, bloody urine, satyriasis, delirium, convulsions, and death. See *Vesicatorin, Tinctures, &c.*

CAOUTCHOUC. Syn. *India Rubber, Elastic Gum.* Indian rubber is the concrete juice of the *siphonia caoutchouc*, *jatropha elastica*, and several other plants. The fresh milky juice is spread over moulds of unbaked clay, and is then exposed to the heat and smoke of a fire, or torches, to dry it, whence it derives its dark colour. Successive coats of juice are laid on, and the operation of drying repeated, until the bottles acquire sufficient thickness. When it has become thoroughly hard and dry, the clay is beaten out. In this form it is commonly imported.

Prop., &c. The general properties of Indian rubber, as well as its numerous applications, are well known. The *fresh juice* has a cream-like appearance and consistence, is coagulated by heat, and is miscible with water, alcohol, and pyroxilic spirit; sp. gr. 1·012 to 1·041; it yields from 18% to 45% of solid caoutchouc, either by heat or evaporation. By excluding it from the air, it may be preserved unchanged for a considerable period. This juice is now imported in large quantities for the waterproofers.

Solid caoutchouc has a sp. gr. ranging between 0·919 and 0·941; it melts at 248° Fahr. into a viscid mass, which does not again harden on cooling; it is unaltered by chlorine, hydrochloric acid, sulphurous acid, fluosilicic acid, ammonia, caustic alkaline lyes, (even when boiling,) and most similar substances; nitric acid and sulphuric acid act on it only by long contact when concentrated. Some specimens of caoutchouc are harder than gutta percha itself, and equally inelastic, whilst others never perfectly solidify, but remain in a condition resembling that of birdlime or printers' varnish.

The *best solvents* of caoutchouc are *rectified sulphuric ether* (which has been washed with water to remove alcohol and acidity), *chloroform*, *bisulphuret of carbon*, a *mixture of bisulphuret of carbon* and *absolute alcohol*, (94 of the first to 6 or 7 of the last,) and *caoutchoucine.* All these liquids dissolve Indian rubber rapidly in the cold, and leave it unaltered on evaporation. The first two are, however, too expensive to be generally employed. The others have a disagreeable odour, but are much cheaper than the rest, and possess the advantage of leaving the film of caoutchouc in a firmer and stronger condition than other solvents.

Pyrogenous oil of turpentine is another cheap and good solvent. *Benzole, rectified mineral* or *coal-tar naphtha,* and *oil of turpentine,* dissolve Indian rubber by long digestion and trituration, (with heat,) otherwise they merely form with it a glutinous jelly that dries very slowly and imperfectly, leaving it much reduced in hardness and elasticity. The *fats* and *fixed oils* also *readily* dissolve caoutchouc, (with heat,) forming permanently glutinous solutions or pastes; so also do most of the *volatile oils,* but the solutions with the majority of them dry with difficulty.

One of the most remarkable properties of Indian rubber is the great amount of heat which is disengaged during its condensation by pressure or in the exercise of its elasticity. During the process of kneading the raw caoutchouc in the "masticators," the *cold water* thrown in to reduce the temperature soon becomes boiling hot. When no water is added, a temperature so high is often reached as to occasion the melting of the rubber. This is particularly the case during the process of "dry kneading" with quicklime. A tube $2\frac{1}{4}$ inches in diameter, impactly secured, was subjected to a force of 200 tons. The result was a compression amounting to 1-10th; great heat was evolved, and the excessive elasticity of the substance caused a flywheel weighing five tons to recoil with alarming violence. Mr. Brockedon states that he succeeded in raising the temperature of an ounce of water 2° in about fifteen minutes by collecting the heat evolved by the extension of a small thread of caoutchouc. He refers this effect to the change in specific gravity, and contends that the heat thus produced is not due to friction, because the same amount of friction is occasioned in the contraction as in the extension of the substance, and the result of this contraction is to reduce the caoutchouc thus acted upon to its original temperature.

The edges and surfaces of Indian rubber are readily and perfectly *joined* by mere contact and intense pressure. On the *small scale,* the edges may be moistened with *ether, naphtha, oil of turpentine,* or *some other solvent,* or by *long boiling in water,* and immediately pressed tight together, and held in contact for some time.

Elastic tubes are readily formed of Indian rubber, by cutting it into uniform slips of proper thickness, and winding them round rods of *polished* glass or metal, so that the edges are in close contact or "overlapping." A piece of tape is then wound round outside it, and the whole boiled in water for 2 or 3 hours, after which time the edges will be found to be sufficiently adherent. A better plan is to immerse the "rubber" in a mixture formed of *bisulphuret of carbon,* 95 parts, and *rectified spirit,* 5 parts, until it swells into a pasty mass, which may then be moulded into any desired form, or passed through the dye of a tubing machine. For chemical purposes, brewing, &c., vulcanized Indian rubber tubing has now taken the place formerly occupied by the unprepared material.

The once celebrated "*Mackintoshes*" are made by spreading two or more coats of a paste made of *caoutchouc* and *rectified coal-tar naphtha* over the surface of the stuff or cloth, and when it has become partially dry, pressing two such surfaces evenly together by passing the goods between a pair of cylinders or rollers. The articles are then placed in a stove room for the composition to harden, and to remove the odour of the naphtha. Of late years, *vulcanized* or *mineralized rubber* (coloured,) has been used for this parpose, and being spread on the outside of the stuff instead of the inside, forms an ornamental and thoroughly waterproof material.

Indian rubber thread is prepared by stretching it (previously cut into coarse filaments) to 5 or 6 times its length in *boiling water* or *hot air,* in which state it is allowed to cool slowly. This process is repeated again and again, until it reaches 16,000 or 17,000 times its original length, when it is glazed by agitating it with *powdered sulphur,* or *French chalk.* This thread is readily joined or "pieced," as it is called, by paring the ends *obliquely* with a pair of scissors or a knife, and then pressing the *clean* ends strongly together with the fingers. When the coarse filaments from the cutting machine are simply stretched with the moistened thumb and finger in the act of "reeling" to about 8 or 9 times their length, they are said to be "*inelasticated,*" and are ready to be made into *elastic braces, elastic web,* and other like *elastic tissues* and *fabrics,* in the braiding machine.

The discovery of the singular action of *sulphur* and the *mineral sulphurets* on caoutchouc was made by Mr. Charles Goodyear, of New York, in 1842, at which date the manufacture of *vulcanized, mineralized,* or *sulphuretted Indian rubber,* may said to have commenced. In 1843, Mr. Thomas Hancock patented a process for vulcanizing Indian rubber in these countries, founded on that of Mr. Goodyear. A sheet of caoutchouc immersed in *melted sulphur* absorbs a portion of it, and at the same time undergoes important changes in many of its leading characteristics. So prepared, it is no longer affected by changes of temperature; it is neither hardened by cold nor softened by any heat insufficient to destroy it. It loses its solubility in the solvents of ordinary caoutchouc, whilst its elasticity is greatly augmented and has become permanent.

The same effect is produced when *sulphur* is kneaded into caoutchouc in a *masticator*, or by means of powerful rollers, as well as when common solvents (*naphtha, spirit of turpentine, &c.*) are charged with a sufficient amount of *sulphur*, in solution, to become a compound solvent of the rubber. In these cases articles may be made of any required form before heating them for the change of condition, technically termed, "*vulcanization.*" It is necessary, however, for this purpose, that the form should be carefully maintained both before and during the exposure to the heat.

"A vulcanized solid sphere of 2½ inches in diameter, when forced between two rollers ¼ inch apart, was found to maintain its form uninjured. In fact, it is the exclusive property of vulcanized caoutchouc to be able to retain any form impressed upon it, and to return to that form on the removal of any disturbing force which has been brought to act upon it." (Brockedon.)

Caoutchouc combines with from 12% to 15% of *sulphur;* the quantity of sulphur added to the *naphtha paste*, should not, therefore, exceed 10% or 12% of its weight.

The *temperatures for vulcanization* by the common method range from 320° to 330°; and the period required is one hour or more, according to the temperature. A much lower temperature is, however, sufficient, if the duration of the exposure is much extended, or the compound mass is softened with any of the common solvents of Indian rubber.

The process of sulphuring, or mineralization, is differently conducted in different manufactories. Under Mr. Burke's patent, *oxysulphuret* or *amorphous sulphuret of antimony* (formed by decomposing a solution of crude antimony in a lye of potash or soda, with hydrochloric acid,) is employed. This powder he combines with either Indian rubber or gutta percha, or mixtures of them, by kneading in a "*masticator*" for 2 or 3 hours, and after strong compression in a mould whilst still warm, he exposes the mass to a steam heat, ranging from 250° to 280° Fahr. The block, so prepared, is afterwards cut into sheets, &c. The advantages possessed by the product are, that it possesses no unpleasant odour, nor does the sulphur effloresce on its surface, as in ordinary vulcanized Indian rubber.

Under Mr. Christopher Nickel's patent, (1849,) *one* part of *sulphur* is kneaded with six parts of *caoutchouc*, and then pressed into moulds, as before. He also vulcanizes *rubber* by exposing it in a cylinder heated in a steam "jacket" to the fumes of *sulphur* or to *sulphuretted gases*, given off from a retort connected with the apparatus. The rubber thus prepared he next subjects to hydraulic pressure in moulds, at a temperature ranging between 220° and 250° Fahr.

Small articles or sheets of Indian rubber may be EXTEMPORANEOUSLY VULCANIZED at *common temperatures* by simple immersion, for a minute or two, in a mixture of *bisulphuret of carbon*, 97½ parts, and *protochloride of sulphur*, 2½ parts; after which they must be well washed first in *weak alkaline lye*, and next in *pure water*. Mr. Parkes employs 100 instead of 97½ parts of the bisulphuret. This method is termed "*cold sulphuring.*"

An *excellent method of vulcanization*, recommended by Mr. Parkes, particularly applicable to small articles, consists in immersing them for about 3 hours in a close vessel containing a solution of *polysulphuret of potassium* at 25° Baumé, (sp. gr. 1·197,) and of the temperature of 240° Fahr. It is afterwards washed in an alkaline lye, then in pure water, and dried.

Among the most recent applications of vulcanized Indian rubber are those connected with its elasticity and its enormous contractile power when extended. Under Mr. E. Smith's patent, "*torsion* springs" for roller blinds, door springs, clock springs, carriage springs, &c., are made of it. Mr. Hodges, in another patent, has availed himself of the same property as a new mechanical power. Short lengths of caoutchouc, which he terms "*vulcanized power purchases,*" are successively drawn down from or lifted to a fixed bearing, and attached to any weight which it is required to raise; when a sufficient number of these power-purchases are fixed to the weight, their combined elastic force lifts it from the ground. Thus ten purchases of the elastic strength each of 50 *lb.* raise 500 *lb.* Each purchase is 6 inches long, and contains about 1½ *oz.* of *vulcanized caoutchouc.* These ten purchases, if stretched to the limit of their elasticity, (not of their cohesive strength,) will lift a weight exceeding 650 *lb.*

The same principle has been applied to *relieve* and *equalize* the *strain* on *ships' cables*, especially where several boats are towing one vessel; and as a *projectile force.* A number of power purchases, attached to the barrel of a gun constructed to project harpoons, will exert a power, if suddenly relieved, proportioned to their aggregate forces. By similar contrivances balls may be projected 200 yards or more, and a charge of No. 4 shot can be thrown 120 yards. A *bow*, in which the string alone is elastic, (the reverse of the usual form,) has been contrived which throws a 30-inch arrow 170 yards.

CAOUTCHOUC (Factitious). Good *boiled linseed oil* (made with litharge) applied, by means of a brush, to any smooth surface, and dried in the sun or smoke, and the process repeated until some thickness is attained, affords a semi-transparent substance of considerable elasticity, and resembling India rubber in many of its sensible qualities. A pound of the oil at once spread upon a stone, in a thin stratum, takes about six months to acquire these properties.

CAOUTCHOUCINE. *Prep.* (Barnard's *patent process.*) A highly volatile fluid, discovered by Mr. Barnard. *Indian-rubber* or *caoutchouc*, as imported, cut into small lumps, containing about 2 cubic inches each, is thrown into a cast-iron still, connected with a *well-cooled* worm-tub, (any flat vessel with a large evaporating surface will do, the entire top of which can be removed for the purpose of cleaning it out;) and heat is applied in the usual way, until the thermometer ranges to about 600° Fahr., when nothing is left in the still but dirt and charcoal. The dark-coloured fetid oil which has distilled over is next rectified along with $\frac{1}{3}$rd its weight of *water*, once or oftener; and at each rectification becomes brighter and paler, until at about sp. gr. ·680 it is colourless, and highly volatile. The product is then shaken up with *nitro-muriatic acid*, or *chlorine*, in the proportion of a $\frac{1}{4}$ of a pint of the acid to 1 gallon of the liquid. To enable the dirt to be the more easily removed from the bottom of the still, *common solder*, to the depth of about $\frac{1}{2}$ an inch, is thrown in.—*Prod.* 80%.

Obs. This substance is the lightest fluid known, and yet its vapour is denser than the heaviest of the gases. Mixed with alcohol, it dissolves all the resins, especially copal and Indian-rubber, at the common temperature of the atmosphere, and it speedily evaporates, leaving them again in the solid state. It mixes with the oils in all proportions. (See *Butter of Cacao.*) It has been used in the manufacture of varnishes, and for liquefying oil paints, instead of turpentine. It is very volatile, and requires to be kept in close vessels. According to the researches of Himly, Gregory, and Bouchardat, the caoutchoucine of Barnard consists of several liquids, some of which have the composition of olefiant gas, and others that of oil of turpentine. One of these, (*caoutchène*, of Bouchardat,) boils below 32°, while another (*heveéne*,) boils at 599°. The most volatile of these liquids has the sp. gr. of 0·654.

CAPERS are the flower buds of the *caparis spinosa*, or caper tree, preserved in vinegar. They are chiefly imported from Spain, Italy, and the South of France, where this tree is largely cultivated for the purpose. The flower-buds are picked daily, and thrown into a cask of strong pickling vinegar, until it becomes full, when it is sold to the dealers by the collector. The former sort them into different sizes by means of copper sieves, in a similar way to that adopted for lead shot and gunpowder. In this way they are divided into *nonpareilles*, *capuchins*, *capotes*, *seconds*, and *thirds*, of which the former, or smallest, are regarded as the best; but much depends upon the quality of the vinegar.

The lively green colour of capers, so much valued by the ignorant, arises chiefly from the presence of copper derived from the sieves used in sorting them. In many cases, copper coin, as sous and halfpence, are added for the purpose. Thus the eye is gratified at the sacrifice of the stomach, and an insidious poison introduced into the system, simply to give an unnatural appearance to a condiment which tastes better without it. See *Copper.*

CAPHOPICRITE. A bitter substance extracted from rhubarb. See *Rhabarberin.*

CAPILLAIRE. *Simple syrup*, or a concentrated solution of *sugar* in *water*, flavoured with *orange flower water*, or some other similar aromatic. The name is derived from that of the mucilaginous syrup, formerly directed to be made of the *adiantum capillus veneris*, or true maiden hair.

CAPNOMOR. An oily fluid, possessing a pungent and an agreeable odour, obtained by Reichenbach, from beech tar.

CAPRIC ACID. Syn. *Acidum Capricum*,—Lat. An acid discovered by Chevreul, and obtained by decomposing *caprate of baryta*, with *dilute sulphuric acid*, or primarily by the *saponification* of *butter*, when it appears combined with *butyric, caproic,* and *caprylic acids.*

Obs. When butter is saponified with caustic potassa or soda, and the resulting soap decomposed by adding an acid, in excess, and distilling the mixture, the four acids above named, pass over into the receiver, in combination with water. The mixed acids may be separated by saturating them collectively with baryta, and by taking advantage of the unequal solubility of the newly-formed baryta salts. The less soluble portion, (equal to about $\frac{1}{20}$th of the dry mass,) contains *capric* and *caprylic acid;* the larger and more soluble portion, *butyric* and *caproic acid.* On the same plan, the two groups are resolved into their separate acids. These acids are deprived of their uncombined water by means of chloride of calcium.

Capric Acid has a mixed odour of acetic acid and that of the goat; is very sparingly soluble in water; but in other respects resembles caproic acid.

CAPROIC ACID. An oily acid, discovered by Chevreul, and obtained by decomposing *caproate of baryta* with *dilute sulphuric acid.* It may also be prepared by boiling *cyanide of amyl* with *potassa,* when *caproate of potassa* is formed.

Caproic Acid is a colourless liquid, much less soluble than butyric acid; and smells less goaty than capric acid. (See above.)

CAPROYLE, *Caproylene,* and *Caprylene.* Homologous radicals or hydrocarbons, bearing the same relation to the corresponding alcohols and acids, that amyl, butyl, &c., do to amyl alcohol, butyric acid, &c. The first is an oily liquid, obtained by acting on *œnanthylic acid* with the *galvanic current.*

CAPRYLIC ACID. From *caprylate of baryta* and *dilute phosphoric* or *sulphuric* acid. It has been obtained by M. Bouis by the oxidation of caprylic alcohol. It is much more soluble than capric acid, but much less so than either caproic or butyric acid. Its odour, which is very powerful, strongly resembles that of perspiration. (See *below.*)

CAPRYLIC ALCOHOL. From *castor oil,* distilled along with *solid hydrate of potassa.* It is an oily liquid, boiling at 356° Fahr. Treated with oxidizing agents, it is readily converted into *caprylic acid.*

CAPSICINE. Syn. *Capsicina.* From *capsicum annuum,* or Chilly pepper.

Prep. A strong *alcoholic tincture* of *capsicum,* is gently evaporated to the consistence of a soft extract, the residuum digested in ether, and the etheral solution evaporated.

Prop., &c. A volatile reddish-coloured liquid; very soluble in alcohol, ether, oil of turpentine, and caustic alkaline lyes; slightly soluble in water, and a little more so in vinegar and acetic acid. It is intensely pungent. The $\frac{1}{12}$th of a gr. placed on the tongue endangers life from suffocation. $\frac{1}{3}$ gr. volatilized by heat in a large room, will cause all its inmates to cough and sneeze violently.

CAPSULES. This term is now commonly applied to small egg-shaped or spherical vessels, in which medicines are placed, for the purpose of covering their nauseous taste, at the time of swallowing them. They are commonly made of gelatine, mixtures of sugar and gelatine, or animal membrane.

Prep. 1. (*Gelatin Capsules.*)—*a.* By dipping the bulbous extremity of an *oiled metallic rod* into a *strong solution of gelatine.* When the rod is withdrawn, it is rotated, in order to diffuse the fluid jelly equally over its surface. As soon as the gelatinous film has partially hardened, it is removed from the mould and placed on pins, furnished with suitable heads, and fixed on a cork table. When sufficiently dry, the capsules are placed upright in little cells, made in the table to receive them, and the liquid with which they are to be filled, is then introduced by means of a small glass tube. They are next closed by dropping some of the melted gelatine on the orifice of each. Six parts of *gelatine,* and one part of *sugar,* are now the common proportions.

b. (Simonin). *Oval balls of wax,* of the requisite size, are prepared by pouring wax into a wooden mould, consisting of two parts, and arranged for the reception of a row of these balls. These are afterwards stuck on iron needles, affixed to rods of convenient size, in rows. The balls are now uniformly coated all at once by dipping in the usual manner, then removed from the needles, and are next placed with the needle holes downwards, on a gently heated plate, when the wax flows out, and a round capsule is left behind.

c. (Giraud.) *Gelatine,* 6 parts; *syrup of gum* and *simple syrup,* of each, 1 part; *water,* 5 parts; melt in a water bath, remove the scum, and proceed as before.

2. (*Membranous Capsules; Organic do.*) From gut-skin moistened and stretched over an oiled bulb of glass or metal, and filled in the common way. These are patented; but as they are neither a novelty nor an improvement on the common capsule, the patent is evidently untenable.

Obs. The common capsules usually hold about 10 or 12 grs. of balsam of copaiba. Those of the shops, in 9 cases out of 10 are filled with adulterated capivi, and at least 4-5ths of them are filled with *train oil* or *linseed oil*, to which a few drops only of balsam of capivi are added. A certain advertising French pharmacien, not quite one hundred miles from Her Majesty's theatre, recently offered in a certain periodical to send samples of his "wares" to any interested party for examination. The editor of this work accepted the challenge through the columns of the same print; but no "samples for examination" from the party alluded to have ever come to hand. "*Impudence*" is often a better salesman than "*good quality*."

Balsam of capivi and *oil of cubebs*, or a mixture of them, *castor oil*, and *cod-liver oil*, are the substances most usually administered in this way. *Baccæ copaiferæ factitiæ* are officinal in the Ph. Castr. Ruth. Ratier has proposed to grease them and administer them per anum. Ricord has strongly recommended *capsules of copaiba*, coated with *extract of rhatany*, as much superior to the common ones of copaiba alone, in the treatment of gleet and gonorrhœa. They may be easily prepared by either of the following methods:

1. By immersing, for an instant, the common capsule in a mixture of *extract of rhatany*, (newly prepared from the root,) 3 parts; *syrup of moist sugar*, 1 part; *mucilage of gum Arabic*, 1 part; melted together in a water bath.

2. By forming the bodies of the capsules with the above mixture or *composition*, instead of with *gelatine*, and then following the same manipulations as for the manufacture of the common gelatine capsules.

These capsules are said to sit well upon the stomach, the tone of which they contribute to improve, and to act with greater certainty than those made of copaiba and gelatine alone.

CARAMEL. The caramel of commerce is spirit colouring, or a concentrated solution of *burnt sugar* in *water*. In this state it is mixed with variable quantities of undecomposed sugar and certain bitter compounds (*asamar, &c.*) To render it quite pure, it should be dissolved in *water*, the solution filtered, and *strong alcohol* added until it ceases to produce a precipitate. *Pure caramel* is thrown down, and may be collected on a filter, washed with alcohol and dried.

Prop., &c. A black or dark-brown powder, soluble in water, to which it gives a rich sepia tint; insoluble in pure alcohol; and incapable of fermentation.

CARAT. A weight of 4 grains used in weighing diamonds, which are spoken of as of so many carats weight. Among *assayers*, a carat is a weight of 12 grains; but more commonly a proportional weight or term, representing the number of parts of pure gold in 24 parts of the alloy; pure gold being spoken of as of 24 carats fine. It is commonly the 24th part of the "*assay pound*," and is nominally subdivided into 4 assay grains, and these again into quarters. See *Assaying.*

CARAWAY. Syn. *Caraway seed; Semena Carui*,—Lat. *Carui*,—Ph. L. The "fruit" (seed) of the "*carum carui*" (Linn.), an umbelliferous plant, common in England and other parts of Europe. They form an agreeable and useful aromatic and carminative, and are especially esteemed in the flatulent colic of children. They are also largely employed as an adjuvant or corrective in various officinal preparations; and as a flavoring ingredient in cakes, biscuits, cordials, confectionary, &c. See *Essences.*

CARBAMIDE. Crystallized anhydrous urea.

CARBAZOTIC ACID. See *Picric Acid.*

CARBOLIC ACID. Syn. *Phenol, Hydrate of Phenyle, Hydrated Oxide of do.*—1. From *common coal-tar*, agitated with *milk of lime*, and after some time, the aqueous portion separated from the undissolved oil, and decomposed by *hydrochloric acid;* the oily product is then purified by cautious distillation, the first third only that comes over being collected.

2. *Crude coal-oil* is distilled in a retort furnished with a thermometer, and the portion which passes over when the heat ranges between 300° and 400° Fahr., is collected apart, and mixed with a *hot strong solution of caustic potassa;* after repose for some time, a semi-crystalline pasty mass forms, which when agitated with water separates into an oily liquid and a heavy alkaline lye; the latter is decanted decomposed by *hydrochloric acid*, and purified by contact with chloride of calcium and distillation; the distillate by refrigeration furnishes crystals, which must be drained, dried, and preserved from the air.

Prop., &c. Long, colourless prismatic crystals, melting at 95° Fahr. to an oily liquid, greatly resembling creosote; the crystals deliquesce in moist air, forming a sort of hydrate; it boils at 370°; sp. gr.

1·065. Commercial creosote consists principally of hydrated carbolic acid.

CARBON. Syn. *Carbonium*, *Carbo*,—Lat. The inflammable matter forming charcoal. Carbon is one of the elementary or simple bodies, and in its pure form exists only in the diamond. It may be obtained sufficiently pure for all chemical purposes, by strongly igniting *lamp-black* in a covered crucible. This, like the diamond, yields pure carbonic acid, by combustion in oxygen. See *Charcoal*, *Organic Bodies*, *&c.*

CARBON (Bromide of). Syn. *Carbonii Bromidum*,—Lat. *Prep.* (Serullas.) *Bromine*, 2 parts; *periodide of carbon*, 1 part; mix, and add just enough *solution of potassa* to make the liberated iodine disappear. The liquid *bromide of carbon*, which collects at the bottom of the solution, is then separated from the supernatant portion, and allowed to stand until it becomes clear. A few crystals of iodide of potassium rise to the surface, and may be removed. The clear liquid is next put into a little *water slightly alkalized with potassa*, to remove a little remaining iodide of carbon, after which it is quite pure.

CARBON (Chlorides of). Several substances of this kind are known to chemists, and are obtained indirectly by the action of chlorine on certain organic compounds. *Dutch liquid* absorbs chlorine, and yields at least four such compounds by losing successive portions of its hydrogen.

Perchloride of Carbon, Sesquichloride of Carbon. A white solid crystalline aromatic substance, obtained by Faraday by putting *Dutch liquid* into a glass vessel containing *chlorine*, and exposing the whole to the light.

Protochloride of Carbon. This is a volatile, colourless liquid, formed when the vapour of the preceding is passed through a red-hot glass or porcelain tube filled with fragments of glass or rock crystal.

Subchloride of Carbon. A white volatile silky substance obtained by repeating the last named process several times.

Bichloride of Carbon. Formed by passing the vapour of *bisulphuret of carbon* mixed with *chlorine gas*, through a red-hot porcelain tube, and distilling the condensed vapour with potassa. Liquid, colourless; sp. gr. 1·56; boils at 170° Fahr.

Chloral may be considered as another chloride of carbon.

The *terchloride of carbon* (*carbonii terchloridum*) of the druggists, is *chloral*, but a spurious article, formed of *chloroform*, 1 part, and *rectified spirit*, 5 parts, is commonly sold for it. The dose is 2 to 5 drops in water, 2 or 3 times daily, as an anodyne, in cancer, spasms, &c. *Externally*, as a lotion, 2 to 3 dr. to water, 6 *oz.*

CARBON (Iodide of). Syn. *Carbonii Iodidum*,—Lat. See *Iodoform.* It is recommended by Litchfield in enlarged glands and obstinate cutaneous affections. See *Ointments.*

CARBON (Sulphuret of). Syn. *Carburet of Sulphur*, *Carbide of do.*, *Sulphide of Carbon*, *Bisulphide of do.*, *Bisulphuret of do.*, *Sulphur Alcohol*; *Carbonii Sulphuretum*, *C. Bisulphuretum*, *Sulphuris Carburetum*, *&c.*,—Lat. A volatile ethereal liquid with many synonyms, of which bisulphuret or bisulphide of carbon are not only those best known but those which are most appropriate.

Prep. 1. *Bisulphuret of iron* (or *iron pyrites*), 5 parts, and *fresh dry charcoal*, 1 part, are heated together in a stone-ware retort, furnished with a glass tube, having the end bent, and passing nearly to the bottom of a bottle or receiver filled with *pounded* ice. The *bisulphuret of carbon* collects at the bottom of the receiver, and is then purified from adhering moisture and sulphur by distilling it, at a low temperature, from fused *chloride of calcium.*

2. By passing the *vapour of sulphur* over *fragments of charcoal*, heated to bright redness in a porcelain tube, and collecting the product as before.

3. (Van Mons.) *Sulphuret of iron*, 11 parts; *charcoal*, 3 parts; as No. 1.

4. (Mulder.) Take an *iron bottle* and make a second opening into it. To one opening adapt a *copper tube* bent twice at right angles; and to the other a *straight tube* dipping into the bottle. Having nearly filled the bottle with pieces of *fresh-burnt charcoal*, screw on the bent and straight tubes, and place the bottle in a furnace, closing the mouth of the latter with a stone or clay cover in two pieces, hollowed in the centre so as to fit the upper part of the bottle, and defend it from the action of the fire. Connect the curved tube with a *Woolfe's bottle*, half filled with water, and placed in a freezing mixture. When the iron bottle is sufficiently heated, introduce by the straight tube (see *above*,) *fragments of sulphur*, and immediately close the mouth of the tube with a plug. The bisulphuret, as it comes over, falls to the bottom of the water, and must be collected and purified as before.

Prop., *&c.* A colourless, pungent, fetid liquor, exceedingly volatile, boiling at 110° Fahr., and inflammable, burning with a pale blue flame. Sp. gr. 1·272, (1·265,—Ure.) It freely dissolves sulphur, phosphorus, and several other substances, and by spontaneous evaporation deposits the first in beautiful crystals. It exceeds all substances in refractive power. (Brewster.) In dispersive power it exceeds all fluid substances except oil of cassia. It produces intense cold by its evaporation. A spirit thermometer, having its bulb covered with cotton, if dipped into this fluid and suspended in the air, rapidly sinks from 60° to 0°, and if put into the receiver of an air-pump it will fall to—81° Fahr. Mercury may be readily frozen in this way. The following *experiment* is both *amusing* and *illustrative*:—A glass of *water* had remained on the table since the preceding evening, and though it might be some degrees below 32° Fahr. it indicated no disposition for congelation. A few drops of *sulphuret of carbon* were applied to the surface; instantly the globules became cased with a shell of icy spiculæ of retiform texture. Where they were in contact with the water, plumose branches darted from the sulphuret, as from a centre, to the bottom of the vessel, and the whole became solidified. The sulphuret of carbon in the interim had volatilized; and during this period the spicules exhibited the colours of the solar spectrum in beautiful array. (Murray.)

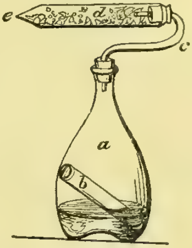
Uses. Bisulphuret of carbon is now prepared on the large scale, and extensively employed as a solvent. See *Caoutchouc, Gutta Percha*, and *Traumaticine.*

CARBONATE. Syn. *Carbonas,*—Lat. A compound of carbonic acid with a base.

Tests, &c. The carbonates are distinguished—1. By effervescing with all the soluble acids when added in excess, *excepting* hydrocyanic acid and hydrosulphuric acid.—2. The gas evolved in the last, passed into lime water and baryta water, occasions white precipitates, which redissolve in acids with effervescence, and after the solution has been boiled are not reprecipitated by liquor of ammonia.—3. Chloride of calcium and chloride of barium give white precipitates in solutions of the *neutral* alkaline carbonates, but in solutions of the alkaline bicarbonates, only after ebullition.

Estim. The *quantity of the base* in an *alkaline* or *earthy carbonate* may be easily determined by the common method of *Alkalimetry*, and the *quantity of carbonic acid*, by the method of Fresenius and Will. The following little apparatus is a simplification of that of these German chemists:—

Into a flask (*a*), a weighed portion of the sample for examination is placed, along with a little water. A small tube (*b*), sufficiently long to maintain a slanting position without falling, is then filled with either *sulphuric acid* or *hydrochloric acid*, and also placed in the flask.



The bent tube (*c*), leads into a horizontal tube (*d*), filled with small fragments of *chloride of calcium*, and having its other end (*e*) drawn out to a capillary orifice. On inclining the apparatus the *acid* escapes over the side of the small tube, and mixing with the liquor in the flask, expels the *carbonic acid* of the *carbonate*, which is then dried by passing over the *chloride of calcium.* After effervescence has ceased, heat should be applied to the bottom of the flask, until it be filled with steam, to expel the carbonic gas it contains. The loss of weight gives the weight of the *carbonic acid gas* that was contained in the sample. The *quantity* of *carbonic acid* in the *carbonates of the metals that do not contain water*, may be determined by heating them to redness in a platina crucible. (See p. 42.)

CARBONIC ACID. Syn. *Fixed Air, Choke Damp, Aerial Acid; Acidum Carbonicum,*—Lat. An acid formed by the chemical union of carbon with oxygen. It is the gas disengaged during the effervescence of soda water.

Prep. 1. *Hydrochloric acid,* 1 part, diluted with *water*, 4 or 5 parts, is poured upon *fragments of white marble*, previously placed in a tubulated retort. Carbonic acid gas is rapidly evolved, and may be either collected in the mercurial pneumatic trough, or applied to immediate use. In this state it contains a little water. It may be dried by passing it over *fused chloride of calcium,* or through *concentrated oil of vitriol.*

2. (*Commercial.*) From *oil of vitriol,* 1 part; *water*, 6 parts; and *chalk* or *whiting*, $1\frac{1}{4}$ parts; mixed in a suitable vessel, applying agitation.

Prop., &c. An invisible, irrespirable gas, possessing a pungent odour, and an acidulous taste; it is neither combustible nor a supporter of combustion; water absorbs about its own volume of this gas, forming *carbonic acid* or *ærated water;* it reddens moistened litmus paper, but the blue colour returns after a time, and immediately on the application a gentle heat; sp. gr. 1·524; 100 cubic inches weigh 47¼ gr., (Dulong and Berzelius; 46½—Ure.) a cubic foot weighs 818 gr. Under a pressure of about 36 atmospheres at 32° Fahr., it becomes fluid, and on the pressure being removed, congeals from the cold produced by its rapid evaporation. It has been estimated that the temperature falls to—180° in this experiment. Carbonic acid gas is destructive to life, and extinguishes combustion. An atmosphere containing more than its natural quantity (about $\frac{1}{1000}$) is unfit for respiration; when containing more than $15\frac{0}{0}$ it instantly destroys life, and extinguishes combustion. The agreeable pungency of ale, beer, porter, wine, &c., is chiefly owing to the presence of carbonic acid, which they lose on exposure to the air, and then become flat and insipid. Spring and well water contain carbonic acid; water that has been boiled has an insipid taste from its absence. The air of wells, cellars, brewers' vats, &c., is frequently contaminated with this gas; hence the necessity of the old plan of letting down a burning candle before venturing in. If the candle will not burn, or burns feebly, human beings cannot breathe there. The neglect of this simple precaution led to the late fatal accident at Barclay's brewery.

Tests. It feebly reddens litmus paper, extinguishes the flame of a burning taper, and forms a white precipitate in aqueous solutions of lime and baryta, which is soluble in acetic acid. By the last test, a very small quantity of this gas may be easily detected in the atmosphere of rooms, &c. See *Carbonates*, and above.

Ant. The patient should be immediately removed into the open air, and placed on his back with the head *slightly* raised. Cold water should be dashed over the body, hot water or mustard poultices applied to the feet, and ammonia (carefully) to the nostrils. Brandy-and-water and other stimulants may be administered. Continued friction on the surface of the body is also very useful. If the patient has ceased to breathe, artificial respiration should be attempted. This may be done by gently pressing down the ribs, and forcing up the diaphragm, and then suddenly withdrawing the pressure. The inhalation of air, mixed with a very *little* chlorine gas, has also been recommended.

Obs. Of the above processes, No. 1 is that commonly adopted on the small scale in the laboratory; No. 2 is that in use among the soda water makers. From this gas being so much heavier than atmospheric air, it may be poured from one vessel to another, like water. When a pneumatic apparatus is not at hand, it may be collected by simply passing the end of a bent tube connected with the generator to the bottom of a bottle or jar, the mouth of which is lightly closed with a piece of card paper or glass. When it is not required that the gas should be dry, a *concentrated solution* of *sulphate of magnesia* or even of *common salt*, may be used instead of mercury, for the pneumatic trough or gasometer. *Wells*, *cellars*, and other *underground apartments*, containing carbonic acid in poisonous quantities, may be freed from this gas by pumping it out, in the same way as water, observing to allow the suction hose to *fully* reach the *floor* or bottom of the place. *Fresh slacked lime* or *milk of lime*, copiously thrown in, will have a like effect, by absorbing the gas. *Free ventilation*, whenever it can be established, is, however, not only the cheapest, but the most efficient remedy.

CARBONIC OXIDE. Syn. *Gaseous Oxide of Carbon; Oxydum Carbonicum*,—Lat. This gas is formed of equal equivalents of carbon and oxygen; or one of oxygen less than is contained in carbonic acid.

Prep. 1. From *carbonic acid gas* passed over fragments of charcoal, heated to redness in a tube of porcelain or iron.

2. From equal weights of *chalk* or *carbonate of soda*, and *iron filings* or *charcoal*, ignited together.

3. (Dumas.) From *binoxalate of potassa*, treated with 5 or 6 times its weight of *strong oil of vitriol* in a glass retort.

Obs. The gas is passed *first* through a *caustic alkaline solution* or *milk of lime*, to deprive it of carbonic acid, and next over *dried chloride of calcium*, to deprive it of moisture. It may be collected either over mercury or water, as the latter absorbs very little of this gas.

Carbonic oxide is colourless, inodorous, neutral, inflammable, and irrespirable. It is often called "choke damp" in Cornwall. The *antidotes*, *&c.*, are the same as for poisoning from inhaling *carbonic acid*.

CARBYLE. Syn. *Carbyl.* When the vapour of *anhydrous sulphuric acid* is passed into *absolute alcohol*, a white, crystalline, solid substance is formed, which has been called *sulphate of carbyl* by Magnus. It may be purified from adhering acid by a little hydrate of baryta. It is soluble in both alcohol and water.

CARDAMOM. Syn. *Cardamum; Cardamomum,*—Ph. L. E. & D. The "seed" or fruit of "*elettaria cardamomum.*" (Ph. L.) An agreeable and much esteemed aromatic, belonging to the *zingiberaceæ.* It is warm, pungent, carminative, and stomachic, and is largely used as a condiment in the East, and in Europe as an adjuvant in other medicines.

CARMINATIVES. Medicines that allay flatulency and spasmodic pains. Among the principal carminatives are *aniseed, caraway seed, cardamoms, cassia, cinnamon, ginger, peppermint,* and the *peppers.* To these may be added *ardent spirits,* and most of the *aromatic essences* and *tinctures.* See *Mixtures, Patent Medicines, &c.*

CARMINE. Syn. *Carmine Red, Vegetable Scarlet; Carminum.* This beautiful pigment is the only substance that can impart the transparent ruddiness of health to the portrait, or the bloom of the rose to the artificial flower.

Prep. The preparation of carmine is little understood, but success in its manufacture depends less on any mystery connected with the process than on the employment of the *purest water* and the *best materials,* and the exercise of moderate *care, dexterity,* and *patience.* The following forms will produce carmine of the richest hues down to ordinary and common, according to the skill possessed by the manipulator.

1. (*Madame Cenette's Process.*) *Cochineal* (in powder), 2 *lb.*, is boiled in *pure river water,* 15 gall., for 2 hours, when *refined saltpetre* (bruised), 3 *oz.*, is added to the decoction, and the whole boiled for 3 or 4 minutes longer; *salt of sorrel,* 4 *oz.*, is next added, and the boiling again renewed for 10 or 12 minutes; the heat is now removed, and the liquid allowed to settle for about 4 hours, after which time it is decanted with a syphon, into shallow plate-like vessels, and set aside for 3 weeks. At the end of this time the film of mould which has formed on the surface is dexterously and carefully removed, without breaking it or disturbing the liquid beneath it. The remaining fluid is next very carefully removed with a syphon, and the adhering moisture, as far as possible, drained off, or sucked up with a pipette. The residuum, which is the carmine, is dried in the shade, and possesses extraordinary lustre and beauty.

2. (*Alxon* or *Langlois Process.*) Powdered *cochineal,* 1 *lb.*, is boiled in *river water,* 4 gall., for 10 minutes, when *carbonate of soda,* ¾ *oz.*, dissolved in *water,* 1 pint, is added, and the whole again boiled for ½ hour longer; when the decoction is cold, *alum* (in fine powder), ¾ *oz.*, is thrown in, and the liquid agitated rapidly until it is *entirely* dissolved; after 20 minutes repose, it is decanted into another vessel, and clarified by heating it with the *whites of* 2 *eggs;* the perfectly clear liquid is then allowed to repose for 40 minutes or longer, when it is decanted, and the carmine which it has deposited is collected, drained on a filter, and dried on shallow plates covered with silver paper. The product by either of the above processes varies from 9½ to 10% on the weight of the cochineal employed in them.

3. (*China process; Spirit do.,*) *Cochineal,* 1 *lb.*, is boiled for 15 minutes, in *water,* 3 gall., *powdered alum,* 1 dr., is next added, and the whole again boiled for 5 or 6 minutes; when the liquid has become cold, the clear portion is decanted, and again heated, and *solution of tin* (*spirits of tin*), cautiously dropped in until all the carmine is precipitated; it is collected, drained, and dried, as before. *Prod.* 1½ oz.

3. (*French process.*) From *cochineal* (in powder), 1 *lb.*, boiled for 15 minutes, in *water,* 3 gall.; *cream of tartar* (in powder), 1 *oz.* is then added, the boiling further continued for 10 minutes, and *powdered alum,* 1½ *oz.* thrown in; after another 2 minutes' boil, the heat is withdrawn, and in 5 or 6 minutes more, the clear portion is decanted into porcelain vessels, which are set aside until the carmine falls down.

4. (*German process.*) Powdered *cochineal,* 1 *lb.*, *water,* 4 gall.; boil 15 minutes, add *powdered alum,* 1 *oz.*; boil 3 minutes longer, remove the heat, allow the liquor to settle for 5 minutes, pour off the clear portion into porcelain or earthenware vessels, and set them aside for 3 or 4 days. The carmine is found deposited on the bottom of the vessel, and must be now carefully drained and dried, as before. The decanted liquor yields more carmine by standing in fresh vessels. *Product.* About 1½ *oz.;* besides ½ *oz.*, or more, of an inferior quality obtained as a second deposit.

5. (*English process.*) From *cochineal,* 1 *lb.*; and *carbonate of potash,* ½ *oz.*, boiled in *water,* 7 gall., for 15 minutes; the vessel is then removed from the fire, and *powdered alum,* 1 *oz.*, added; the liquor is then well agitated and allowed to settle for about 15 minutes longer; the clear liquid is next decanted into a clean copper, and *isinglass,* ½ *oz.*, dissolved in *water,* 1 pint, (and strained) added; as soon as a coagulum

forms upon the surface, the heat is removed, and the liquid is strongly agitated with a bone or silver spatula, after which it is allowed to repose for 20 or 30 minutes. The deposited carmine must be drained and dried, as before.

Prop., *&c.* Pure carmine is a very light, lustrous, scarlet powder, entirely soluble in liquor of ammonia, a test by which its *purity* is readily determined. Preisser has given the name *carmine* to a colourless crystalline compound, which he has obtained from cochineal, and which, according to him, forms, by oxidation, *carmeine*, or the red colouring matter of the insect. Mr. Warren De La Rue says the pure colouring principle of cochineal is *carminic acid.* Others have given the name *cochinellin* to a similar substance. Pelletier and Caventou regard the carmine of commerce as consisting of cochinellin, animal matter, and an acid. By digesting *liquor of ammonia* on *carmine*, until all the colour is taken up, filtering and adding *acetic acid* and *alcohol*, till the whole is precipitated; and lastly, carefully washing the precipitate with *spirit of wine*, at proof, and drying in the shade, *carmine* of the *richest* and *most lustrous hue*, may be obtained even from samples of inferior quality.

Uses, *&c.* As a pigment in velvet and miniature painting, and for tinting artificial flowers, and as rouge for the complexion. The powdered cochineal (*carmine grounds*), from which the coloured liquor (*liquid rouge*, *carmine liquor*,) has been decanted, is used by the paper stainers, and both are used in the preparation of *carminated lake.*

Obs. The best black cochineal is generally used for the preparation of carmine. For ordinary qualities, *spirits of tin* (bichloride) is added to the decoction as a precipitant, and the liquid being put into suitable vessels, (wash-hand basins answer very well,) a deposit of carmine slowly takes place. Neither exposure to solar light nor artificial heat is advisable during the drying, but the latter must nevertheless be effected with all possible expedition. Hence, the finer shades of carmine can only be successfully made during certain states of weather; as in very hot weather the liquid rapidly sours or ferments, and the deposit is more or less dissolved; whilst in dull, damp weather, it is difficult to dry the precipitate sufficiently, which is then apt to become mouldy, and to lose colour. The researches of Pelletier and Caventou tend to show that the solution of tin used as a precipitant, should be at the maximum of oxidation or chlorination, to produce the richest shades of carmine. That first deposited is, in all cases, the most beautiful, and the quality gradually deteriorates as the process proceeds. 6 or 7 dr. only of carmine of the *very finest quality* can hence be obtained from 1 *lb.* of cochineal. See *Cochinellin, &c.*

CARMINE (Blue). Syn. *Blue Lake.* When the *solution of indigo in oil of vitriol* is neutralized with *carbonate of potassa*, a bulky blue precipitate separates, which has received the name of *blue carmine* or *soluble indigo.*

CARMINE (Liquid). Syn. *Fluid Carmine*, *Liquid Rouge*, *Carmine Ink.*—1. A solution of *carmine* in *ammonia water*, or *spirits of hartshorn.* Very rich and beautiful.

2. The residual liquor of the process of making carmine. Inferior. The *first* is used in velvet and miniature painting, and for tinting artificial flowers; the *second* for common purposes, as a stain or wash.

CARMINIC ACID. *Prep.* (Mr. W. De La Rue.) A *decoction of cochineal* is precipitated by adding a solution of *acetate of lead*, and the impure *carminate of lead* thus formed, after being washed with water, is *suspended in water*, and decomposed by a *stream of sulphuretted hydrogen;* (see *absinthic acid;*) the whole process is repeated with the decanted solution; the second solution, so obtained, is then evaporated to dryness, dissolved in *absolute alcohol*, digested on some washed *crude carminate of lead*, (to separate a little phosphoric acid,) and, lastly, mixed with *ether* (to precipitate some nitrogenized matter;) the residuum obtained by careful evaporation, is pure *carminic acid.*

Prop., *&c.* A purple brown mass, yielding a rich red powder; it is freely soluble in water and alcohol; slightly soluble in ether; and without decomposition in oil of vitriol; it is feebly acid; its salts are termed *carminates*, only two or three of which have been examined. According to Mr. De La Rue, this acid constitutes the *pure colouring* matter of cochineal.

CAROTINE. A crystalline, ruby-red substance, obtained from the root of the *daucus carota* (*sativa*) or garden carrot. It is tasteless; odourless; neutral; fusible; inflammable; insoluble in ether and water; slightly soluble in alcohol; and very soluble in the mixed and volatile oils.

CARPETS. Considerations of *cleanliness* and *economy* may demand a few words on *carpets* and *hearth-rugs* here. We are assured by an experienced person, that before proceeding to *sweep a carpet*, a few handfuls of waste tea-leaves should be sprinkled over it, (say some five or six minutes before.) A stiff hair broom or hair brush *only* should be employed, unless the carpet be very dirty, when a whisk or carpet-broom may be used *first*, followed by another made of hair, to take off the loose dust. The frequent use of a *stiff* "carpet-broom," (those made of cane or birch are here alluded to,) soon wears off the beauty of the best carpet. An ordinary clothes-brush, or a clean one, resembling the "dirt brush" used for shoes, is best adapted for superior carpets. When carpets are very dirty, they should be cleaned by shaking and beating. In laying down carpets, it is very advisable, at first, to cover the floor beneath them with large sheets of thick paper, so as to prevent dust from rising between the boards. Old drugget, sacking, matting, or any similar substance, will effect the same purpose, and also, by breaking the force of contact between it and hard bodies, materially increase its durability.

Brussels Carpets may be cleaned with *ox-gall*, (1 pint to a pailful of water,) and a scrubbing-brush and floor-cloth; afterwards rinsing them in fresh water applied in the same way. They should be previously perfectly freed from dust by "beating them," and should be nailed down before commencing the above operations. Great care should be taken to rub them as dry as possible with a clean dry floor-cloth. A small portion only should be done at a time, and a dry windy day selected for the purpose. A carpet treated in this manner will be greatly refreshed in colour, particularly the greens.

Kidderminster Carpets will scarcely bear the above treatment without becoming so soft as to get speedily dirty again. This may in some measure be prevented, by brushing them over with a hot weak solution of size in water, to which a little alum has been added. Curd soap, dissolved in hot water, may be used instead of ox-gall, but it is more likely to injure the colours, if produced by false dyes. When there are spots of grease on the carpeting, they may be covered with curd soap, dissolved in boiling water, and rubbed with a brush until the stains are removed, when they must be cleaned with warm water as before. The addition of a little gall to the soap renders it more efficacious. Some persons employ a mixture of *soap*, *fuller's earth*, and *turpentine*, for the same purpose.

CARRAGEENIN. Syn. *Soluble Gelatin*, *Vegetable do.* The pure jelly extracted from *carrageen* or *Irish moss*. It may be purified by agitation with dilute alcohol, and filtration. It closely resembles animal jelly. A similar substance is obtained from *Ceylon moss*.

CARROT. Syn. *Carota*,—Ph. L. E. & D. *Dauci Radix*,—Ph. L. 1836. The fresh root ("*radix recens*") is officinal in the Ph. L. & E. and the seed ("*fructus;*" "*semina;*") in the Ph. E. & D. The *seed* is carminative and diuretic; the *expressed juice of the root* is anthelmintic. Scraped *raw carrot* is sometimes employed as a stimulant application to sore nipples; the *boiled root* as a poultice to sores and tumours. As an article of food, unless young and well dressed, carrots are rather indigestible.

CARTHAMINE. Syn. *Carthamic Acid; Pure Rouge, Safflower Carmine, Safflower Lake.* The red colouring matter of *carthamus tinctorius* or safflower.

Prep. 1. *Safflower*, exhausted by washing it with water, (or with water acidulated with acetic acid,) is dried, coarsely pulverized, and the powder digested in a *weak solution of carbonate of soda;* pieces of clean white cotton or calico are then immersed in the solution, and *acetic acid* gradually added in slight excess; the cotton is next washed, dried, and digested in a fresh quantity of *dilute solution of carbonate of soda*, and agitation employed until the whole of the colour is again dissolved; the new solution is filtered and slightly supersaturated with *citric acid* (or *acetic acid*); the *carthamine* which falls down in rich carmine red flocks, is lastly washed with *cold distilled water*, and dried.

2. *Washed safflower* (dried and powdered), any quantity; *aqueous solution of carbonate of soda*, (containing 15% of carbonate,) q. s. to form a thick paste; after some hours press out the red liquor, *nearly* neutralize it with *acetic acid*, put in cotton as before, and add *acetic acid* in slight excess; the next day remove the cotton and wash it in *water holding in solution* 5% *of carbonate of soda*, until the colour is dissolved out, after which precipitate with *citric acid*, as before.

Prop., *&c.* An amorphous, brilliant, greenish powder; nearly insoluble in water; soluble in alcohol, forming a gorgeous purple solution, and in weak alkaline lyes, giving an equally beautiful red one.

CARYOPHILLIN. Syn. *Clove Camphor*, *Clove Resin.* A resinous substance, extracted from *Molucca cloves* by means of alcohol. By repeated evaporations and re-solutions, it may be obtained in a satiny, crystalline form. It is odourless, tasteless, fusible, volatile, and soluble both in alcohol and ether. It is reddened by sulphuric acid.

CASCARILLA. Syn. *Cascarilla,*—Ph. L. The bark of *croton eleutheria* or the *sea-side balsam,* a tree growing in the Bahamas and Jamaica. It is an aromatic bitter, stomachic, and tonic. *Dose.* 10 gr. to 30 gr. in the form of powder, infusion, or tincture; in diarrhœa, dysentery, dyspepsia, low fevers, intermittents, &c.

CASCARILLINE. Syn. *Cascarillina. Prep.* (Duval.) *Cascarilla,* is exhausted with *cold water,* by percolation, precipitated with *acetate of lead,* and the filtrate treated with *sulphuretted hydrogen;* (see *absinthic acid;*) the filtered liquid after agitation with *animal charcoal* and filtration, is gently evaporated to dryness. The powder is redissolved in boiling alcohol and crystallized by very slow or by spontaneous evaporation. It has a bitter taste, and acid reaction; its aqueous solution is unaffected by the ferric salts and tincture of galls. *Dose.* 1 to 3 gr.; in dyspepsia, &c.

CASE-HARDENING. Syn. *Steel surfacing.* The operation of giving a surface of steel to iron goods. Tools, fire-irons, fenders, keys, &c., are usually case-hardened.

Process. 1. The goods (finished in every respect but polishing,) are put into an iron box, and covered with *animal* or *vegetable charcoal,* and "cemented" at a red heat, for a period varying with the size and description of the articles operated on.

2. (Moxon.) *Cow's horn* or *hoof* is baked or thoroughly dried, and pulverized; to this is added an equal quantity of *bay salt,* and the whole is made into a paste with stale *chamber-lye,* or *white wine vinegar;* the iron is covered with this mixture, and bedded in it, in loam, or inclosed in an iron box. In this form it is laid on the hearth of the forge to dry and harden, then it is put into the fire, and blown till the lump has a blood-red heat, (no higher.) It is hardened as before.

3. Coat the goods with a paste made of a *concentrated solution of prussiate of potash* and *loam;* then expose them to a strong red heat, and when it has fallen to a dull red, plunge the whole into cold water.

4. The goods, previously polished and finished, are heated to a bright-red and rubbed or sprinkled over with *prussiate of potash.* As soon as the prussiate appears to be decomposed and dissipated, the articles are plunged into cold water.

Obs. The process of case-hardening has been well conducted, when the surface of the metal proves sufficiently hard to resist a file. The last two plans are a great improvement upon the common method. By the topical application of prussiate of potash (ferrocyanide of potassium) any part of a piece of iron may be case-hardened, without interfering with the rest.

CASE-HARDENING POWDERS. Syn. *Case-hardening Compositions.* 1. *Prussiate of potash,* dried and powdered.

2. *Prussiate of potash,* 3 parts; *sal ammonia,* 1 part; mix.

3. *Sal ammoniac* and *bone-dust,* of each, 2 parts; *prussiate of potash,* 1 part. (See above.)

CASEINE. Syn. *Caseum, Casein, Lact-albumen, Albumen* of *Milk.* Cheese made from skimmed milk, and well pressed, is nearly pure caseine. (Liebig.)

Caseine has lately engaged the attention of organic chemists, from being a modification of the *proteine* of Mulder. When caseine is thrown down from milk by adding an acid, it combines with a little of it, forming a kind of salt. With sulphuric acid a sulphate of caseine is formed. The acid may be removed by washing, when pure caseine is left behind. A solution of caseine in water very slightly alkalized, (as milk,) does not coagulate in boiling. In this it differs from *albumen;* as also in being precipitated by acetic acid, whereas albumen is not. The most remarkable property of caseine is its coagulation by certain animal membranes, as in the process of cheese-making, with rennet. In this operation the rennet loses less than $\frac{1}{1500}$th part of its weight. *Legumine* is vegetable caseine. By first adding a little caustic potassa to albumen, and then some alcohol, a precipitate is formed, having all the properties of caseine. (Liebig.)

Caseine precipitated with acetic acid contains about 1% of *sulphur;* when precipitated with alcohol it contains about 6% of *phosphate of lime.* Pure caseine is insoluble in alcohol and ether, and in water unless alkalized.

CASKS. The *care and management* of casks is an important affair in a large establishment. It is found that they *last longest* when "stored" either in a dry situation, or in one uniformly very moist. Continual variations from the one to the other speedily rot them. As soon as casks are emptied they should be bunged down quite air-tight, with as much care as if they were full, by which means they will be preserved both sweet and sound. Should any of the hoops become loose, they should be immediately driven up tight, which will at once prevent the liability of their being lost or misplaced, as well as the casks "fouling" or becoming musty from the admission of air. For this purpose, those out of use should be occasionally "hauled over" and examined. *Good casks* are very *expensive articles.* The casks and vats belonging to the great brewery of Messrs. Barclay and Co., of London, are said to be worth several score thousand pounds.

Numerous plans are adopted for cleaning and purifying *stinking* and *musty casks*, among which are the following:—

1. Wash them well out with *oil of vitriol*, diluted with an equal weight of *water.*

2. Wash them first with a little *chloride of lime* and *warm water*, and then with *water soured with oil of vitriol.*

3. Match them with *sulphur*, or with *sulphur mixed with a little saltpetre.*

4. Unhead them and whitewash them with fresh *milk of lime*, made pretty strong. This plan is commonly followed for brewer's vats.

5. Remove the heads, and char the insides of the staves by the aid of a fire of shavings, kindled within them.

6. A simpler, safer, and more effectual method of charring them than the last, is to wash the *dry* casks out with the strongest *oil of vitriol.* This not only purifies the surface of the staves, but penetrates into *all* the cracks, some of which might escape the action of the fire. The strongest oil of vitriol (sp. gr. 1·845,) may be bought in quantity at 1¼*d.* per *lb.*, or less than 2*s.* a gall.; a quantity sufficient, with common skill and care, to wash out 50 or 60 hogsheads or pipes.

7. *Steam* has lately been applied to the insides of casks, with great advantage. *High-pressure steam* is driven in at the bung-hole, at the same time that the cask is violently agitated, (a heavy chain having been previously put into it,) until all the dirt and bad smell is removed.

8. A *lye of pearlash* or *soda*, mixed with *milk of lime*, as well as *strong hot brine*, and other similar liquors, have been adopted by some persons, and are highly spoken of.

9. The coopers boil the staves for gin casks in a strong *lye of alum* before placing them together, to prevent their colouring the spirit, but *washing with oil of vitriol* is a better plan.

10. Some persons fill musty casks with water, and add 3 or 4 *lb.* of *coarsely powdered fresh-burnt charcoal*, and agitate well for a few days.

Obs. In all the above cases the greatest care must be taken to scald, or soak and well rinse out the casks after treating them in the manner referred to above. See *Brewing Utensils*, *Matches*, *&c.*

CASSAREEP. The *expressed juice* of the *sweet cassava*, a variety of the *jatropa manihot* or *bitter cassava.* *Used* in the West Indies as a condiment.

CASSAVA. Syn. *Cassada*, *Cassava Meal*, *Cassada do.; Farina Mandiocæ*,—Lat. From the *jatropa manihot*, (Linn.) or *bitter cassava*, a poisonous tropical tree of the natural order *Euphorbiaceæ.* The roots after being well washed and scraped, are rasped or grated, and the pulp thus formed is subjected to strong pressure, to expel the poisonous juice which it contains. The compressed pulp is next thoroughly dried over the fire, being constantly stirred the whole time, by which any remaining portion of the noxious juice is either volatilized or decomposed. It now forms *cassava meal.* When it is further prepared by grinding, it forms *fine cassava meal*, or *cassava flour.* When the compressed pulp is baked on a hot plate, it forms *cassava bread* or *cassava cakes*, the flavour of which greatly resembles that of Scotch oat-cakes. See *Tapioca.*

CASSIA. Syn. *Cassia*,—Ph. L. The "fruit" (Ph. L.; the "pulp of the pods," —Ph. E.) of the *cassia fistula*, (Linn.) or *purging cassia.* (See below.)

CASSIA PULP. Syn. *Cassia præparata*,—Ph. L. *Prep.* The *cassia*, (pods or fruit,) broken lengthwise, are macerated in sufficient *distilled water* to cover them, for six hours, constantly stirring; and the "purified pulp" strained through a hair sieve, and evaporated to the consistence of a confection in a water bath. *Dose.* As a mild laxative, 1 to 2 dr.; as a purgative, ¾ oz. to 1½ oz.

CASSOLETTES (Scented). See *Pastilles* and *Perfumery.*

CASTOR. Syn. *Castoreum*,—Ph. L. E. & D. "The follicles of the prepuce of the *castor fiber* or *beaver*, filled with a peculiar secretion." (Ph. L.) "A peculiar secretion from the præputial follicles." (Ph. E. & D.). It is often sophisticated; a fraud readily detected by the "absence of the membranous partition in the interior of the bags, as well as by the altered smell and taste." (Ure). *Dose.* 1 to 2 dr. or more, in powder or made into pills; in nervous and spasmodic affections, especially in hysteria, epilepsy, and other like diseases of females.

CASTORINE. Syn. *Castorina*, *Castoreum Camphor.* When *castor* is cut into small pieces and boiled in about 6 times its weight of *alcohol*, a crystalline substance (*castorine*) is deposited by the filtered tincture in cooling. By re-solution in alcohol, it may be obtained under the form of colourless prismatic acicular crystals.

Prop., *&c.* Castorine is soluble both in ether and hot alcohol, is inflammable, and by long boiling with nitric acid is converted into *castoric acid.* This acid forms salts with the bases, called *castorates.*

Obs. Genuine Russian castor, although the most expensive, must be employed in the above process, as scarcely any castorine can be obtained from the American variety.

CASTS. In preparing casts and moulds with *gelatine*, *wax*, *fusible metal*, and similar substances, it is important to use them at the lowest temperature compatible with fluidity; as when only a few degrees hotter, the water which adheres to the things from which the casts are taken, is converted into vapour, and produces bubbles. *Fusible metal* may be allowed to cool in a tea-cup until just ready to set at the edges, and then poured into the moulds. In this way beautiful casts from moulds of wood, or of other similar substances may be procured. When taking impressions from gems, seals, &c., the fused alloy should be placed on paper or pasteboard, and stirred about till it becomes pasty, from incipient cooling, at which moment the gem, die, or seal, should be suddenly stamped on it, and a very sharp impression will then be obtained.

CATALEPSY. Syn. *Trance; Catalepsis, Catalepsia.* A disease in which the organs of sense and motion cease to exercise their functions, and the heart and lungs feebly perform their offices and in a scarcely perceptible manner. The paroxysm generally comes on without previous warning, and its duration varies from a few minutes to several days, and if medical reports are to be credited, sometimes for a much longer period. Dr. Cullen seriously affirms that this disease is *always* counterfeited.

Treat. Ammoniacal stimulants applied to the nostrils, and spirituous liquors injected into the stomach, with general friction of the body, and free access to pure air, are the best remedies. Electricity and galvanism should also be had recourse to, when the necessary apparatus is at hand.

CATAPLASMS. See *Poultices.*

CATARRH. Syn. *Catarrhus*,—Lat. The "*cold in the head*," or "*cold on the chest*," of domestic medicine. *Influenza* is a severer form of this complaint, and has been called *epidemic catarrh.*

The common *symptoms* of catarrh are a copious discharge from the eyes and nose, a hoarseness, and generally a cough, more or less severe. The exciting causes are sudden changes of temperature, and exposure to currents of cold air while the body is heated; hence the frequency of colds in hot and changeable weather.

Treat. A light diet should be adopted, and animal food and fermented and spirituous liquors should be particularly avoided. Some *mild aperient* should be administered; and when the symptoms are severe, or fever or headache is present, small *diaphoretic doses* of *antimonials*, accompanied by copious draughts of diluents, as *barley-water*, *weak tea*, or *gruel*, should be taken. This treatment, except in very bad cases, will generally effect a cure.

CATECHINE. Syn. *Catechuic Acid, Resinous Tannin.* When *cubical gambir*, or *catechu*, in powder, is treated with *cold water*, a portion remains undissolved. This is *catechine.* By repeated solutions in *alcohol*, it may be obtained under the form of white silky acicular crystals.

Prop., *&c.* Catechine strikes a green colour with the salts of iron, but does not precipitate gelatine. When dissolved in caustic potassa, and the solution exposed to the air, it absorbs oxygen, and *japonic acid* is formed. If, instead of caustic potassa, carbonate of potassa is employed, it is converted into *rubinic acid.*

CATECHU. Syn. *Gambir; Terra Japonica; Cutch; Catechu*,—Ph. L. E. & D. "The extract from the wood of *acacia catechu*, or from the leaf of *uncaria gambir;*" (Ph. L.) Also of the "kernels of *areka catechu;* probably, too, from other plants." (Ph. E.)

There are several varieties of catechu known in commerce, of which the principal are—

Bombay Catechu. Firm, brittle, dark brown, of a uniform texture, and a glossy, semi-resinous, and uneven fracture. Sp. gr. 1·39. Richness in tannin, 52%.

Bengal Catechu. Rusty brown colour externally; porous, and more friable than the preceding. Sp. gr. 1·28. Richness in tannin, 49·5%.

Malabar Catechu. Resembles the last in appearance, but is more brittle and gritty. Sp. gr. 1·40. Richness in tannin, 45·5%.

Of the above varieties the *first* is the one generally employed in medicine, and which commonly passes by the name of *catechu.* The *second*, popularly passes under the name of *terra japonica.*

Pur. It is "almost entirely dissolved by boiling water. The cold solution does not give a blue colour with *iodide of potassium* and dilute nitric acid added together." If ether be added to 100 gr. of either variety, 40 gr. of the dried ethereal extract should be soluble in cold water." (Ph. L.)

Estim. It is often of importance to the tanner and dyer to determine the richness of this article in *tannic acid* or *tannin.* The following are two simple methods:—

1. Exhaust a weighed sample (in powder) with *ether*, and evaporate by the heat of a hot water bath. The product, which is the tannin, must then be accurately weighed.

2. Dissolve the sample, (in powder,) in *hot water*, let it cool out of contact with the air, filter, and add a *solution of gelatine*, as long as a precipitate falls. The precipitate, after being washed and dried at a steam heat, contains 40§ of tannin.

Uses, &c. Catechu is extensively employed in medicine, both *internally* and *externally*, as an astringent. It is used to flavour British brandy, and by the tanners as a substitute for oak bark. With it the dyer produces, inexpensively, many of his most pleasing browns. To cottons it imparts a brown without a mordant. "The *salts of copper* with *sal ammoniac* cause it to give a BRONZE COLOUR, which is very fast; the *proto-muriate of tin*, a BROWNISH-YELLOW; the *per-chloride of tin*, with the addition of *nitrate of copper*, a DEEP BRONZE HUE; *acetate of alumina*, alone, a REDDISH-BROWN, and with *nitrate of copper*, a REDDISH OLIVE GRAY; *nitrate of iron*, a DARK BROWN GRAY. For dyeing a GOLDEN COFFEE-BROWN, it has entirely superseded *madder*; 1 *lb.* of it being equivalent to 6 *lb.* of this root." (Ure.) *Dose.* 10 gr. to 30 gr. in solution, in water, or made into a bolus, or sucked as a lozenge.

CATGUT. The prepared and twisted intestines of animals. *Prep.* The guts, taken whilst warm from the animal, are thoroughly cleaned, freed from adherent fat, and well rinsed in pure water. They are next soaked for about 2 days in water, after which, they are laid on a table and scraped with a copper-plate, having a semicircular notch, beginning the operation at the smaller end. In this way the mucous and peritoneal membranes are removed. The guts are then put into fresh water, and soaked until the next day, when they are again scraped, the larger ends cut off, and after well washing, again steeped for a night in fresh water, and then for 2 or 3 hours in a weak lye of pearlash or potash, (2 *oz.* to the gall.) They are lastly washed in clean water, and passed through a polished hole in a piece of brass to smooth and equalize their surface; after which they are twisted, and sorted, according to the purposes for which they are intended. For many purposes, it is then *dyed* or *sulphured*, and rubbed with *olive oil.* It improves by age. Red or black ink, or any of the simple dyes or stains are used to colour it.

Uses, &c. Catgut is employed in several of the arts. The *strings* of *harps, violins,* &c., are formed of this material. *Whipcord* is made from catgut, which is sewed together while soft with the *filandre* or scrapings, after which it is put into a frame and twisted. *Bowstrings* for hatmakers are made out of the largest intestines, 4 to 12 of which are twisted together, until the cord is extended to 15 to 25 feet in length. It is then rubbed perfectly smooth and free from knots, half dried, sulphured twice, again stretched and sulphured, and lastly, dried in a state of tension. *Clockmakers' cords* are made of the smallest intestines, in a similar manner.

The best *fine catgut* is made at Venice or Rome, from the intestines of thin sinewy sheep. That made in England is formed from the fat sheep killed for the shambles, and is, hence, inferior. *Coarse catgut*, for *turning lathes*, &c., is made from the intestines of horses, cut into 4 or 5 strips, by forcing a ball furnished with projecting knives placed crosswise along them. These strips are next twisted, dried, and rubbed smooth with fish skin. *Gutta percha* and *vulcanized Indian rubber* are now applied to many of the purposes formerly exclusively occupied by *catgut.*

CATHARTICS. See *Purgatives.*

CATHARTINE. The *purgative principle of senna*, first noticed by Lassaigne and Fenuelle. A strong aqueous infusion of *senna leaves*, is evaporated to the consistence of a syrup, out of contact with the air; this fluid extract is then digested in *alcohol* or *rectified spirit*, and the tincture, after filtration, is evaporated to dryness by a gentle heat.

Prop., &c. A reddish-coloured, uncrystallizable mass; having a peculiar odour, and a bitter, nauseous taste; freely soluble in both water and alcohol, and strongly cathartic. Two or three gr. cause nausea, griping, and purging. It has been proposed to employ it, combined with aromatics, as a cathartic.

CATHETERS. Small tubes introduced into the bladder for the purpose of drawing off its contents. They may be regarded as hollow bougies.

Prep. 1. A piece of smooth *catgut*, or *steel wire*, bent to the proper shape, is coated with *melted wax*. When cold, it is dipped repeatedly into an *ethereal solution of Indian rubber*, until a sufficient thickness is obtained, after which it is dried by a gentle heat, and then boiled in *water* to melt out the wax, and to allow the catgut to be withdrawn.

2. From slips of *Indian rubber*, as directed under *Bougies*.

3. A smooth *tissue of silk* is woven over a bent wire, and then coated with a surface of *Indian rubber*, or *elastic varnish*, and finished off as before. See *Bougies*.

CAUDLE. Gruel enriched by various additions.

Prep. 1. *Thick oatmeal gruel* mixed with about one-half its weight of *good mild ale*, (made hot,) and as much *sugar*, and *mace*, *nutmeg*, or *ginger*, as will make it agreeable.

2. To the last add *an egg*, well beaten.

3. *Sugar*, 3 or 4 lumps; *hot water*, a tablespoonful; dissolve; add 1 *egg;* beat well together; further add a *glass of wine* and a little *nutmeg* or *ginger;* mix well, and stir the mixture into *good gruel*, (hot,) $\frac{3}{4}$ pint.

Uses, &c. A nourishing and restorative mixture during convalescence, much used among certain classes after accouchement. It is an excellent domestic remedy for *colds, &c.*, unaccompanied with fever; for which purpose it should be taken on retiring to rest at night, preceded by a dose of castor oil during the day.

CAUSTIC. Syn. *Causticum*,—Lat. A substance that corrodes or destroys the texture of organized bodies. This action is popularly termed "*burning*."

The principal caustics are *nitrate of silver*, *caustic potassa*, a *mixture of caustic potassa* and *quicklime*, *sulphate of copper*, *red oxide of mercury*, *verdigris*, *tincture of sesquichloride of iron*, *chloride of zinc*, *chloride of antimony*, *nitric acid*, and *acetic acid*.

Use. Caustics are employed to remove excrescences, morbid growths, granulations, &c., as corns, warts, and proud flesh; and to open issues, abscesses, &c. The *first*, *second*, and *fourth* are applied by gently rubbing them on the part previously moistened with water; the *third* is commonly made into a paste, with rectified spirit or glycerine, before application; *red oxide of mercury* and *verdigris*, (in the form of powder,) are often sprinkled over foul and indolent ulcers; whilst the *acids* and other *liquid caustics*, are applied with a feather, camel hair-pencil, or glass rod. The same applies to the liquid preparations below. In all cases care should be taken to confine the application to the affected part.

CAUSTIC (Ammoniacal). See *Ointments*, and *below*.

CAUSTIC (Antimonial). Syn. *Causticum Antimoniale*,—Lat. Chloride of antimony.

CAUSTIC (Arsenical). Syn. *Causticum Arsenicale*, *C. Arseniosum*, *C. A. Compositum*,—Lat. *Prep.* 1. See *Plunket's Caustic*.

2. (Cutan. Hosp.) *Calomel*, $2\frac{1}{2}$ oz.; *red sulphuret of mercury*, 1 dr.; *arsenious acid*, 1 dr. to 2 dr.

3. (Van Mons.) *Arsenious acid*, 6 dr.; *dragon's blood*, 2 dr.; *animal charcoal*, $1\frac{1}{2}$ dr.; *cinnabar*, 3 oz.

4. (Ratier.) *Arsenious acid*, 1 part; *kino*, 8 parts; *cinnabar*, 16 parts. The ingredients of the last three must be separately reduced to fine powder, and then carefully mixed. They are favourite applications on the Continent, in cases of cancer, cancerous sores, obstinate lepra, &c. They are either dusted over the part, or are made into a paste with mucilage or the saliva, and applied like an ointment on a piece of rag or lint; due caution being observed, and the effects watched. The last is much used in the French hospitals.

CAUSTIC (Canquoin's). See *below*.

CAUSTIC (Cantharides). Syn. *Causticum Cantharidis*,— Lat. *Prep.* 1. *Powdered catharides* made into a paste with *concentrated acetic acid*.

2. (Cutan. Hosp.) *Tannin*, 1 oz.; *cantharides* (powdered), 2 oz.; *strong acetic acid*, 8 oz.; digest a week, and strain. Blisters.

CAUSTIC (Common). See *Potassa* (fused), and *Potassa with Lime*.

CAUSTIC (Duvilles) *Prep.* 1. *Aloes*, 5 oz.; *proof spirit*, 10 oz.; *oil of vitriol*, 6 oz.; mix.

2. *Aloes* (in powder), $2\frac{1}{2}$ oz.; *rum*, $\frac{1}{4}$ pint; mix, and the next day add, *oil of vitriol*, 1 oz. A favorite caustic in veterinary practice; especially in foot-rot.

CAUSTIC. (Filho's). *Prep.* From *caustic potassa*, 2 parts; *quicklime*, (in powder,) 1 part; melt together in a ladle, mix well, and pour it into small leaden tubes, the size of a large swan quill. When cold coat each piece with *melted bees' wax* to exclude the air. *Used* as a strong caustic in veterinary practice. It is applied like nitrate of silver.

CAUSTIC (Golden). Syn. *Caustic of*

Chloride of Gold; Causticum Aureum, C. Aurii Chloridi,—Lat. *Prep.* 1. (Recamier.) *Terchloride of Gold,* 6 gr.; *nitro-hydrochloric acid,* 1 oz.; dissolve.

2. (Legrand.) As the last, but using *nitric acid.* Both are recommended as caustics, in syphilitic, scrofulous, and scorbutic ulcers, cancerous growths, &c.; applied by means of a dossil of lint.

CAUSTIC (Gondret's). Syn. *Gondret's Ammoniacal Caustic; Pommade de Gondret; Causticum Ammoniacale,* — Lat. *Prep.* 1. See *Ammoniacal Ointment.*

2. (Original formula.) *Almond oil,* 2 dr.; *suet,* 4 dr.; *lard,* 6 dr.; melt together in a wide-mouthed bottle, cool a little, add *liquor of ammonia,* 12 dr.; and agitate until cold. A powerful rubefacient and counter-irritant; used to produce an immediate revulsion. If covered with a compress it raises a blister in 4 or 5 minutes.

CAUSTIC (Iodine). Syn. *Causticum Iodinii,*—Lat. *Prep.* (Lugol.) *Iodine* and *iodide of potassium,* of each, 1 part; *water,* 2 parts; dissolve. *Used* in similar cases to iodine paint, and to scrofulous growths and ulcers.

CAUSTIC (Lunar). *Nitrate of silver* fused and formed into sticks by pouring it into moulds.

CAUSTIC (Mercurial). Syn. *Caustic of Nitrate of Mercury; Causticum Acidi Hydrargyri Nitratis, C. H. Deutonitratis,* —Lat. From *mercury,* 1 part; *commercial nitric acid,* 2 parts; dissolve.

2. (Cutan. Hosp.) *Mercury,* 1 part; *nitric acid* (sp. gr. 1·5), 2 parts.

3. (P. C.) As No. 1, but evaporating the solution to $\frac{3}{4}$ths its weight. These liquids are applied with a pencil or lint, in scrofulous and syphilitic ulcers and eruptions, and in lupus, psoriasis, lepra, and other obstinate skin diseases; but their use requires great care.

4. (With arsenic.—Cutan. Hosp.) *Mercury,* $\frac{1}{2}$ oz.; *nitric acid,* 1 oz.; *arsenious acid,* $\frac{1}{2}$ dr.; as before.

CAUSTIC (Nitric). Syn. *Solidified Nitric Acid; Causticum Nitricum,*—Lat. *Prep.* (Dr. Rivallie.) *Concentrated nitric acid,* is gradually dropped on a *piece of lint,* placed in a saucer or glass; as soon as the lint is gelatinized, it is pressed into a suitable shape with a glass rod, and applied to the part; it must be removed in 15 minutes. In cancerous tumours, fungoid growths, &c.

CAUSTIC (Opiated). Syn. *Caustic Opiatum,*—Lat. *Prep.* 1. *Common caustic* (potassa with lime), 4 dr., *powdered opium,* 1 dr.; *soft soap,* q. s. to make a paste. Applied to fungous ulcers.

CAUSTIC (Plunket's). *Upright crowfoot* and *lesser spear-wort,* of each, 1 oz.; *sulphur,* 5 scrup.; *white arsenic,* (in very fine powder), 1 dr.; beat to a smooth paste, form it into balls, and dry them in the sun. In cancer; a portion of one of the balls is reduced to powder, which is mixed up with *yelk of egg,* and applied on a piece of bladder.

CAUSTIC (Potential). Fused caustic potassa.

CAUSTIC (Recamier's). See *Golden Caustic.*

CAUSTIC (Sulphuric). Syn. *Causticum Sulphuricum, C. Acidi Sulphurici,*—Lat. *Prep.* 1. *Plaster of Paris* made into a paste with *oil of vitriol.*

2. *Saffron, lint,* or *unsized paper,* soaked in *oil of vitriol,* and triturated to a plastic mass.

CAUSTIC (Zinc). Syn. *Caustic of Chloride of Zinc, Dr. Canquoin's Cancer Caustic; Causticum Zinci, C. Z. Chloridi,*—Lat. *Prep.* 1. (Dr. Canquoin.)—*a.* From *chloride of zinc,* 1 dr.; *flour,* 2 dr.; made into a stiff paste with *water,* q. s.

b. From *chloride of zinc,* 1 dr.; *flour,* 3 dr.; *water,* q. s.; as the last.

c. From *chloride of zinc,* 1 dr.; *flour,* 4 dr.; *water,* q. s.; as before.

d. From *chloride of zinc,* 2 dr.; *chloride of antimony,* 1 dr.; *flour,* 5 dr.; as before.

2. (Alex. Ure.) As above, but substituting *plaster of Paris* for the *flour* there ordered.

Uses, &c. As a caustic in cancer, lupus, skin-marks, (*nævi,*) &c. It is formed into small cakes or wafers not exceeding 1 or 2 lines in thickness, one of which is applied to the part, and allowed to remain on from 6 to 12 hours, when it is removed, and the part covered with a poultice. It produces an eschar, often exceeding a quarter of an inch in depth. The chlorides must be in the form of powder, and well mixed with the flour previously to adding the water. The last (No. 1. *d.*) is recommended in nodulated cancerous tumours.

CAUSTICS (Veterinary). In *veterinary practice* any of the substances enumerated in the list of caustics at page 212, may be employed, care being had to select the cheapest, and to employ them of proportionate strength to meet the requirements of the case. See *Veterinary Medicine.*

CAVIARE. Syn. *Caviar, Caviale.* The salted roe of several species of sturgeon. It is much esteemed by the Russians as well as by some other nations of northern

Europe, and is occasionally eaten as a delicacy in this country. It is, however, very oily, indigestible, and unwholesome.

CAYENNE (Soluble). See *Peppers.*

CEDRA. See *Liqueurs.*

CEDRENE. The *oil of cedar-wood,* by careful distillation, is separable into two substances,—a solid crystalline compound, (*cedrone,*) and a volatile liquid hydrocarbon, (*cedrene.*) The first may be converted into the other by distillation with *anhydrous phosphoric acid.*

CEDRIRET. A red crystalline substance obtained from the *lighter oil of hard-wood tar,* by the action of *caustic alkalies* and *oxidizing agents.* It forms reticulated crystals, insoluble in water, alcohol, and ether; soluble in oil of vitriol, to which it imparts a deep blue colour.

CELLULOSE. See *Lignin.*

CEMENT. Syn. *Cementum,* — Lat. Any substance which, when applied to the surfaces of other bodies, causes them to adhere together when placed in contact. Those referred to below are among the most useful preparations of this class. The term cement is also applied by builders and architects to several species of *mortars* and *like compositions* employed either to unite stones and bricks into masses, or as a protective covering against the weather or water, or to make statues, cornices, and similar ornamental articles.

In general, the thinner the stratum of interposed cement, the stronger is the junction of the surfaces operated on. This caution is necessary, as in their anxiety to unite broken articles, persons generally defeat themselves, by spreading the cement too *thickly* on the edges of the fracture; whereas the least possible quantity should be used, so as to bring the edges as close as possible together.

CEMENT (Alabaster). 1. From *plaster of Paris,* (in fine powder,) made into a cream with *water,* and at once applied.

2. *Yellow resin,* 2 parts; melt, and stir in *plaster of Paris,* 1 part.

3. *Yellow resin, bees' wax,* and *plaster of Paris,* equal parts.

4. *Sulphur* or *shellac,* melted with sufficient *plaster of Paris* or *colouring matter* to give the desired shade. *Used* to join or mend pieces and figures in *alabaster, white marble, Derbyshire spar, porphyry,* and other like substances; and to fill up cracks, supply chips out of corners, &c. The last three are applied hot, the surfaces to be united having been previously warmed.

CEMENT (Architectural). 1. From *paper* (reduced to a smooth paste by boiling it in water), *sifted whiting,* and *good size,* equal parts, boiled to a proper consistence.

2. *Paper paste, size,* and *plaster of Paris,* equal parts; as before.

Obs. This is a species of papier-maché. It is *used* to make *architectural ornaments, busts, statues, columns, &c.* It is very light, and receives a good polish, but will not stand the weather unless it is well varnished or painted.

CEMENT (Armenian). Syn. *Diamond Cement, Persian do., Turkish do., Jeweller's do.* The jewellers of Turkey, who are mostly Armenians, have a singular method of ornamenting watch-cases, &c., with diamonds and other precious stones, by simply glueing or cementing them on. The stone is set in silver or gold, and the lower part of the metal made flat, or to correspond with the part to which it is to be fixed; it is then gently warmed, and the glue is applied, which is so very strong that the parts thus cemented never separate. This glue will strongly unite pieces of *glass* and *china,* and even *polished steel,* and may be applied to a variety of useful purposes.

Prep. 1. (*Original Armenian formula,*— Eton.) Dissolve five or six bits of *gum mastic,* each the size of a large pea, in as much *rectified spirit of wine* as will suffice to render it liquid; and, in another vessel, dissolve as much *isinglass,* previously a little softened in water, (though none of the water must be used,) in *French brandy* or *good rum,* as will make a two-ounce phial of *very strong glue,* adding two small bits of *gum galbanum* or *ammoniacum,* which must be rubbed or ground till they are dissolved. Then mix the whole with a sufficient heat. Keep the glue in a phial closely stopped, and when it is to be used, set the phial in boiling water.

2. (*Keller's.*) Soak *isinglass,* ½ *oz.,* in *water,* 4 *oz.,* for 24 hours; evaporate in a *water bath* to 2 *oz.;* add *rectified spirit,* 2 *oz.,* and strain through muslin; mix this, whilst warm, with a solution formed by dissolving *gum mastic* (best), ¼ *oz.,* in *rectified spirit,* 2 *oz.;* add of *powdered gum ammoniac,* 1 dr., and triturate together until perfectly incorporated, avoiding loss of the spirit by evaporation as much as possible.

3. *Isinglass soaked in water and dissolved in spirit,* 2 *oz.* (thick); dissolve in this 10 gr. of *very pale gum ammoniac* (in tears), by rubbing them together; then add 6 large tears of *gum mastic,* dissolved in the *least possible quantity of rectified spirit.*

4. *Isinglass dissolved in proof spirit* (as above), 3 *oz.*; *bottoms of mastic varnish* (thick, but clear), 1½ *oz.;* mix well.

Obs. When carefully made, this cement resists moisture and dries colourless. As usually met with, it is not only of very bad quality, but sold at exorbitant prices. "Some persons have sold a composition under the name of Armenian cement in England; but this composition is badly made: it is much too thin, and the quantity of mastic is much too small." (Eton.) *Mastic* and *mastic varnish* are also used by jewellers as cements.

CEMENT (Beale's). *Chalk*, 60 parts; *lime* and *salt*, of each, 20 parts; *Barnsey sand*, 10 parts; *iron filings* or *dust*, and *blue* or *red clay*, of each, 5 parts; grind together and calcine. Patented as a *fire-proof cement.*

CEMENT (Botany Bay). *Yellow gum* (Botany bay gum) and *brickdust*, equal parts, melted together. *Used* to cement coarse earthenware, &c.

CEMENT (Bottle). *Prep.* 1. *Rosin*, 1 *lb.; tallow* or *suet*, $\frac{1}{4}$ *lb.;* melt together, and stir in the *colouring matter.*

2. *Rosin*, 5 *lb.; bees' wax*, 1 *lb.; colouring*, q. s.; as last.

3. (*Red.*) To *each pound of the above* add *whiting* (dry), 3 *oz.*; *light red* (burnt ochre), 4 *oz.;* or *red bole*, q.s.; (all in fine powder.)

4. (*Black.*)—*a.* To *each pound* of No. 1, or No. 2, add *ivory black* (bone black), q.s. *b.* From *black pitch*, 6 *lb.; ivory black* and *whiting*, of each 1 *lb.;* melted together. *Used* in the same way as wax for bottle corks, cask bungs, &c. See *Maissiat's Cement.*

CEMENT (Brimstone). *Melted brimstone*, either alone, or mixed with *rosin* and *brick-dust.* Cheap and useful.

CEMENT (Bruyere's). *Clay*, 3 parts; *slaked lime*, 1 part; mix and expose them to a full red heat for 3 hours, then grind to powder. Recommended as an hydraulic cement.

CEMENT (Building). Syn. *Artificial Puzzolene.* From a *mixture* of *clay* or *loam*, *broken pottery*, *flints*, or *silicious sand*, or broken bottle glass, and *wood ashes*, exposed to a considerable heat in a furnace, until it becomes partially vitrified; it is then ground to fine powder, sifted, and mixed with one-third its weight of *quicklime*, also in fine powder, after which it must be packed (tight) in casks to preserve it from the air and moisture. For use it is mixed up with water and applied like Roman cement.

CEMENT (Cap). *Rosin*, 5 *lb.; bees' wax* and *dried Venetian red*, of each, 1 *lb.;* melted together. *Used* for chemical and electrical purposes.

CEMENT (Cheese). From *grated cheese*, 2 parts; *quicklime* (in fine powder), 1 part; *white of egg*, q. s.; beat to a paste. *Used* for earthenware, &c.

CEMENT (Chemical). *Prep.* From *yellow wax*, 4 parts; *common turpentine*, 2 parts; *Venetian red* (well dried), 1 part; melted together. *Used* as a temporary stopping or lute for the ends or joints of tubes, which are not exposed to much heat; as in alkalimetry, &c. See *Electrical Cement.*

CEMENT (Chinese). Syn. *Shell-lac Cement, Liquid glue. Prep.* 1. Finest pale *orange shell-lac* (broken small), 1 part; *rectified spirit* (strongest), 2 parts; digested together in a corked bottle in a warm place until dissolved. Very strong and useful; almost odourless. It should have about the consistence of treacle.

2. As before, but using *wood naphtha* as the solvent. Inferior to the last, but excellent for many purposes.

3. *Borax*, 1 *oz.; water*, $\frac{3}{4}$ pint; *shell-lac*, 3 *oz.;* boil in a covered vessel until dissolved, then evaporate to a proper consistence. Cheap and useful, but dries slowly.

Uses, &c. Employed to mend glass, china, fancy work, jewellery, &c., for which it is only inferior to Armenian cement. The *first formula* produces a cement so strong that pieces of wood may be joined together, cut slopingly across the grain, and will afterwards resist every attempt to break them at the same place. In many of the islands of the Indian Ocean, in Japan, China, and the East Indies, a similar cement is used to join pieces of wood for bows, lances, &c. The fluid is thinly smeared over each face of the joint, a piece of very thin gauze interposed, and the whole pressed tightly together and maintained so until the next day. Joints so made will even bear the continual flexure of a bow without separating. It is admirable for *fishing rods.* The product of the *second formula* is the *liquid glue* of the shops. That of the *last* is commonly used by the *druggists* and *oilmen*, instead of gum, for fixing labels on bottles exposed to damp.

CEMENT (Coppersmiths). Syn. *Blood Cement.* From *bullock's blood* thickened with *finely powdered quicklime. Used* to secure the edges and rivets of copper boilers, to mend leaks from joints, &c. It must be used as soon as mixed, as it rapidly gets hard. It is cheap and durable, and is suited for many other purposes.

CEMENT (Curd). *Prep.* 1. The *curd*

of skimmed milk, beaten to a paste with *quicklime*, in fine powder.

2. To the last add a little *white of egg.* The curd is obtained by adding *vinegar* or *rennet* to the *milk.* Both are used for glass and earthenware.

CEMENT (Cutler's). *Prep.* 1. *Black rosin*, 4 *lb.; bees' wax*, 1 *lb.;* melt, and add *finely-powdered* and *well-dried brickdust*, 1 *lb.;* mix well.

2. Equal weights of *rosin* and *brickdust*, melted together.

Use. To fix knives and forks in their handles. It is put into the hollow of the handle, and the metal, previously made hot enough to melt the composition, pressed into its place whilst warm, and the whole kept upright and still until quite cold.

CEMENT (Diamond). See *Armenian Cement.*

CEMENT (Egg). *White of egg* thickened with *finely-powdered quicklime. Used* to mend earthenware, glass, china, marble, alabaster, spar ornaments, &c. It does not resist long exposure to moisture, unless it has been exposed to heat.

CEMENT (Elastic). *Prep.* 1. *Caoutchouc*, (in small pieces), 1 part; *chloroform*, 3 parts; dissolve.

2. (Lenher.) *Caoutchouc*, 5 parts; *chloroform*, 8 parts; dissolve, and add *gum mastic* (powdered), 1 part. Elastic and transparent.

CEMENT (Electrical). Syn. *Chemical Cement.* From *black rosin*, 7 *lb.; red ochre*, 1 *lb.; plaster of Paris*, ½ *lb.;* (both well-dried and still warm;) melted together, and the heat and agitation continued until all frothing ceases, and the liquid runs smooth; the vessel is then withdrawn from the fire, and the mixture stirred until cooled sufficiently. *Used* to cement the plates in galvanic troughs, join chemical vessels, &c. See *Cap Cement, Singer's Cement, &c.*

CEMENT (Engineer's). *Prep.* 1. *Ground white-lead*, mixed with as much *red-lead* as will make it of the consistence of putty.

2. Equal weights of *red lead* and *white lead*, mixed with *boiled linseed oil* to a proper consistence. *Used* by engineers and others to make metallic joints. A washer of hemp, yarn, or canvass, smeared with the cement, is placed in the joint, which is then "brought home," or screwed up tight. It dries as hard as stone. It also answers well for joining *broken stones*, however large. *Cisterns* built of square stones, put together, while dry, with this cement, will never leak or come to repair.

CEMENT (Extemporaneous). 1. *Shell-lac*, melted and run into small sticks the size of a quill. *Used* to join glass, earthenware, &c. The edges are heated sufficiently hot to melt the cement, which is then *thinly* smeared over them, and the joint made while they are still hot. This is the cement so commonly vended in the streets of London, and which used to surprise us in our boyhood days.

2. *Tears of gum mastic*, used in the same way. Commonly employed by jewellers and others.

CEMENT (Fireproof). *Prep.* From *fine river sand*, 20 parts; *litharge*, 2 parts; *quicklime*, 1 part; *linseed oil*, q. s. to form a thin paste. Applied to walls it soon acquires a stony hardness. It is also used to mend broken pieces of stone, stone steps, &c. See *Beale's Cement, &c.*

CEMENT (Flour). Syn. *Paste, Flour Paste.* This useful and well-known article is made by mixing about a *tablespoonful* of *wheat flour* with *cold water*, (say) ½ pint, adding the latter gradually, and thoroughly stirring in each portion before pouring in more; the vessel is then placed over the fire, and the whole assiduously stirred until it boils, great care being taken to prevent "caking on the bottom," or "burning." Some persons add about ⅓rd of a teaspoonful of *powdered alum* to the water, which is said to strengthen the product; the *shoemakers* add a like quantity of *powdered rosin* to the *flour*, with the same intention. The addition of a few grains of *corrosive sublimate*, or a few drops of *creosote*, will prevent it turning mouldy, and is said to preserve it for years. When too hard or dry, it may be softened by beating it up with a little hot water.

CEMENT (French). *Mucilage of gum arabic*, thickened with *starch powder* or *farina;* a little *lemon juice* is sometimes added. *Used* by naturalists in mounting specimens; by artificial-flower makers; and by confectioners, to stick paper, wafer paper, ornaments, &c., on their fancy cakes. Plain mucilage is often used in the same way.

CEMENT (Gad's). Syn. *Gad's Hydraulic Cement.* From *clay* (well-dried and powdered), 3 parts; *oxide of iron*, 1 part; mixed together, and made into a stiff paste with *boiled oil. Used* for work required to harden under water.

CEMENT (Gibbs'). Mr. Gibbs has patented (1850) various processes for making admirable building and architectural cements, equal in hardness and durability, and superior in colour, to the best Roman and Portland cements at present in use. His materials are obtained from "the vast beds of (natural) *argillaceous marls* and *marly limestones*, or *marl stones*, which contain the due admixture of *lime*, *silica*, and *alumina*, from which hydraulic cements and artificial stones may be manufactured." These materials he finds in "the chalk formation, the Wealden formation, the Purbeck beds, the lias formation, the mountain limestone, and the lowest strata of the coal measures." After duly choosing his materials according to the particular object in view, he prepares them "by burning in kilns, and grinding in mills, in the way cement is now manufactured." Marls and lime-stones are to be "first dried in kilns or ovens, at a heat fit for baking, until all moisture be driven off, and that then the calcination be prolonged as much as possible; the heat being kept as low as is only just sufficient to effect complete calcination—this being indispensable, to avoid the commencement of vitrification, which would destroy the adhesive properties of the cement."

CEMENT (Glue). *Prep.* 1. From *glue*, 1 *lb.*, melted with the least possible quantity of water, and then mixed with *black rosin*, 1 *lb.*, and *red ochre*, 4 *oz.*

2. *Glue*, melted as above, and mixed with about a ¼th of its weight each of *boiled oil* and *red ochre.*

3. (Ure.) *Melted glue* (of the consistence used by carpenters), 8 parts; *linseed oil boiled to varnish with litharge*, 4 parts; incorporate thoroughly together.

4. *Glue* (melted as last), 4 parts; *Venice turpentine*, 1 part.

Obs. The *first three* dry in about 48 hours, and are very useful to render the joints of wooden casks, cisterns, &c., watertight; also to fix stones in frames. The last serves to cement glass, wood, and even metal to each other. They all resist moisture well.

CEMENT (Grinder's). *Prep.* 1. From *pitch*, 5 parts; *wood ashes* and *hard tallow*, of each, 1 part; melted together.

2. *Black rosin*, 4 *lb.; bees' wax*, 1 *lb.;* melt, and add of *whiting*, (previously heated red hot, and still warm,) 1 *lb.*

3. *Shell-lac*, melted and applied to the pieces slightly heated. *Used* to fix pieces of glass, &c., whilst grinding. The last is used for lenses and fine work.

CEMENT (Hamelin's). Syn. *Hamelin's Mastic.* From *siliceous sand*, 60 parts; *Bath* or *Portland stone*, (in fine powder,) 40 parts; *lime-marl*, 20 parts; *litharge*, 8 parts; ground together. For *use*, it is mixed up with *linseed oil* and used like mortar. When this cement is applied to the purpose of covering buildings intended to resemble stone, the surface of the building is first washed with *linseed oil.*

CEMENT (Hensler's). *Litharge*, 3 parts; *quicklime*, 2 parts; *white bole*, 1 part; (all in fine powder;) *linseed oil varnish*, q. s. to make a paste. *Used* for china, glass, &c.

CEMENT (Hœnle's). *Shell-lac*, 2 parts; *Venice turpentine*, 1 part; fused together, and formed into sticks. It is *used* like *extemporaneous cement* for glass and earthenware.

CEMENT (Hydraulic). *Hydraulic mortars* or *cements*, are those which set or become hard under water. Common lime does not possess this property; but limestones containing from 8% to 25% of *alumina*, *magnesia*, and *silica*, yield a lime on burning, which does not slake when moistened with water, but forms a mortar with it, which hardens in a few days when covered with water, although it does not acquire much solidity in the air. *Puzzolana*, *septaria*, and *argillaceous* or *siliceous earths*, burnt, either with or without the addition of *common limestone*, and then ground to powder, form excellent *hydraulic cements.* The reniform limestone, commonly called "*cement stone*," which is found distributed in single nodules or lenticular cakes, in beds of clay, is the substance most commonly used in this country for the manufacture of the cements in question. See *Gad's*, *Hamelin's*, and *Parker's Cements, &c.*

CEMENT (Iron). This is formed of the *borings* or *turnings of cast-iron*, which should be clean and free from rust, mixed with a small quantity of *sal ammoniac* and *flowers of sulphur.* For use, it is stirred up with just enough water to thoroughly moisten it, and it is "rammed" or "caulked" into the joints with a blunt *caulking chisel* and *hammer*, after which the joint is screwed up by its bolts as tightly as possible. If the turnings or borings are very coarse, they are broken by pounding in an iron mortar, and the dust sifted off before use. The following are good proportions:—

1. *Sal ammoniac*, (in powder,) 2 *oz.; flowers of sulphur*, 1 *oz.; iron borings*, 5 *lb.; water*, q. s. to mix.

2. *Sal ammoniac*, 2 *oz.; sulphur*, 1 *oz.; iron borings*, 12 *lb.; water*, q. s. to mix.

3. *Sal ammoniac*, 2 *oz.; iron borings*, 7 or 8 *lb.; water*, q. s. to mix.

4. *Iron borings*, 4 *lb.; good pipeclay*, 2 *lb.; powdered potsherds*, 1 *lb.;* make them into a paste with *salt* and *water.*

Remarks. The first of these forms is that generally employed for common purposes, but formerly much more sulphur and sal ammoniac were used. We are told by one of the leading engineers in London, that the strongest cement is made *without* sulphur, and with only 1 or 2 parts of *sal ammoniac*, to 100 of *iron borings* (see the third form); but that when the work is required to dry rapidly, as for the steam joints of machinery wanted in haste, the quantity of sal ammoniac is increased a little, and a very small quantity of sulphur is added. This addition makes it set quicker, but reduces its strength. As the power of the cement depends on the oxidizement and consequent expansion of the mass, it is evident that the less foreign matter introduced the better. No more of this cement should be made at a time than can be used at once, because it soon spoils. I have seen it become quite hot by standing even a few hours, when it contained sulphur; and I have been informed by workmen, that when much sulphur is used, and it has been left together in quantity all night, combustion has taken place. The *last form* produces a cement that gets very hard when allowed to dry slowly, and is excellent for mending cracks in iron boilers, tanks, &c.

CEMENT (Japanese). Syn. *Rice Glue.* From *powdered rice*, mixed with a little *cold water*, and *boiling water* gradually poured in until it acquires a proper consistence; when it is boiled for 1 or 2 minutes in a clean saucepan or earthen pipkin. It is beautifully white, and almost transparent, for which reason it is well adapted for fancy paper work, which requires a strong and colourless cement. It is superior to *French cement.* See *above.*

CEMENT (Keene's Marble). Baked *gypsum* or *plaster of Paris*, steeped in a *saturated solution of alum*, and then recalcined, and reduced to powder. For *use*, it is mixed up with *water*, as ordinary plaster of Paris.

Obs. This cement has been most extensively applied as a stucco. It is susceptible of a high polish, and, when coloured, produces beautiful imitations of mosaic, and other inlaid marbles, scagliola, &c. It is not adapted to hydraulic purposes, or for exposure to the weather, but is admirable for internal decorations, and from its extreme hardness is very durable. It may be coloured or tinted of any shade, by diffusing mineral colours (levigated, if in powder,) through the water used to mix up the cement with. A pleasing tint is given to this cement by adding a little solution of green copperas to the alum liquor.

CEMENT (Laboratory). Syn. *Chemical Mastic.* From equal parts of *pitch, rosin,* and *plaster of Paris,* (thoroughly dried,) mixed together. *Used* for the masonry of chlorine chambers, vitriol works, &c.; and as a lining for casks intended to hold chloride of lime.

CEMENT (Mahogany). *Prep.* 1. Melt *bees' wax*, 4 *oz.;* then add *Indian red*, 1 *oz.*, and enough *yellow ochre*, to produce the required tint.

2. *Shell-lac*, melted and coloured as above. Very hard. Both are *used* to fill up holes and cracks in mahogany furniture by the cabinet makers. *Red putty* is also used for the same purpose.

CEMENT (Maissiat's). *Indian rubber*, is melted either with or without about 15% of either *bees' wax* or *tallow; quicklime*, (in fine powder,) added; and the heat continued, until change of odour shows that combination has taken place, and until a proper consistence is obtained. *Used* as a water-proof and air-tight covering for corks, bungs, &c.

CEMENT (Marine). See *Marine Glue* and *Elastic Cement.*

CEMENT (Optician's). *Prep.* 1. *Shell-lac* softened with *rectified spirit* or *wood naphtha.* For fine work.

2. *Bees' wax*, 1 *oz.; rosin*, 15 *oz.;* melt, and add, *whiting*, (previously made red hot, and still warm,) 4 *oz.*

3. *Rosin*, 1 *lb.;* melt and add *plaster of Paris* (dry), 4 *oz.* The above are used to fix glasses, stones, &c., while polishing and cutting them. The last is a very strong cement for rough purposes.

CEMENT (Parabolic). Syn. *Universal Cement. Prep.* Curdle *skim milk* with *rennet* or *vinegar*, press out the *whey*, and dry the *curd* by a *very gentle heat*, but as quickly as possible. When it has become quite dry, grind it in a coffee or pepper mill, and next triturate it in a mortar until reduced to a very fine powder. Mix this powder with $\frac{1}{10}$th of its weight of new dry *quicklime*, also in very fine powder, and to every ounce of the mixture add 5 or 6 gr. of *powdered camphor*; triturate the whole well together and keep it in wide-mouth 1 *oz.* phials, well corked. *Used* to join glass, earthenware, &c. It is made into a paste with a little water, as wanted, and applied immediately.

CEMENT (Parker's). This cement is made of the *nodules of indurated* and *slightly ferruginous marl*, called by mineralogists septaria, and also of some other species of argillaceous limestone. These are burnt in conical kilns, with pit coal, in a similar way to other limestone, care being taken to avoid the use of too much heat, as if the pieces undergo the slightest degree of fusion, even on the surface, they will be unfit to form the cement. After being properly roasted, the calx is reduced to a very fine powder by grinding, and immediately packed in barrels, to keep it from the air and moisture.

Uses, &c. This cement is tempered with water, and applied at once, as it soon hardens, and will not bear being again softened down with water. For *foundations* and *cornices* exposed to the weather, it is usually mixed with an equal quantity of clean angular sand; for use as a *common mortar*, with about twice as much sand; for *coating walls* exposed to cold and wet, the common proportions are 3 of *sand* to 2 of *cement*, and for *walls exposed to extreme dryness or heat*, about 2½ or 3 of sand to 1 of cement; for facing *cistern work, water frontages, &c.*, nothing but cement and water should be employed. Under the name of *compo'* or *Roman cement*, it is much employed for *facing houses, water-cisterns*, setting the *foundations of large edifices*, &c.

CEMENT (Pew's). *Quicklime*, 1 part; *baked clay*, 2 parts; (both in powder;) mix and calcine; then add *gypsum*, (fresh baked and in fine powder,) 1 part, to *powdered baked clay*, 2 parts; mix well, add the former mixture and incorporate them well together. *Used* to cover buildings. It is applied like mortar, and is very hard and durable. See *Gibbs' Cement, &c.*

CEMENT (Plumber's). *Black rosin* melted with about an equal weight of *brick-dust.* Sometimes a little *pitch* or *tallow* is added.

CEMENT (Portland). From *clay* and *chalk*, or *argillaceous river-mud* and *chalk* or *limestone*, calcined together, and then ground to powder. See *Parker's Cement.*

CEMENT (Roman). Genuine Roman cement consists of *puzzolene*, (a ferruginous clay from Puteoli, calcined by the fires of Vesuvius,) *lime*, and *sand.* The only preparation which the puzzolene undergoes is that of pounding and sifting. It is generally mixed up with water, like most other cements, but occasionally with bullock's blood and oil, to give the composition more tenacity. That used in this country is now generally prepared from the *septaria* of either Harwich or Sheppy, or of the lias formation, or from the *cement stone* found in the upper division of the lias formation, or in the shale beds of the Kimmeridge clay. It is also prepared from several artificial mixtures of *ferruginous clay* and *lime*, calcined together. See *Parker's* and *Gibbs' Cement.*

CEMENT (Seal Engraver's). Resembles *plumber's cement. Used* to fix the pieces of metal while cutting, and also to secure seals and tools in their handles. It grows harder and improves every time it is melted.

CEMENT (Singer's). *Prep.* 1. *Rosin*, 5 *lb.; bees' wax*, and *red ochre*, (in fine powder,) of each, 1 *lb.; plaster of Paris*, 4 *oz.;* mix as directed under *Electrical Cement.*

2. *Black rosin*, 7 *lb.; well-dried red ochre* and *plaster of Paris*, of each, 1 *lb.;* as above. *Used* to cement the plates in voltaic troughs, join chemical vessels, &c.

CEMENT (Turner's). Resembles *plumber's cement.*

CEMENT (Varley's). Syn. *Varley's Mastic. Black rosin*, 16 parts; *bees' wax*, 1 part; melt, add *whiting*, (sifted, dried by a dull red heat, and allowed to cool,) 16 parts; and stir until nearly cold.

CEMENT (Universal). See *Parabolic Cement.*

CEMENT (Water.) *Prep.* 1. From good *gray clay*, 4 parts; *black oxide of manganese*, 6 parts; *limestone*, (reduced to powder by sprinkling it with water,) 90 parts; mix, calcine, and powder.

2. Mix *white iron ore*, (manganese iron ore,) 15 parts, with *lime*, 85 parts; calcine and powder as above. Both this and the preceding must be mixed up with a little sand for use. A piece thrown into water rapidly hardens.

3. *Fine clean sand*, 1 cwt.; *quicklime*, in powder, 28 *lb.*; *bone ashes*, 14 *lb.* The above are beat up with water for use. See *Hydraulic Cement, &c.*

CEMENT (Waterproof). Several compounds of this class have been already noticed. The celebrated "*waterproof cement of Dihl*" consists of *porcelain clay* or *pipeclay*, dried by a gentle heat, and powdered, mixed up to the consistence of a paste with *boiled linseed oil*, and, sometimes, a little *oil of turpentine.* It is coloured by adding a little *red* or *yellow ochre*, or any similar pigment. It is used to cover the fronts of buildings, roofs of verandahs, &c.

CEMENT (for China, Glass, &c.) Various preparations are adopted for mending *broken china, earthenware*, and *glass*, among which those generally adopted by careful housewives will be found noticed under the heads *Curd, Cheese, Chinese, Diamond, Egg, Extemporaneous, Parabolic*, and *Hœnle's Cements.* All of these are easily made, and as easily applied, and several of them may be purchased ready prepared at the drug and oil shops. Nature supplies some cements ready to our hands, as the juice of garlic and the white slime of large snails. It has been stated in a certain scientific journal, that a broken flint has been joined so effectually with this *snail cement*, that when dashed upon a stone pavement, the flint broke elsewhere than at the cemented part. But the superior quality and economy, as well as delicacy, of artificial cements, leave no occasion for our seeking for natural ones.

CEMENT (for Iron Boilers). From *dried clay*, in powder, 6 *lb.; iron filings*, 1 *lb.;* made into a paste with *boiled linseed oil. Used* to stop the cracks and leaks in iron boilers, stoves, &c.

CEMENT (for Leather and Cloth). *Prep.* 1. *Gutta percha*, 3 parts; *caoutchouc*, 1 part; (both cut small;) *pyrogenous oil of turpentine* or *bisulphuret of carbon*, 8 parts; mix in a close vessel, and dissolve by the heat of *hot water.*

2. *Gutta percha*, 1 *lb.; caoutchouc*, 4 *oz.; pitch*, 2 *oz.; shell-lac*, 1 *oz.; linseed oil*, 2 *oz.;* melted together. Both are used for uniting cloth, leather, &c. The first is gently warmed, and the second melted before being applied.

CEMENT (for Metal Letters). *Copal varnish*, 16 parts; *drying oil*, 6 parts; *turpentine* and *oil of turpentine*, of each, 3 parts; *liquefied glue*, (made with the least possible quantity of water,) 5 parts; melt together in a water bath, and add, *fresh slaked lime* (perfectly dry, and in very fine powder,) 10 parts. *Used* to attach metal letters to plate glass, in shop windows, &c.

CEMENT (for Spar and Marble). See *Alabaster Cement. Egg* and *Parabolic Cements* also answer for the same purpose.

CEMENT (for Steam-boilers, &c.) *Prep.* From *litharge*, in fine powders, 2 parts; *sand*, (very fine,) and *quicklime*, (that has been allowed to slake spontaneously by exposing it in a damp place,) of each, 1 part; mix, and keep it from the air. *Used* to mend the cracks in boilers, ovens, &c., and to secure steam joints. It is made into a paste with *boiled oil* before application.

CEMENTATION. The process of embedding a substance in, or covering it with, some powder or composition capable of acting on it when heated, and in this state exposing it to a red heat. *Iron* is converted into *steel*, and *glass* into *Reaumur's porcelain*, by cementation.

CENTAURINE. Syn. *Centaurina.* The bitter extractive matter of *erythæa centaurium* or *common centaury.* Combined with *hydrochloric acid* it has been highly recommended as a febrifuge.

CENTAURITE. The bitter principle of the *cnicus benedictus*, or *blessed thistle.*

CERAINE. A non-saponifiable fat obtained along with margaric acid when *bees' wax* is treated with *caustic potassa.*

CERASIN. Syn. *Prunine.* The insoluble portion of cherry-tree gum. It is identical with bassorine. Dr. John applies the term to all those gums, which, like tragacanth, *swell*, but do not *dissolve* in water. See *Bassorine.*

CERATE. Syn. *Ceratum*,—Lat. A thick species of ointment containing wax. Cerates are intermediate in consistence between ointments and plasters; but are less frequently employed than either of those preparations.

It is a general custom with the druggists to use a less quantity of wax for their cerates than that which is necessary to give them a proper consistence, and in many cases, it is omitted altogether, and its place supplied by *hard suet* or *stearine*, and frequently by *common resin. Lard* is also very generally substituted for olive oil. Indeed, in no class of pharmaceuticals are the instructions of practitioners and the colleges more commonly disregarded. The operation of melting the ingredients should be performed in a *water bath* or *steam bath*, and the liquid mass should be assiduously stirred until cold.

All the *medicated cerates* may be prepared by adding the *active ingredients*, in the form of *fine powder, soft extract, solution, &c.*, as the case may be, to either *simple cerate* or *spermaceti cerate*, in the proportions indicated under the head of "*Doses*" appended to every article of importance noticed in this work. The mixture, which must be complete, may be effected by working the articles together on a marble or glass slab or tile, or still better, by trituration in a clean wedgewood mortar. In some cases the *simple cerate* is melted by a gentle heat, and the whole stirred or triturated until nearly solid; in others, digestion with heat is employed.

CERATE. Syn. *Simple Cerate, Simple Dressing; Ceratum*,—Ph. L. *C. Simplex*, —Ph. L. 1824. *Prep.* (Ph. L.) *Yellow wax*, 20 oz.; melt by a gentle heat; add *olive oil*, 1 pint; and stir until it begins to solidify.

Used as a simple emollient dressing. The corresponding preparations of the other colleges will be found noticed under *Ointments.* The *ceratum simplex* of the Ed. Pharm. is *spermaceti cerate.*

CERATE (Acetate of Lead). Syn. *Cerate of Sugar of Lead; Ceratum Plumbi Acetatis,*—Ph. L. *Prep.* (Ph. L.) *White wax,* 5 oz.; *olive oil,* 18 fl. oz.; melt together; add, *acetate of lead,* (in fine powder,) 5 dr., previously triturated with *olive oil,* 2 fl. oz., and stir till they unite, (begin to solidify.) *Used* as a cooling dressing to burns, excoriations, and inflamed sores.

CERATE (Ammoniacal). Syn. *Ceratum Ammoniacale,* — Lat. *Prep.* (Rechoux.) *Simple cerate,* 1 oz.; *carbonate of ammonia,* 1 dr.; mix. As a counter-irritant in croup, &c.

CERATE (Arsenical). Syn. *Ceratum Arsenici, C. Acidi Arseniosi,*—Lat. *Prep.* 1. (Ph. U. S.) *Arsenious acid,* (in very fine powder,) 20 gr.; *simple cerate,* 1 oz.

2. (Sir A. Cooper.) *Arsenious acid* and *sublimed sulphur,* of each, 1 dr.; *spermaceti cerate,* 1 oz. The above ingredients must be very carefully triturated together. The *first* is used as a dressing to cancerous sores; the *second* is applied on lint as a caustic in like cases.

CERATE (Belladonna). Syn. *Cerate of Deadly Nightshade; Ceratum Belladonnæ,* —Lat. *Prep.* (W. Cooley.) *Extract of belladonna,* 3 dr.; *simple cerate,* 1 oz.; *olive oil,* 1 dr.; triturate together in a warm mortar, until nearly cold. *Used* in frictions to indolent tumours.

CERATE (Belladonna, — Compound). Syn. *Ceratum Belladonnæ Compositum,*—Lat. *Prep.* (W. Cooley.) *Belladonna cerate,* 1 oz.; *iodide of gold,* 12 gr.; carefully triturated together. *Used* as a friction to scrofulous and syphilitic tumours, and to remove syphilitic and rheumatic pains. A most active and excellent preparation.

CERATE (Brown). See *Plasters.*

CERATE (Cacao). Syn. *Cacao Pommade. Butter of cacao, white wax,* and *oil of almonds,* equal parts, melted together and strained. *Used* as a cosmetic for chapped hands and lips, &c.

CERATE (Calamine). Syn. *Turner's Cerate, Healing Salve; Ceratum Calaminæ,* —Ph. L. & E. *C. Lapis Calaminaris,*—Ph. L. 1788, &c. *Prep.* 1. (Ph. L.) *Yellow wax,* 7½ oz.; *olive oil,* 1 pint; melt together, remove the vessel from the fire, and when they first begin to thicken, add *prepared calamine,* 7½ oz., and stir constantly until they cool.

2. (P. E.) *Prepared calamine,* 1 part; *simple cerate* (Ph. E.), 5 parts; mix.

3. (Ph. D.) See *Calamine Ointment.*

4. (Commercial.) *Hard suet,* 5 *lb.; lard,* 3 *lb.;* melt, and sift in, gradually, *calamine,* 4 *lb.;* agitate well for a few minutes, or until the whole is perfectly mixed, and after *one* minute's repose, pour it off into another vessel, the coarse sediment that has fallen to the bottom being carefully avoided; lastly, stir assiduously, until it is nearly cold. This forms the Turner's cerate of the wholesale druggists. In many cases nothing but *lard* and *calamine* are used.

Uses, &c. When honestly prepared with *genuine calamine,* it is a most valuable desiccant and astringent application to excoriations, ulcers, burns, scalds, sore nipples, &c. It has long been held in popular esteem as a drying and healing dressing for sores.

CERATE (Calamine and Mercury). Syn. *Ceratum Calaminæ cum Hydrargyro,*—Lat. *Prep.* (Ph. Chirur.) *Calamine Cerate,* 1 ℔; *nitric oxide of mercury,* 1 oz.; mix. *Used* as a stimulant application to foul and indolent ulcers, psorophthalmia, &c.

CERATE (Calomel). Syn. *Ceratum Calomelanos, C. Hydrargyri Chloridi,*—Lat. *Calomel,* 1 dr.; *spermaceti cerate,* 7 dr. In herpes, and some other skin diseases.

CERATE (Calomel,—Compound). Syn. *Ceratum Calomelanos Compositum,*—Lat. *Calomel,* 2 dr.; *calamine cerate,* 1 oz.; *olive oil,* 1 dr.

CERATE (Camphor). Syn. *Ceratum Camphoratum, C. Camphoræ,*—Lat. *Pommade du frère Cosme,*—Fr. *Olive oil,* 1 ℔; *white wax,* ½ ℔; *camphor,* 3 dr. As an application to chaps, chilblains, abrasions, excoriations, and slight wounds. See *Camphor Balls.*

CERATE (Cantharides). Syn. *Ceratum Lyttæ, C. Cantharidis,*—Lat. *Prep.* (Ph. L.) *Cantharides,* (in very fine powder,) 1 oz.; *spermaceti cerate,* 6 oz.; mix. Irritant; *used* to keep blisters open, and to stimulate issues, and indolent ulcers and tumours.

CERATE (Chalk). Syn. *Ceratum Cretæ,* —Lat. *Chalk,* (thoroughly dried, and in fine powder,) 2 dr.; *simple cerate,* 6 dr.; *almond oil,* 3 dr. In piles, and foul ulcers.

CERATE (Chalk,—Acetated). See *Kirkland's Neutral Cerate.*

CERATE (Chalk,—Compound). Syn. *Ceratum Cretæ Compositum,*—Lat. *Prep.* 1. To *simple chalk cerate,* 1 oz.; add *powdered catechu,* ½ dr. In piles, and foul and indolent ulcers.

2. (U.S. Hosp.) *Lead plaster* and *olive oil,* of each, 8 oz.; *white wax,* 3 oz.; melt together; add *liquor of diacetate of lead,* 6 oz.; thoroughly incorporate, and then further add, *chalk,* (in fine powder,) 5 oz. Cooling and astringent. Useful in inflamed sores, excoriations, piles, &c.

CERATE (Cherry-laurel). Syn. *Ceratum*

Lauro-cerasi, C. Calmans,—Lat. *Prep.* (Roux.) *Simple cerate,* 1 oz.; *cherry-laurel water,* ½ oz. As an application to burns.

CERATE (Cinchona). Syn. *Bark Cerate; Ceratum Cinchonæ,*—Lat. *Prep.* 1. *Extract of bark,* 2 dr.; *simple cerate,* 1 oz.

2. (Van Mons.) *Simple cerate,* 8 oz.; *camphor,* 1½ dr.; melt together by a gentle heat, then add gradually, *decoction of Peruvian bark* (concentrated), 1 oz., and triturate until cold. As a dressing for ill-conditioned ulcers.

CERATE (Cinnabar). Syn. *Ceratum Rubrum, C. Cinnabaris, C. Hydrargyri Sulphureti Rubri,*—Lat. *Prep.* 1. *Camphor,* 20 gr.; *vermilion,* 60 gr.; *simple cerate,* 1 oz. This is *Alibert's Antiherpetic Pommade.*

2. (Ph. Chirur.) *Yellow wax* and *lard,* of each, ½ ℔; *yellow resin,* ½ oz.; *red sulphuret of mercury,* 1 dr. *Used* as a common dressing.

CERATE (Citrine). See *Resin Cerate.*

CERATE (Copaiba). Syn. *Ceratum Copaibæ*—Lat. *Prep.* 1. *Spermaceti cerate,* 3 oz.; melt by a gentle heat, then add, *balsam of capivi,* 1 oz.

2. (Dr. Houlton.) *White wax,* 1 oz.; *balsam of capivi,* 2 oz.; mix, as last. Both the above have been recommended as topical applications to wounds and ulcers of the rectum, vagina, and urethra; especially in those of a fistulous character; and in piles, &c.

CERATE (Copper). Syn. *Cupriated Cerate; Ceratum Cupri; C. C. Ammoniati,* —Lat. *Prep.* (Swediaur.) *Simple cerate,* 8 parts; melt, and add *solution of ammoniaret of copper,* 1 part. As a stimulant dressing for indolent ulcers; and in psorophthalmia, &c.

CERATE (Cosmetic). Syn. *Cold Cream, Cerate of Galen; Ceratum Cosmeticum, C. Galeni, Cremor Frigida,* — Lat. *Pommade en Crême,* Fr. *Prep.* 1. *Oil of sweet almonds,* 1℔; *white wax* and *spermaceti,* of each, 2 oz.; melt, pour the mixture into a marble or wedgewood mortar, which has been heated by standing for some time in boiling water; add, gradually, *rose water,* 10 fl. oz., assiduously stirring until an emulsion is formed; then further add, *oil of bergamot,* ½ oz.; *oil of lavender,* 1 dr.; and continue the stirring or trituration until the whole has become cold.

2. To the last, add *otto of roses,* 1 dr.; *oil of rosemary,* 15 drops.

3. *Oil of almonds,* 5 oz.; *spermaceti,* 5 dr.; *white wax,* 4 dr.; *rose water,* 3½ oz.; *balm of Mecca,* (genuine,) 8 drops.

4. As the last, with *essence of vanilla,* 15 drops; *essence of ambergris,* 10 drops.

5. (P. C.) *White wax,* 1 part; *oil of almonds,* 4 parts; *rose water,* 3 parts; as before.

6. (Van Mons.) *White wax* and *butter of cacao,* of each, 1 part; *oil of almonds* and *rose water,* of each, 4 parts.

Obs. The above are used as agreeable and cooling emollients for irritable surfaces, excoriations, sore nipples, &c. See *Cold Cream* and *Ointments.*

CERATE (Croton). Syn. *Ceratum Crotonis,* — Lat. *Prep.* (Caventou.) *Lard,* 5 parts; *wax,* 1 part; melt, and when nearly cold, add *croton oil,* 2 parts. *Used* as a counter-irritant; but is apt to affect the bowels.

CERATE (Goulard's). See *Lead Cerate.*

CERATE (Hemlock). Syn. *Ceratum Conii,*—Lat. *Prep.* (St. B. Hosp.) *Spermaceti,* 2 oz.; *white wax,* 3 oz.; melt, and add of *hemlock ointment,* 12 oz. *Used* for inveterate cancerous, scrofulous, and other sores.

CERATE (Honey). Syn. *Ceratum Mellis,*—Lat. *Prep.* 1. *Simple cerate,* 3 parts; *honey,* 1 part; *oil of lemon grass,* 6 drops. *Used* as cold cream.

2. (Ph. Chirur.) *Olive oil,* ½ ℔.; *wax* and *lead plaster* (or *galbanum plaster*), of each, 4 oz.; melt and add *honey,* ½ ℔. As a cooling emollient dressing.

CERATE (Issue). Syn. *Ceratum ad Fonticulos,*—Lat. As *issue plaster,* but adding a little *almond oil.*

CERATE (Kirkland's). Syn. *Kirkland's Neutral Cerate; Ceratum Neutrale, C. Cretæ Acetatis,*—Lat. *Prep.* 1. *Lead plaster,* 8 oz.; *olive oil,* 4 oz.; melt, sift in *chalk,* 4 oz.; mix well, then add gradually, *Goulard's extract,* ½ oz.; *distilled vinegar,* 4 oz.; and stir until cold.

2. (Paris.) *Lead plaster,* 8 oz.; *olive oil* and *chalk,* of each, 4 oz.; *sugar of lead,* 3 dr., (dissolved in) *distilled vinegar,* 4 fl. oz. As a cooling dressing to irritable ulcers and excoriated parts.

CERATE (Lead). See *Kirkland's Cerate, Cerate of Acetate of Lead, &c.*

CERATE (Lead,—Compound). Syn. *Goulard's Cerate; Ceratum Plumbi Compositum,*—Ph. L. *Prep.* (Ph. L.) *Olive oil,* 16 fl. oz.; *yellow wax,* 8 oz.; melt, remove the vessel from the fire, and when they begin to thicken, add gradually, *solution of diacetate of lead,* (slightly warmed,) 6 fl. oz.; and stir constantly until the whole is nearly cold; then add *camphor,* 1 dr., dissolved in *olive oil,* 4 fl. oz., (by heat,) and stir until the cerate is quite cold. *Used* in similar cases to *Kirkland's Neutral Cerate.*

CERATE (Marshall's). *Prep.* 1. *Palm oil* and *calomel,* of each, 2 oz.; *sugar of lead,* 1 oz.; *ointment of nitrate of mercury,* 4 oz.; triturated together in a Wedgewood mortar.

2. (Paris.) *Palm oil,* 5 oz.; *calomel,* 1 oz.; *acetate of lead,* ½ oz.; *citrine ointment,* 2 oz.; as the last. Applied to the eyes, &c.

CERATE (Mercurial). Syn. *Ceratum Mercuriale, C. Hydrargyri,*—Lat. *Prep.* 1. (Guibourt.) *Strong mercurial ointment* (Ph. L.) and *simple cerate,* equal parts.

2. (Ph. L. 1746.) *Strong mercurial ointment* and *yellow wax,* of each, 6 oz.; *lard,* 3 oz. Both are *used* as dressings to venereal ulcers.

CERATE (Mercurial,—Compound.) Syn. *Ceratum Mercuriale Compositum, C. Hydrargyri,*—Ph. L. *Prep.* (Ph. L.) *Mercurial ointment* (strong) and *compound soap cerate,* of each, 6 oz.; *camphor* (in powder), 1½ oz.; triturate together. Alterative and discutient; to disperse indolent tumours and swellings; and as a resolvent in enlarged joints, &c.

CERATE (Metopium). Syn. *Ceratum Metopii,*—Lat. *Prep.* (Dr. Barham.) *Hog-gum* (from *rhus metopium*), and *lard,* of each, 4 oz.; *white wax* and *root of sweet aristolochia* (powdered), of each, 2 oz.; *yellow resin,* 1 oz.; In stiff joints and rheumatic pains.

CERATE (Mezereon). Syn. *Ceratum Mezerei,*—Lat. *Prep.* 1. *Extract of Mezereon,* 1 part; (dissolved in) *alcohol,* 5 parts; add *bees' wax,* 5 parts; *olive oil,* 11 parts; melt together and continue the heat until all the alcohol is evaporated.

2. *Green oil of mezereon,* 1 part; *simple cerate,* 20 parts; melt together. Both are *used* to keep up the discharge from blistered surfaces, and as a stimulant application to indolent sores.

CERATE (Neutral). See *Kirkland's Cerate.*

CERATE (Nitrate of Mercury). Syn. *Citrine Cerate; Ceratum Hydrargyri Nitratis,*—Lat. *Prep.* (St. B. Hosp.) *Citrine ointment* and *simple cerate,* equal parts. See *Ointments.*

CERATE (Opium). Syn. *Laudanum Cerate, Anodyne do.; Ceratum Opii, C. Opiatum, C. Anodynum,*—Lat. *Prep.* 1. *Tincture of opium* and *olive oil,* of each, 2 dr.; *simple cerate,* 1 oz.; digest with heat until all the spirit and water is evaporated, constantly stirring the mixture all the time.

2. (Gibert.) *Wine of opium,* 1 dr.; *simple cerate,* 1 oz.

3. (Lagneau.) *Opium* (in fine powder) ½ dr.; *yelk of* 1 *egg;* mix, then triturate it with *simple cerate,* 1 oz.

Obs. The above are applied to painful swellings, piles, and ulcers, and in chronic ophthalmia, &c.

CERATE (Phosphorated). Syn. *Ceratum Phosphori, C. Phosphoratum,*—Lat. *Prep.* 1. *Phosphorus,* 6 gr.; *simple cerate,* 3 oz.; heat together in a phial placed in a water bath, with frequent agitation for 2 hours; and after repose for 10 minutes, pour off the clear portion, and stir it well until cold.

2. (Foy.) *Phosphorated ether,* 5 parts; *simple cerate,* 24 parts. Both of the above have been recommended as frictions in obstinate cutaneous affections, and in rheumatism of the joints.

CERATE (Pitch). Syn. *Ceratum Picis Burgundicæ,*—Lat. *Prep.* (Beral.) *White wax,* 3 parts; *suet,* 4 parts; *Burgundy pitch,* 6 parts; melted together. A mild stimulant and detergent dressing. See *Ointments.*

CERATE (Quinine). Syn. *Ceratum Quiniæ,*—Lat. *Prep.* 1. *Disulphate of quinine,* 5 or 6 gr.; *simple cerate,* 1 dr. Applied to the denuded dermis (endermically).

2. *Sulphate of quinine* and *olive oil,* of each, 1 dr.; *simple cerate,* 6 dr. As a friction. Both are used in intermittents.

CERATE (Resin.) Syn. *Basilicon, B. Cerate, B. Ointment, Yellow Basilicon; Citrine Cerate, Ceratum Citrinum.*—Ph. L. 1745. *C. Resinæ Flavæ,*—Ph. L. 1788. *C. Resinæ,*—Ph. L. 1809 and since. *Prep.* 1. (Ph. L.) *Yellow resin* and *bees' wax,* of each, 15 oz.; melt, add *olive oil,* 1 pint; strain through a cloth, and stir the mixture until cold.

Obs. The above is the formula of the London College, but the *basilicon of the shops* is seldom, if ever, made in this manner. The following forms are those commonly used in trade, but the products are much inferior to that made according to the directions in the Pharmacopœia.

2. (Commercial.)—*a. Yellow resin,* 10 *lb.; bees' wax,* 2 *lb.; linseed oil,* 7 *lb.;* melt together and stir until cold.

b. As the last, but using *nut oil* instead of *linseed oil.*

c. Nut oil, 1 gall.; *bees' wax,* 5 *lb.; yellow resin,* 14 *lb.*

d. Lard (common) and *linseed oil,* of each, 3 *lb.; yellow resin,* 9 *lb.;* as before.

Uses, &c. This cerate is a mild stimulant, detergent, and digestive application; and as such is employed to dress foul and indolent ulcers, blistered surfaces, burns, &c. For the corresponding preparations of the other colleges, see *Ointments.*

CERATE (Resin,—Compound). Syn. *Deshler's Cerate; Ceratum Resinæ Compositum,*—Lat. *Prep.* (Ph. U. S.) *Resin, suet,* and *bees' wax,* of each, 1 *lb.; turpentine,* ½ *lb.; flax-seed oil* (linseed oil), ½ pint; as above. Rather more stimulating than *resin cerate,* but used for the same purposes.

CERATE (Rose). Syn. *Lip Salve; Ceratum Rosatum,*—Lat. *Prep.* (P. C.) *Oil of almonds,* 16 parts; *white wax,* 8 parts; *alkanet root,* 1 part; digest, with a gentle heat, until sufficiently coloured, then strain, and for *every ounce* of the cerate, add *otto of roses,* 2 drops. See *Lip Salve.*

CERATE (Savine). Syn. *Ceratum Sabinæ,*—Ph. E.; & Ph. L. 1836. *Prep.* 1. (Ph. E.) *Bees' wax,* 1 part; *lard,* 4 parts; *fresh savine* (leaves, bruised,) 2 parts; boil together until the leaves become crisp, then strain, with pressure, through a linen cloth.

2. (Ph. L. 1836.) *Lard,* 2 ℔; *savine leaves,* 1 ℔; *bees' wax,* ½ ℔; as last.

3. (Ph. L. 1851.) In the last Ph. L. and Ph. D., this preparation is included among the *ointments;* in trade, however, the old name (Ph. L. 1836) is still generally retained.

Obs. The preparation of this cerate requires caution, as the active principle of the savine being volatile, is injured by long boiling and a high temperature. The leaves are usually boiled until they are crisp, but as this takes some time, the essential oil, and consequently the odour, is nearly all dissipated. A better plan is to express the juice from the leaves, and to add it to the wax and oil melted together, and just beginning to cool. As usually met with in the shops, this cerate has a lively green colour, and the odour of the fresh plant; but neither of these is derived from the leaves in the common process of making it. The *first* is caused by the addition of *powdered verdigris,* and the *last,* by adding a little of the *essential oil of savine* to the compound when nearly cold. The preparations of the British Colleges have only a very pale green colour, and even that rapidly changes by exposure to the air. A *uniform green colour* may therefore be regarded as a proof of *adulteration;* as the *unadulterated compound,* however skilfully prepared, is of a *dingy green colour,* of little intensity; and after it has been made a short time, it *fades on the surface,* and the under portion becomes streaky and mottled. A greater quantity of colour is obtained from the leaves by long digestion in the fat and wax in earthen vessels, at a moderate heat, than by hasty boiling. In this way a lively green is sometimes produced, but it rapidly changes in the manner just mentioned.

The following forms are those commonly adopted by the wholesale druggists for the manufacture of this cerate:—

4. *Lard* and *suet,* of each, 6 *lb.; yellow wax,* 2 *lb.;* melt them together in an earthen vessel; add 2 *oz.* of *distilled verdigris,* (previously rubbed down smooth in a mortar with an equal weight of *sweet oil;*) strain, whilst hot, into a large earthen pot, and when the whole has cooled a little, add of *oil of savine,* 1 *oz.,* and stir until cold.

5. *Savine leaves,* 4 *lb.; yellow wax,* 2 *lb.; lard,* 8 *lb.;* boil until the leaves become crisp; then strain, and add, of *green ointment* (lively coloured), 5 *lb.;* when cooled a little, further add, of *oil of savine,* 3 dr., and stir briskly until cold. *Prod.* 13½ *lb.*

Uses, &c. Savine cerate and ointment are chiefly employed to keep up the discharge from blisters, (*perpetual blisters,*) for which purpose it is preferable to preparations of cantharides. The practice of colouring this cerate with verdigris, which is general in trade, cannot be too severely censured, as its therapeutic action is thereby altered. The copper may be detected by burning down a little in a *platinum* or *Hessian crucible,* washing out the ashes with a little *dilute nitric acid,* placing the liquor in a glass tube, and applying the usual tests. See *Copper* and *Ointments.*

CERATE (Simple). Syn. *Ceratum Simplex,*—Lat. *Prep.* 1. (Ph. E.) *Spermaceti,* 1 part; *white wax,* 3 parts; *olive oil,* 6 parts; melt by a gentle heat, and stir until cold.

2. (Ph. L.) The simple cerate (*ceratum,*—Ph. L. 1836 & 1851; *ceratum simplex,*—Ph. L. 1824;) of the London College, does not contain spermaceti, and is made with yellow wax. See *Cerate* and *Spermaceti Cerate.*

CERATE (Soap). Syn. *Compound Soap Cerate; Ceratum Saponis,*—Ph. L. 1836. *Ceratum Saponis Compositum,* — Ph. L. 1851. *Prep.* 1. (Ph. L.) Boil *litharge,* 15 oz., *in distilled vinegar,* 1 gall., until dissolved, stirring continually; then add of *Castile soap,* 10 oz.; again boil until all the moisture is evaporated; then add, gradually, *bees' wax,* 12½ oz., and *olive oil,* 1 pint, previously melted together, and stir until nearly cold.

2. (Wholesale.) *Distilled vinegar,* 6 gall.; *litharge,* 5 *lb.; soap,* 3¾ *lb.; yellow wax,* 4½ *lb.; olive oil,* 6 pints. Mix as above.

Good *nut* or *poppy oil* may be used instead of *olive oil.*

Uses, &c. Soap cerate is resolvent, cooling, and desiccative, and is chiefly employed as a cooling dressing for scrofulous swellings, &c. It may be spread on linen and applied like a plaster. It is sometimes used as a support for fractured limbs, and forms an excellent dressing for *soft corns.*

Obs. Unless the instructions contained in the above formulæ are followed in every particular, the process is apt to miscarry. When this is the case, the cerate, on cooling, separates into two portions, and is commonly full of hard gritty particles. To prevent this, care should be taken to use soap of the best quality. This mishap cannot be got over by "long boiling and stirring," as is generally supposed. The only remedy is, the addition of a little more soap, previously melted with some water, and again evaporating to a proper consistence. A small quantity of *liquor of potassa* has a similar effect.

The colour and consistence of *soap cerate* chiefly depends on the length of time it is kept heated after the addition of the oil and wax. As evaporation proceeds, so the colour and consistence increase. Its usual colour is that of a lively pale chocolate-brown, but occasionally it is much paler. This arises from its containing an undue quantity of moisture. When it has been kept heated for a period beyond that usually adopted, it attains greater hardness, and is then frequently called *hard soap-cerate,* (*ceratum saponis durum;*) but by over-boiling it is apt to become gritty.

CERATE (Spermaceti). Syn. *White Cerate, White Lip Salve; Simple Cerate, Ceratum Simplex,*—Ph. E. *C. Album,*—Ph. L. 1745. *C. Spermatis Ceti,*—Ph. L. 1788. *C. Cetacei,*—Ph. L. 1809, and since. *Prep.* 1. (Ph. L.) *Spermaceti,* 2 oz.; *white wax,* 8 oz.; melt by a gentle heat; add, *olive oil* (warm), 1 pint, and stir with a spatula until they cool.

2. (Ph. E.) See *Simple Cerate.*

3. (Ph. D.) The corresponding preparation of the Ph. D. is classed under *Ointments,* and contains lard.

4. (*Commercial.*) On the *large scale* lard or suet is substituted for oil, by which means less wax is required. The following is a good form where a cheap article is wanted, and is that commonly adopted in the wholesale trade:—

Clarified mutton suet, 5½ *lb.; white wax* and *spermaceti,* of each, ¾ *lb.;* as above.

Uses, &c. Emollient and cooling. It is commonly employed as a soft cooling dressing, as a lip salve, as an application to chaps, chilblains, &c.

Obs. The materials should be melted by a very gentle heat (that of a water bath is best) in a clean stoneware vessel, and as soon as perfect liquefaction takes place, the heat should be withdrawn, and the fluid cerate strained into a clean vessel, and stirred with a clean wooden spatula until it solidifies. To facilitate the cooling, the vessel may be placed in cold water or in a current of cold air. In this way the product is rendered both whiter and finer than when the liquid mass is allowed to cool by itself. By adding a little *flowers of benzoin* with the oil, or a little *nitric ether* when the cerate is about *half cold,* this, as well as other like preparations, will keep for years without becoming rancid or suffering any material change of condition. See *Fats.*

CERATE (Sulphur). Syn. *Ceratum Sulphuris, C. Sulphuratum,*—Lat. *Prep.* (P. C.) *Washed sulphur,* 2 parts; *cerate of Galen,* 7 parts; *almond oil,* 1 part; mix. In itch, &c.

CERATE (Sulphuret of Mercury). *Prep.* (Swediaur.) *Yellow resin,* ½ oz.; *yellow wax* and *lard,* of each, ½ lb; *vermilion,* 20 gr. As a dressing to unhealthy ulcers. See *Cinnabar Cerate.*

CERATE (Tobacco). *Bees' wax,* 3 oz.; *yellow resin,* 1 oz.; *olive oil,* 6 oz.; *tobacco juice,* 4 oz.; mix and evaporate to dryness, and when nearly cold, add *bergamot,* 2 dr. *Used* to destroy pediculi, &c.

CERATE (Touch). Syn. *Ceratum pro tectu,*—Lat. *Cerat pour le toucher,*—Fr. *Prep.* (Soubeiran) *Spermaceti* and *yellow wax,* of each, 1 part; *olive oil,* 16 parts; melt, add *caustic soda,* 1 part, and stir until cold. *Used* in hospitals for "practising the touching in accouchments."

CERATE (Turner's). See *Calamine Cerate.*

CERATE (Verdigris). Syn. *Ceratum Æruginis, C. Cupri Diacetatis,*—Lat. *Prep.* 1. *Resin cerate,* 19 parts; *verdigris* (in fine powder), 1 part.

2. (For. Ph.) *Wax* and *resin,* of each, 6 parts; *Venice turpentine,* 5 parts; *linseed oil,* 2 parts; *verdigris,* 1 part. *Used* as a mild escharotic and stimulant to fungous ulcers, warts, corns, &c.

CERATE (White). See *Spermaceti Cerate.*

CERATE (Zinc). Syn. *Ceratum Zinci, C. Z. Oxydi,*—Lat. *Oxide of zinc,* 20 gr.; *spermaceti cerate* 1 oz. In sore nipples, excoriations, &c.; and in chronic ophthalmia.

CERATE (Zinc,—Compound.) Syn. *Ceratum Zinci Compositum,*—Lat. *Prep.* 1. To the last, add *calomel,* 10 gr. *Used* as the last, and in scrofulous ophthalmia.

2. (Mid. Hosp.) *Zinc ointment* and *compound lead ointment,* equal parts. Cooling, astringent; in excoriations, and as a dressing for ulcers.

3. (Hufeland.) *Oxide of zinc* and *lycopodium,* of each, 15 gr.; *simple cerate,* ½ oz. In sore nipples, ulcerations of the breast, tetters, &c. It acts best when diluted with half its weight of spermaceti cerate.

CEREBRIC ACID. A peculiar acid compound, first noticed by M. Frémy, obtained along with *oleo-phosphoric acid* when the brain and nerves are treated with *hot alcohol.* It is solid, white, crystalline; freely soluble in boiling alcohol, and forms a solid gelatinous mass with hot water; fusible with decomposition, exhaling a peculiar odour, and leaving much charcoal behind. With the alkalies it forms insoluble salts termed *cerebrates.*

CEREBROLEINE. When *oleo-phosphoric acid* is boiled in water, it is resolved into a fluid neutral oil and phosphoric acid, which dissolves. The former is *cerebroleine.*

CERIC ACID. Formed by the oxidation of *cerin* and *myricine.*

CERINE. Syn. *Cerotic Acid,*—Brodie. When *pure bees' wax* (bleached) is digested in *boiling alcohol* for some time, a solution of *myricine* and *cerine* is formed. The former is deposited as the liquid cools, and the latter may be obtained by evaporating the decanted portion. *Cerine* is a white crystallizable substance, soluble in 16 parts of boiling alcohol; fuses at 144° Fahr.; and is readily saponified with caustic alkaline lyes, by which it is converted into *margaric acid* and *ceraïne.* It greatly resembles white wax, of which indeed it forms from 70% to 80%.

CERIUM. A metal discovered in 1803 by Hisinger and Berzelius, in the mineral named *cerite.* It is obtained in combination with two other metals called by Mosander *Lanthanium* and *Didymium.* The *mixed oxides* may be procured by dissolving *calcined* and *powdered cerite* in *nitro-hydrochloric acid,* filtering, neutralizing with *pure potassa* and then precipitating with *tartrate of potassa.* The powder that falls down is next washed, and calcined.

The mixed oxides may be separated by solution in *nitric acid,* evaporation, and calcination. The mass previously powdered is then to be digested in *water containing* 2% *of nitric acid;* the undissolved portion is OXIDE OF CERIUM. The solution contains the OXIDES OF LANTHANIUM and DIDYMIUM. These may be obtained as carbonates by adding a *solution of carbonate of potassa.* The precipitate, dissolved in *sulphuric acid* in excess, and slowly crystallized, yields rose-coloured crystals of *sulphate of didymium,* and violet ones containing lanthanium and didymium. By adding the latter to the mother liquor, and repeating the process, the whole of the didymium salt may be separated by crystallization, leaving *sulphate of lanthanium* behind.

The combinations of these metals are but little known, and are now the subject of investigation. Various compounds with the acids, sulphur, and chlorine, have been formed.

CEROMEL. *Prep.* (Van Mons.) *Bees' wax.* 1 oz.; *honey,* 4 oz.; melt together and stir until cold. An excellent application to irritable ulcers, abraided surfaces, sore nipples, &c.

CEROTIC ACID. See *Cerine.*

CEROTYLE. The theoretical base of *cerotic acid* and *cerotylic alcohol,*—according to Brodie.

CETENE. A colourless oily-looking liquid, obtained by repeatedly distilling *ethal* with *glacial phosphoric acid.* It is inflammable and soluble in alcohol and in ether.

CETIC ACID (of Chevreuil). This has been shown to be a mere admixture of *cetine* and *margaric acid.*

CETINE. Chevreuil applied this name to pure spermaceti. *Prep.* Dissolve *spermaceti* in *boiling alcohol,* and collect the crystals that are deposited as the solution cools. Bright pearly crystals, melting at 120°, and subliming at 670° Fahr.

CETRARIC ACID. Syn. *Cetrarine, Cetrarina* (?). The bitter principle of Iceland moss. It exists, in the free state, in the cortical portion of the thallus.

Prep. 1. *Iceland moss* (bruised), 1 part; *rectified spirit,* 6 parts; boil in a covered vessel for half an hour; express the liquor whilst hot, filter, and distil off the spirit; redissolve the residuum in boiling alcohol, decant the clear, and let the solution cool slowly; lastly collect the crystals and preserve them out of contact with air.

2. (Herberger.) *Iceland moss* (in coarse powder), 1 ℔; *alcohol* (0·883), 4 ℔; boil as before, cool until vapours cease to rise, express the tincture, add *hydrochloric acid,* 3 dr. (dissolved in) *water,* 2 oz.; let it

rest for a night in a closed mattrass; then decant, throw the deposit on a filter, press it in bibulous paper, and whilst still moist, wash it with both *alcohol* and *ether;* lastly, purify it by digestion in *boiling alcohol*, as before.

Prop., &c. Pure *cetraric acid* occurs under the form of minute shining acicular crystals; it is intensely bitter, non-volatile, scarcely soluble in water, ether, and cold alcohol; soluble in alkaline solutions forming soluble salts, which give a red colour with the persalts of iron, and a yellow one with acetate of lead. These compounds are called *cetrarates*. As it possesses distinct acid properties, it is incorrectly called cetrarine and cetrarina. *Dose.* 2 to 4 gr. every 3 hours, as a febrifuge; 1 to 3 gr. thrice daily, as a tonic.

CETYLE. The theoretical base of the *cetyl-compounds*. Pure spermaceti (*cetine*) is said to be *cetylate of oxide of cetyle*. Spermaceti is saponified with great difficulty, and yields by the process, a crystallizable fat, (*cetylic alcohol*,) and a substance resembling margaric acid, (*cetylic acid*.) The second may also be procured from the first by oxidation, and the two resemble in their chemical relations those of acetic acid and ordinary alcohol.

CEVADIC ACID. See *Sabadillic Acid*.

CHABERT'S OIL. Syn. *Chabert's Empyreumatic Oil; Oleum Empyreumaticum Chaberti, O. contra Tæniam Chaberti. Prep.* (Ph. Bor. 1847.) From *empyreumatic oil of hartshorn*, 1 part; *oil of turpentine*, 3 parts; mix and distil over three fourths only in a glass retort, and keep it in well stopped bottles. In tapeworm. *Dose.* Two teaspoonfuls in water, night and morning, until 4 to 6 or even 7 oz. have been taken; a cathartic being also administered from time to time.

CHAIRS. The black leather work of *chairs, settees*, &c. may be restored by first well washing off the dirt with a little warm soap and water, and afterwards with clean water. The brown and faded portions may now be restained by means of a little *black ink*, or preferably, *black reviver*, and when this has got thoroughly dry, they may be touched over with *white of egg*, strained and mixed with a little *sugar-candy*. When the surface is nearly dry, it should be polished off with a clean brush.

CHALK. Syn. *Soft Carbonate of Lime, Earthy do.; Creta*,—Lat. Chalk is largely used in the arts and manufactures, and in medicine. The natural varieties are remarkable for the fossils which they contain. The *coloured chalks* which are used as pigments and for crayons, generally contain both clay and magnesia, as well as oxide of iron, and are minerals quite distinct from *white chalk*, or *chalk*, properly so called. The latter is an *amorphous carbonate of lime*. Exposed for some time to a red heat, it is converted into *quicklime;* ground in mills and elutriated, it forms *whiting;* the same process performed more carefully and on a smaller scale produces the *prepared chalk* used in medicine. When prepared artificially (by precipitation), it is the *precipitated chalk* of modern pharmacy. (See *below*.)

CHALK (Black). Drawing slate.

CHALK (Brown). Umber.

CHALK (Camphorated). Syn. *Cretaceous Tooth Powder, Camphorated do.; Creta Camphorata, C. cum Camphorâ*,—Lat. *Prep.* 1. *Camphor*, 1 *oz.;* add a few drops of *spirit of wine*, reduce it to a very fine powder, and mix it (perfectly) with *precipitated chalk*, 7 *oz.;* lastly, pass it through a clean fine sieve, and keep it in a corked bottle. These proportions make the strongest "*camphorated tooth powder*" of the shops.

2. *Camphor*, 1 *oz.; precipitated chalk*, 15 oz.; as before. These are the best and safest proportions, and those now generally adopted by the West-end perfumers.

3. As either of the above, but using "*prepared chalk*" in lieu of "*precipitated chalk*." Less white and velvety, but cleans the teeth better than the softer article.

Use, &c. Camphorated chalk is much esteemed as a dentifrice; especially by smokers, and those troubled with foul teeth, or a stinking breath. It may be scented with a few drops (3 or 4 to each *oz.*) of *otto of roses, oil of cloves*, or *neroli*, or of the *essences of ambergris, musk*, or *vanilla;* but care must be taken not to overdo it. When the *teeth* are *much furred* or *discoloured*, it may be mixed with about one-seventh of its weight of *finely-powdered pumice stone* (sifted through lawn) which will render it more effective. A little *carmine, rouge, light red* (burnt ochre), *red coral*, or *rose pink*, is also sometimes added to give it a tinge approaching that of the gums. The quantity of camphor (1 to 3 or 4) commonly ordered in certain books is absurdly large, and would render the compound not only unpleasant in use, but actually detrimental to the teeth. See *Dentifrices*.

CHALK (French). Soap stone or steatite, a soft magnesian mineral, possessing the property of writing in glass. Its powder (obtained by scraping) is very soft, velvety, and absorbent of grease. It forms the *boot powder* of the boot- and shoemakers.

CHALK (Precipitated). Syn. *Precipitated Carbonate of Lime; Creta Præcipitata, Calcis Carbonas Præcipitatum,*—Lat. *Prep.* 1. By adding to a *solution of chloride of calcium,* any quantity, another of *carbonate of soda,* (both cold,) and well washing the precipitate with *pure water,* and drying it out of the dust.

2. (Ph. D.) *Solution of chloride of calcium* (Ph. D.), 5 parts; *carbonate of soda,* 3 parts; (dissolved in) *water,* 4 parts.

Uses, &c. It is chiefly employed for making aromatic confection, cretaceous powder, and chalk mixture. That of the shops is seldom pure, the refuse of the soda-water makers (*sulphate of lime*) being commonly sold for it. When pure it is wholly soluble, with effervescence, in *dilute hydrochloric acid.* (See *below.*)

CHALK (Prepared). Syn. *Creta,*—Ph. E. & Ph. L. 1836. *Creta Præparata,*—Ph. L. 1851. *Creta Alba,*—Ph. D. *Prep.* 1. (Ph. L. 1836.) Rub *chalk,* 1 lb., with sufficient water, added gradually, until reduced to a smooth cream; then stir this into a large quantity of *water,* and, after a short interval, to allow the coarser particles to subside, pour off the supernatant water, (*still turbid,*) into another vessel, and allow the suspended powder to settle; lastly, collect the chalk so prepared and dry it. In the same way *shells* are prepared, after being first freed from impurities and washed with boiling water.

2. (Commercial.) On the *large scale* the *chalk* is ground in mills, and the elutriation and deposit made in large reservoirs. It is now seldom prepared by the druggist.

Pur. "It is almost entirely soluble in dilute hydrochloric acid, emitting small bubbles of carbonic acid gas. Hydrosulphuric acid does not disturb this solution; neither, when it has been heated, does ammonia or solution of lime added in excess." (Ph. L.)

Uses, &c. In *medicine,* as an absorbent, antacid, and desiccant; in acidity, heartburn, dyspepsia, and other like stomach affections, and in diarrhœa, depending on acidity or irritation; in the latter, generally combined with aromatics, astringents, or opium. It forms a valuable dusting powder in excoriations, ulcers, &c., especially in those of children. *Dose.* 10 gr. to a spoonful, in a little water or milk, or made into a mixture with mucilage or syrup.

CHALK (Red). A natural clay containing about 18% of protoxide and carbonate of iron.

CHALYBEATES. Syn. *Chalybeata, Ferruginea,*—Lat. The medicinal qualities of the preparations of iron are noticed under the name of that metal. Those most frequently employed in medicine are—*iron filings; Quevenne's iron;* the *black oxide, magnetic oxide,* and *sesquioxide of iron;* the *ammonio-chloride* and *sesqui-chloride;* the *carbonate* and *saccharine carbonate;* the *citrate* and *ammonia-citrate;* the *iodide, lactate,* and *sulphate;* the *tartrate, ammonio-tartrate,* and *potassio-tartrate of iron;* and the *chalybeate mineral waters.* For the *doses, &c.,* see the respective articles.

CHAMOMILE. Syn. *Anthemis,*—Ph. L. "The flower of the *anthemis nobilis.*" (Ph. L.) It is bitter, stomachic, and tonic; in dyspepsia, loss of appetite, intermittents, &c. It is an effectual remedy for nightmare; and, according to Dr. Schall, the only certain remedy for that complaint. *Dose.* 10 gr. to ½ dr., or more, in powder or made into a tea. Fomentations are also made with it. See *Extracts, Oils, Pills, &c.*

CHAMPAGNE. See *Wines.*

CHAPS. These are too well known to require description. *Chapped hands* are common amongst persons with a languid circulation, who are continually "dabbling" in water during cold weather. *Chapped lips* generally occur in persons with pallid, bluish, moist lips, who are much exposed to the wind in dry cold weather; especially in those who are continually moving from heated apartments to the external air. The application of a little *cold cream, pomatum, spermaceti ointment, lard,* or any *similar article,* will generally prevent chaps on the lips, and chaps and chilblains on the hands. Persons employed in oil and tallow works, or about oil, and who have consequently their hands continually in contact with greasy matter, never suffer from these things. A little oil or unguent of any kind, *well rubbed* on the hands on going to rest (removing the superfluous portion with a cloth,) will not only preserve them from cold, but tend to render them both soft and white. It is said that a once favorite actress, now "in the sere and yellow leaf," celebrated for the beauty of her hands, covers them nightly with the flare of a calf or lamb with the fat attached, over which is drawn a glove of leather. See *Chilblains.*

CHAR (Potted). The flesh of the *salmo Alpinus* (Linn.) or *trout of the Alps,* common in the lakes of Lapland, preserved by the common process of potting.

CHARCOAL. Syn. *Wood Charcoal, Ve-*

getable do.; Carbo,—Ph. L. *Carbo Ligni,* —Ph. L. 1836. *Carbo Vegetabilis, &c.* Coal made by charring; the fixed residuum of vegetables exposed to ignition out of contact with atmospheric air. "Charcoal prepared from wood, by means of fire." (Ph. L.)

Charcoal is prepared for fuel by burning pieces of wood, (commonly of 1 to 4 inches in diameter, and from 1 to 3 feet in length,) formed into a conical pile, which is then covered with turf or clay, to exclude the air, only 2 or 3 small holes at the bottom being left for lighting the wood, and a few others, still smaller, at top, to admit of the escape of the smoke. The combustion is allowed to proceed very slowly for 8 or 10 days, more or less, until the volatile matter of the wood is driven off, when the air holes are stopped up with *clay,* and the further combustion of the pile arrested. The whole is then allowed to remain until quite cold, before it is broken up.

The *charcoal* employed in the *manufacture of gunpowder* is burnt in close iron cylinders, and has hence received the name of "*cylinder charcoal.*" For this and other nice purposes, it is essential that the last portion of the tar and vinegar should be suffered to escape, and the reabsorption of the crude vapours prevented, by cutting off the communication between the cylinders and the condensing apparatus; as without this precaution, on the fire being withdrawn, a retrograde movement of the products takes place, and the charcoal is much reduced in quality. The *dogwood, alder,* and *willow,* are those used for making charcoal at Waltham Abbey. The *Dutch white willow,* and after that the *Huntingdon willow,* are said to yield the best charcoal for gunpowder. The charcoal from the cylinders of the pyroligneous acid (*wood-vinegar*) works, is also called *cylinder charcoal,* and is that chiefly used for *chemical purposes;* but it is inferior to that prepared for gunpowder. It has been stated, that in charring wood, a portion of it is sometimes converted into a species of pyrophorous. Perhaps this might have been the cause of the late dreadful explosion at the Waltham works.

The *box-wood charcoal,* employed in voltaic electricity, is prepared by putting prismatic pieces of box-wood, about 1 inch long by ½ inch thick, into a crucible, which is then filled with clean dry sand, covered up, and exposed to a red heat for about an hour.

Uses, &c. These are numerous and varied. Charcoal is extensively employed as a *fuel;* and in metallurgy for *tempering metals;* reduced to powder, it is used to surround vessels and bodies required to *retain their heat for some time;* a coating of charcoal, formed on *piles* and *stakes of wood,* by charring them, promotes their preservation, by shielding them from air and moisture; fresh-burnt charcoal (in powder) *restores tainted meat* and *putrid water, decolours vegetable solutions, deodorizes fetid substances,* and *withdraws lime from syrups* filtered through it.

In *medicine,* charcoal is principally used as an *antiseptic* or *disinfectant,* either in the form of powder or made into a poultice. It has been given internally in *dyspepsia, diarrhœa, dysentery, heartburn, agues, constipation, sickness of pregnancy,* and various other diseases, with advantage. As a *prophylactic of cholera* and *fevers* it is invaluable and superior to all other substances. It forms the best *tooth-powder* known, as it both whitens the teeth and deodorizes the breath. "In the French edition of Hahnemann's Materia Medica, (*par* Jourdan; *Paris,* 1834;) no less than 35 pages are occupied with the enumeration of the symptoms produced by *one millionth of a grain* of this substance." (Pereira.) This is doubtless absurd; but on the other hand, the medical, and especially the prophylactic powers of charcoal, have been unjustly neglected in this country. *Dose.* 10 gr. to a teaspoonful, or more *ad libitum.* An ointment made with *lard* and *charcoal* has been successfully employed in some skin diseases. In all cases, to be useful, the charcoal must be both *fresh-burnt* and *fresh-powdered,* and carefully preserved, out of contact with the air, until about to be administered. Fresh *carbonized bread* forms an excellent charcoal, both for a prophylactic and a tooth-powder.

Charcoal *varies in its qualities* according to the substance from which it is prepared; that of the *soft woods,* (*willow* or *alder,*) is best for *crayons* and *gunpowder;* that of the *hard woods* for fuel, and for *blowpipe* "*supports.*" That made by a low-red heat, not exceeding cherry red, and which has a dull surface, is the most valuable. If the heat is carried much beyond this point, the charcoal acquires a brilliant surface, and deteriorates in quality. *Chesnut charcoal* is preferred by smiths for forging, as it not only burns slowly, but deadens as soon as the blast ceases. *Areca-nut charcoal* is preferred as a dentifrice; but, unfortunately, the honest druggists, usually sell *willow charcoal* or *box-wood charcoal* for it.

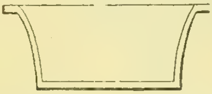
Ant., &c. Poisoning or suffocation, resulting from respiring the fumes of burning charcoal, (carbonic acid,) has been already alluded to, and the treatment briefly pointed out. It may be further added, that the most simple excitant in this species of asphyxia, is the passage into the nasal fossæ of a feather dipped in *common vinegar.* It is the means which has always first caused the muscular contractions indicating revival. (Pelletan.)

Gilders, jewellers, copper-plate printers, braziers, &c., who use small open fires of burning charcoal, should endeavour to create a draught of air to carry off the fumes, and should take care to keep to "*windward,*" (as sailors say,) by which means they will avoid them. *Milk of lime* and *quicklime* have been employed to absorb the gas, but their action must necessarily be very limited. The only certain remedy is *thorough ventilation.* This should be adopted, even at slight personal inconvenience in other respects.

CHARCOAL (Animal). Syn. *Animal Black, Bone do., Ivory do.; Carbo Animalis, C. Ossis, Ebur Ustum Nigrum,*—Lat. The charcoal obtained by igniting bones in close vessels.

Prep. On the large scale, two different processes are adopted to produce bone black:—

1. *Bones,* (deprived of their grease by boiling,) are broken to pieces, and put into small cast-iron pots, varying from $\frac{3}{8}$ to $\frac{1}{2}$ an inch in thickness. (See *Engr.*) Two of these being filled, are dexterously placed with their mouths together and then luted with *loam.* A number of these vessels are then placed side by side and piled on each other, in an oven resembling a potter's kiln, to the number of 100 or 150, or even more. The fire is next kindled, and the heat kept up strongly for 10 or 12 hours, according to circumstances, until the process is completed. The whole is then allowed to cool before opening the pots.



2. *Bones* (previously boiled for their grease) are introduced into retorts similar to those used in gas works, and heat being applied, the volatile products are conveyed away by iron pipes to cisterns where the condensable portion (*bone spirit, &c.*) is collected. As soon as the process of distillation is finished, the solid residuum in the retorts, (while still red hot,) is removed through their lower ends into wrought-iron canisters, which are instantly closed by air-tight covers, and luted over. These are then raised to the ground by a crane, and set aside to cool.

Obs. The *bone-grease,* obtained as above, is sold to the candle and soap makers. The boiled bones are then sorted, the *finest pieces* being selected for making handles for knives, tooth-brushes, buttons, &c.; the *next sort* is taken for making into bone black; while the *smallest* and *worst* portion, forming the residue, is reserved for grinding into manure. The carbonized bones are next ground in a mill, and the resulting coarse powder, sorted by sieves into two kinds, one, *granular,* somewhat resembling gunpowder, for *decolorizing liquids,* and the other, *quite fine,* to be used as a *pigment.* The first is sold under the name of *animal charcoal;* the second, as *bone* or *ivory black.*

Uses, &c. This article possesses the valuable property of taking lime and other saline matter from syrups and other aqueous solutions, especially organic ones, at the same time that it decolours them. *Its power as a decolorizer* may be tested by adding it to a *solution of brown sugar* or of *molasses,* or to *water containing* $\frac{1}{1000}$ part *of indigo dissolved in sulphuric acid.* The test should be made in a small glass tube. By well washing and carefully reburning it, this charcoal may be used any number of times. As a decolorizer and deodorizer, animal charcoal is vastly superior to vegetable charcoal. (See *below.*)

CHARCOAL (Animal). Syn. *Carbo Animalis,*—Ph. L. "Charcoal prepared from bullock's blood, by fire." (Ph. L.) *Used* in the preparation of the vegeto-alkaloids and as an antidote to poison. It is the purest and most powerful variety of animal charcoal. For *Tests* see *below.*

CHARCOAL (Animal,—Purified.) Syn. *Carbo Animalis Purificatus,*—Ph. E. & D.; & Ph. L. 1836. *Prep.* 1. (Ph. E.) *Commercial hydrochloric acid* and *water,* of each, 12 fl. oz.; mix, stir in *animal charcoal,* (bone black,) 1 ℔; digest, with gentle heat and frequent agitation, for 2 days; then boil, dilute with *water,* 1 quart, and filter through linen or calico; wash the charcoal which remains on the filter with *water,* until what passes off is scarcely (not at all) affected by *solution of carbonate of soda;* heat the washed charcoal, at first moderately, and then to (dull) redness in a closely covered crucible.

2. (P. D.; & Ph. L. 1836.) As before (nearly), omitting the "boiling." *Used* for the same purposes as the last.

3. (Commercial.) *Hydrochloric acid,*

1 *lb.; water*, 1 pint; mix, add *bone black*, 7 *lb.;* make a paste; in 2 or 3 days stir in *boiling water*, 1 quart; and the next day wash it with fresh water until the washings cease to affect litmus paper or a solution of carbonate of soda; then collect it in a cloth, and drain, press, and dry it; lastly, heat it to redness, as before. *Used* to decolour syrups, &c.; and occasionally by the distillers and rectifiers. It is inferior to the preceding, although frequently sold for them.

Pur., &c. "Ignited with its own volume of red oxide of mercury, it is dissipated, leaving only a scanty ash" less than $\frac{1}{200}$th part. (Ph. E.) "It gives off no bubbles (of carbonic acid) on the addition of hydrochloric acid; nor is anything afterwards thrown down from this acid on adding either ammonia or sesqui-carbonate of ammonia." (Ph. L. 1836.)

Obs. We must again impress on the reader the necessity of employing the preceding charcoals (except as pigments) *only* when *recently burnt* and kept *thoroughly excluded from the air*, as by exposure, they lose *all* their valuable properties, and become absolutely *inert.*

CHARCOAL (Lardner's Prepared). *Charcoal*, (in very fine powder,) 1 *oz.; prepared chalk*, 3 *oz.;* mix. A good tooth-powder.

CHARGES (for Cattle). See *Veterinary Medicine.*

CHARRING (Surface). The operation by which the surface of wood is carbonized, to prevent its decay from exposure to air and moisture. *Stakes and piles* are generally thus treated before they are driven into the ground. *Casks* are charred on the inside by coopers when they are intended to hold water. In both these cases the fire is commonly applied directly to the wood. A *new method* has, however, been lately employed with apparent success. This consists in washing the wood with the *strongest oil of vitriol.* In this way, not only the outer surface, but the surface of all the cracks and holes, gets carbonized, which is not the case when heat is employed. It succeeds admirably with *musky casks* and *vats.*

CHASCHISCH. Syn. *Hadschy?* The common name, in the East, of all intoxicating compounds prepared from Indian hemp. See *Hemp* (Indian).

CHEESE. Syn. *Caseum, Caseus,*—Lat. The curd of milk compressed into a solid mass. That of commerce is usually salted and dried, and in some varieties, it is also coloured and flavoured.

The *process of cheese-making* is one which is eminently interesting and scientific, and which, in every gradation, depends on principles which chemistry has developed and illustrated. When a *vegetable* or *mineral acid* is added to *milk*, and heat applied, a coagulum is formed, which, when separated from the liquid portion, constitutes cheese. *Neutral salts, earthy* and *metallic salts, sugar*, and *gum Arabic*, as well as some other substances, also produce the same effect; but that which answers the purpose best, and which is almost exclusively used by dairy farmers, is *rennet*, or the mucous membrane of the last stomach of the calf. Alkalies dissolve this curd at a boiling heat, and acids again precipitate it. The solubility of cheese in milk is occasioned by the presence of alkaline phosphates and of free alkalies. In fresh milk these substances may be readily detected by the property it possesses of restoring the colour of reddened litmus paper. The addition of an acid neutralizes the alkali, and so precipitates the curd in an insoluble state.

"The acid indispensable to the coagulation of milk, is not *added* to the milk in the preparation of cheese, but it is *formed in the milk* at the expense of the milk-sugar present. A small quantity of *water* is left in contact with a small quantity of a *calf's stomach* for a few hours, or for a night; the water absorbs so minute a portion of the mucous membrane as to be scarcely ponderable; this is mixed with milk; its state of transformation is communicated, (and this is a most important circumstance,) *not to the cheese*, but *to the milk-sugar*, the elements of which transpose themselves into lactic acid, which neutralizes the alkali, and thus causes the separation of the cheese. By means of *litmus paper* the process may be followed and observed through all its stages; the alkaline reaction of the milk ceases as soon as the coagulation begins. If the cheese is not immediately separated from the whey, the formation of *lactic acid* continues, the fluid turns acid, and the cheese itself passes into a state of decomposition.

"When cheese-curd is kept in a cool place, a series of transformations take place, in consequence of which it assumes entirely new properties; it gradually becomes semi-transparent, and more or less soft throughout the whole mass; it exhibits a feebly acid reaction, and develops the characteristic caseous odour. Fresh cheese is very sparingly soluble in water, but after having been left to itself for two or three years, it becomes (especially if all the fat be previously removed) almost completely *soluble* *in cold water*, forming with it a solution, which, like milk, is coagulated by the addition of the acetic or mineral acids. The cheese, which whilst fresh is insoluble, returns during the maturation, or ripening, as it is called, to a state similar to that in which it originally existed in the milk. In those English, Dutch, and Swiss cheeses, which are nearly inodorous, and in the superior kinds of French cheese, the caseine of the milk is present in its unaltered state.

"The *odour* and *flavour of the cheese* is owing to the decomposition of the butter; the *non-volatile acids*, the *margaric*, and *oleic acids*, and the *volatile butyric acid*, *capric* and *caproic acids*, are liberated in consequence of the decomposition of glycerine, (the sweet principle of oils, or, as it might be termed, the sugar of oils.) *Butyric acid* imparts to cheese its characteristic caseous odour, and the differences in its pungency or aromatic flavour depend upon the proportion of *free* butyric, capric, and caproic acids present." In the cheese of certain dairies and districts, *valerianic acid* has been detected along with the other acids just referred to. Messrs. Jljenko and Laskowski found this acid in the cheese of Limbourg, and M. Bolard in that of Roquefort.

"The transition of the *insoluble* into *soluble caseine* depends upon the decomposition of the *phosphate of lime* by the *margaric acid* of the butter; *margarite of lime* is formed, whilst the *phosphoric acid* combines with the caseine, forming a compound soluble in water.

"The bad smell of inferior kinds of cheese, especially those called *meagre* or *poor cheeses*, is caused by certain *fetid products* containing *sulphur*, and which are formed by the decomposition or putrefaction of the caseine. The alteration which the butter undergoes, (that is, in becoming rancid,) or which occurs in the *milk-sugar* still present, being transmitted to the caseine, changes both the composition of the latter substance and its nutritive qualities.

"The principal conditions for the preparation of the superior kinds of cheese, (other obvious circumstances being of course duly regarded,) are *a careful removal of the whey, which holds the milk-sugar in solution, and a low temperature during the maturation or ripening of the cheese*." (Liebig.)

Cheese differs vastly in *quality* and *flavour*, according to the method employed in its manufacture, and the richness of the milk of which it is made. Much depends upon the quantity of cream it contains, and consequently when a superior quality of cheese is desired, cream is frequently added to the curd. This plan is adopted in the manufacture of *Stilton cheese* and others of a like description. The addition of *a pound* or *two of butter* to the *curd for a middling size cheese*, also vastly improves the quality of the product. To ensure the richness of the milk, not only should the cows be properly fed, but certain breeds chosen. Those cultivated in Alderney, Cheddar, Cheshire, Gloucestershire, Guernsey, and North Wiltshire, deserve a preference in this respect.

The *materials employed in making cheese* are milk and rennet. *Rennet* is the stomach of the calf, and is used either fresh, or salted and dried; generally in the latter state. The *milk* may be of any kind, according to the quality of the cheese required. *Cows' milk* is that generally employed; but occasionally *ewes' milk* is used; and sometimes, though more rarely, that from *goats*.

In *preparing his cheese*, the dairy farmer puts the greater portion of the *milk* into a large tub, to which he adds the remainder, sufficiently heated to raise the temperature to that of *new milk*. The whole is then whisked together, the *rennet* or *rennet liquor* added, and the tub covered over. It is now allowed to stand until completely "turned," when the *curd* is gently struck down several times with the skimming-dish, after which it is allowed to subside. The "vat" covered with cheese-cloth is next placed on a "horse" or "ladder" over the tub, and filled with curd by means of the skimmer, care being taken to allow as little as possible of the oily particles or butter to run back with the whey. The curd is pressed down with the hands, and more added as it sinks. This process is repeated until the curd rises to about 2 inches above the edge. The *newly-formed cheese*, thus partially separated from the whey, is now placed in a clean tub, and a proper quantity of *salt* added, as well as of *annotta*, when that *colouring* is used, after which a board is placed over and under it, and pressure applied for about 2 or 3 hours. The cheese is next turned out and surrounded by a fresh cheese-cloth, and then again submitted to pressure in the "cheese press" for 8 or 10 hours, after which it is commonly removed from the press, salted all over, and again pressed for 15 to 20 hours. The quality of the cheese especially depends on this part of the process, as if any of the whey is left in the cheese, it rapidly becomes bad-flavoured. Before placing it in the press the last time, the common practice is to pare the edges smooth and sightly. It now only remains to wash the outside of the cheese in *warm whey* or *water*, to wipe it dry, and to colour it with *annotta* or *reddle*, as is usually done.

The *storing of the newly-made cheese* is the next point that engages the attention of the maker and wholesale dealer. The same principles which influence the *maturation* or ripening of fermented liquors, also operate here. In England a *cool cellar*, neither *damp* nor *dry*, and which is *uninfluenced by changes of weather* or *season*, is commonly regarded as the best for the purpose. If possible, the temperature should on no account be permitted to exceed 50° or 52° Fahr. at any portion of the year. An average of about 45° is preferable when it can be procured. A place exposed to sudden changes of temperature is as *unfit for storing cheese* as it is for *storing beer.* "The quality of Rochefort cheese, which is prepared from sheep's milk, and is very excellent, depends exclusively upon the places where the cheeses are kept after pressing and during maturation. These are cellars, communicating with mountain grottoes and caverns, which are kept constantly cool, at about 41° to 42° Fahr., by currents of air from clefts in the mountains. The value of these cellars as storehouses varies with their property of maintaining an equable and low temperature. Giron mentions that a certain cellar, the construction of which had cost only 480*l.*, (12,000 francs,) was sold for 8,600*l.*, (215,000 francs,) being found to maintain a suitable temperature, a convincing proof of the importance attached to temperature in the preparation of these superior cheeses." (Liebig.)

It will thus be seen that very slight differences in the materials, in the preparation, or in storing of the cheese, materially influence the quality and flavour of this article. The *richness of the milk*,—the *addition to* or *subtraction of cream from the milk*,—the *separation of the curd from the whey with* or *without compression*,—the *salting of the curd*,—the *collection of the curd*, either *whole* or *broken*, before pressing,—the *addition of colouring matter*, as *annotto* or *saffron*, or of *flavouring*,—the *place* and *method of storing*,—and the *length of time allowed for maturation*, all tend to alter the taste and odour of the cheese, in some or other particular, and that in a way readily perceptible to the palate of the connoisseur. No other alimentary substance appears to be so seriously affected by slight variations in the quality of the materials from which it is made, or by such apparently trifling differences in the methods of preparing it.

Var. The varieties of cheese met with in commerce are very numerous, and differ greatly from each other in richness, colour, and flavour. These are commonly distinguished by names indicative of the places in which they have been manufactured, or of the quality of the materials from which they have been prepared. Thus, we have *Dutch*, *Gloucester*, *Stilton*, *skimmed-milk*, *raw-milk*, *cream*, and other *cheeses;* names which explain themselves. The following are the principal varieties met with in Europe:—

Brickbat cheese. (Wiltshire.) From its form; made in Wiltshire of new milk and cream.

Cheddar cheese. (Cheddar.) A fine spongy kind of cheese, the eyes or vesicles of which contain a rich oil; made up into round thick cheeses of considerable size, (150 to 200 *lb.*)

Cheshire cheese. (Cheshire.) From new milk, without skimming, the morning's milk being mixed with that of the preceding evening, previously warmed, so that the whole may be brought to the heat of new milk. To this the rennet is added, in less quantity than is commonly used for other kinds of cheese. On this point, much of the flavour and mildness of the cheese is said to depend. A piece of dried rennet, of the size of half-a-crown, put into a pint of water over night, and allowed to stand until the next morning, is sufficient for 18 or 20 gallons of milk. In large round thick cheeses (100 to 200 *lb.* each). They are generally solid, homogeneous, and dry, and friable rather than viscid.

Cottenham cheese. (Cottenham.) A species of cream cheese, superior to Stilton, from which it also differs in shape, being flatter and broader than the latter.

Cream cheese. From the "strippings," (the last of the milk drawn from the cow at each milking,) from a *mixture of milk and cream*, or from *raw cream* only, according to the quality desired. In small pieces, a gentle pressure only, (that of a 2 or 4 *lb.* weight,) being applied to press out the whey. After twelve hours, it is placed upon a board or wooden trencher, and turned every day, until dry. It ripens in about three weeks. A little *salt* is generally added, and frequently a *little powdered lump sugar.* In small squares.

Derbyshire Cheese. (Derbyshire.) A small white rich variety, very similar to Dunlop cheese.

Dunlop Cheese. (Dunlop, &c.) Rich,

white, and buttery; in round forms, weighing from 30 *lb.* to 60 *lb.*

Dutch Cheese. (Holland.) Of a globular form. 5 to 14 *lb.* each. Those from Edam are very highly salted; those from Gouda less so.

French cheese. The Roquefort and Neufchatel cheeses are those most esteemed.

German Cheese. *Westphalian* cheese derives its peculiar flavour from the curd being allowed to become partially putrid before being pressed. In small balls or rolls of about 1 *lb.* each.

Gloucester Cheese. (Gloucestershire.) *Single Glo'ster*; from milk, deprived of part of its cream; *Double Glo'ster*, from milk retaining the whole of the cream. Mild tasted, semi-buttery consistence, without being friable; in large round flattish forms.

Green or *Sage Cheese.* From milk mixed with the juice or an infusion or decoction of sage leaves, to which marygold flowers and parsley are frequently added.

Lincoln Cheese. (Lincolnshire.) From new milk and cream; in pieces about 2 inches thick; soft, and will not keep over 2 or 3 months.

Neufchatel Cheese. (Neufchatel.) The best of its kind manufactured in France; made of cream, and weigh about 5 or 6 *oz.*

Norfolk Cheese. (Norfolk.) Dyed yellow with annotto or saffron; good, but not superior; in cheeses of 30 *lb.* to 50 *lb.*

Parmesan Cheese. (Parma, &c.) From the curd of skimmed milk, hardened by a gentle heat. The rennet is added at about 120°, and an hour afterwards, the curd is set on a slow fire until heated to about 150° Fahr.; during which the curd separates in small lumps. A few pinches of saffron are then thrown in. In about a fortnight, the outer crust is cut off, and the new surface varnished with linseed oil, and one side coloured red.

Polish Cheese. (Poland.) Inferior.

Roquefort Cheese. (Roquefort.) From ewes' milk; the best prepared in France. It greatly resembles Stilton, but is scarcely of equal richness or quality, and possesses a peculiar pungency and flavour.

Russian Cheese. (Southern Russia.) Inferior, bad tasted, and dirty.

Slipcoat or *Soft Cheese.* A very rich white cheese, somewhat resembling butter; for present use only.

Stilton Cheese. (Stilton.) The richest and finest cheese made in England. From raw milk, to which cream taken from other milk is added; in cheeses generally twice as high as they are broad. Like wine, this cheese is vastly improved by age, and is therefore seldom eaten before it is 2 years old. A spurious appearance of age is sometimes given to it by placing it in a warm damp cellar, or by surrounding it with masses of fermenting straw, or dung.

Suffolk Cheese (Suffolk.) From skimmed milk; in round flat forms, from 24 *lb.* to 30 *lb.* each; resembles the *skimmed* or "*scald milk cheese*" of Devonshire.

Swiss Cheese. The principal cheeses made in Switzerland are the *Gruyère* or *Jura*, and the *Schabzieger* or *green cheese.* The latter is flavoured with melilot.

Wiltshire Cheese. (Wiltshire.) Resembles poor Cheshire or Glo'ster. The outside is generally painted with a mixture of of *ruddle* or *red ochre* and *whey.*

York Cheese. (Yorkshire.) From cream: it will not keep.

Qual., &c. Cheese has been objected to as an article of diet, but without sufficient reason, since it is, when of good quality, eminently nutritious, wholesome, and digestible. Like all other food, cheese digests more readily when well masticated, and the neglect of this precaution is one reason why it frequently disagrees with delicate stomachs. It is rendered more agreeable to many palates by toasting it, but becomes less digestible by that operation. The basis of cheese is *caseine* or *coagulated curd*, a proteine substance; it therefore cannot fail to prove nutritious, provided it is properly digested. *Cheese-curd*, carefully freed from water and milk by expression, and the addition of salt, is a *mixture* of *caseine* and *butter.* It contains *all* the *phosphate of lime*, and *part* of the *phosphate of soda* of the milk. (Liebig.) When taken as a condiment, especially when rich and old, it powerfully promotes the secretion of the saliva and gastric juice, and thereby aids the stomach in performing its proper functions. *Rotten cheese* is very *unwholesome.*

Concluding Remarks. It is surprising that cheese is not more frequently made an article of domestic manufacture, especially by housewives resident in the country. The operations of cheese-making are all exceedingly simple, and not laborious, and will, in most cases, amply repay the outlay for the milk. Besides, cheese is not unfrequently coloured with stains and pigments, which are injurious, and even poisonous, the risk of taking which is not encountered when it is made at home. Several persons have nearly lost their lives from eating cheese coloured with annotta, for instance. This substance, though harmless in itself, is frequently adulterated with *red-lead,* so that the cheesemaker may very innocently introduce a dreadful poison, when he only intends to improve the colour of his goods.

When a whole cheese is cut, and the consumption small, it is generally found to become unpleasantly dry, and to lose flavour before it is consumed. This is best prevented by cutting a sufficient quantity for a few days' consumption from the cheese, and keeping the remainder in a cool place, rather damp than dry, spreading a thin film of butter over the cut surface, and covering it with a cloth or pan, to keep off the dirt. This removes the objection existing in small families against purchasing a whole cheese at a time. The common practice of buying small quantities of cheese should be avoided, as not only a higher price is paid for any given quality, but there is little likelihood of obtaining exactly the same flavour twice running. Should cheese become too dry to be agreeable, it may be used for stewing, or for making *grated cheese* or *Welsh-rare-bits.*

CHEESE (Apple). The pomace or ground apples from the cider press.

CHEESE (Damson.) *Prep.* From *damsons* boiled with a *little water*, the pulp passed through a sieve, and then boiled with about *one fourth* the weight of *sugar*, until the mixture solidifies on cooling; it is next poured into small tin moulds previously dusted out with sugar. *Cherry cheese, gooseberry cheese, plum cheese, &c.*, are prepared in the same way, using the respective kinds of fruit. They are all very agreeable candies or confections.

CHEESE (Legumen). The Chinese prepare an actual cheese from peas, called "tao-foo," which they sell in the streets of Canton. The *paste from steeped ground peas* is boiled, which causes the starch to dissolve with the casein; after straining the liquid, it is coagulated by a *solution of gypsum;* this *coagulum* is worked up like sour milk, salted, and pressed into moulds.

CHEESE (Roquefort—Factitious.) *Prep.* (Roulle.) The *gluten of wheat* is kneaded with a *little salt*, and a *small portion* of a *solution of starch*, and made up into cheeses. It is said that this mixture soon acquires the taste, smell, and unctuosity of cheese, and when kept a certain time, is not to be distinguished from the celebrated *Roquefort cheese*, of which it possesses all the peculiar pungency. By slightly varying the process, other kinds of cheese may be imitated.

CHEESE (Toasted). This much relished article is seldom well prepared. The following has been handed to us by the cook of a certain nobleman who prides himself on his gustful appetite:—Cut the *cheese* into slices of moderate thickness, and put them into a tinned copper saucepan, with a *little butter* and *cream ;* simmer *very gently* until they are quite dissolved, then remove the saucepan from the fire, allow the whole to cool a little, add some *yelk of egg*, well beaten, add *spice*, make the compound into a "shape," and brown it before the fire.

CHELIDONIC ACID. From the *chelidonium majus* or *great celandine*, in which it exists combined with lime, and associated with malic and fumaric acid. It forms slender, colourless needles, very soluble in water; is bibasic, and when exposed to a high temperature, is converted in *Pyrochelidonic acid.* It forms three classes of salts (*chelidonates*) with the bases.

CHELSEA PENSIONER. *Prep.* From *gum guaiacum*, ¼ *oz.; rhubarb*, ½ *oz.; cream of tartar*, 2 *oz.; flowers of sulphur*, 4 *oz.; nutmegs*, 2 in number; (all in powder;) *honey*, 1½ *lb.*, or q. s.; made into an electuary by beating them together in a mortar. *Dose.* One to two tablespoonfuls, night and morning, in gout and chronic rheumatism. The name is said to have been given to it from the circumstance of a Chelsea pensioner having cured Lord Amherst with it.

CHELTENHAM SALTS. See *Salts.*

CHEMIQUE. See *Chemic Blue.*

CHEROOTS. *Genuine cheroots* are a species of cigar imported from Manilla, in the Philippine Islands, and are distinguished by extreme simplicity of construction, as well as delicacy of flavour. Those now so commonly sold under the name in England, are, for the most part, made of *inferior* or *damaged tobacco* and *lettuce leaves*, (chiefly the latter,) further sophisticated by the addition of *treacle, colouring matter, saltpetre, common salt*, and other similar articles.

CHERRIES are the fruit of different species of the genus *cerasus* and the natural order *rosaceæ.* They are regarded as wholesome, cooling, nutritive, laxative, and antiscorbutic. In eating them, care should be taken to avoid swallowing the stones. Brandy flavoured with this fruit or its juice, is known as *cherry-brandy.* Morella cherries preserved in brandy are called *brandy cherries.* See *Brandy, Fruit, &c.*

CHERRY LAUREL. The *prunus laurocerasus*, (Linn.) *Leaves*, occasionally used instead of bay leaves in cookery. The *distilled oil* and *distilled water* are both POISONOUS.

CHICA. The red colouring matter deposited by a decoction of the leaves of *bignonia chica* in cooling. *Used* by the American Indians to stain their skin. It is soluble in alcohol, ether, oil, fat, and alkaline lyes, and slightly so in boiling water.

CHICORY, or *wild succory*, is the *chicorium intybus* of Linnæus, a plant of the natural order *compositæ.*

The *fresh root of chicory* (*radix chicorii recens*) is reputed to be alterative, attenuant, diuretic, febrifuge, hepatic, resolvent, and tonic; and in large doses, aperient. It is now seldom used in medicine, although it appears to possess similar qualities and equal activity to those of dandelion. "An infusion of the root, mixed with syrup, becomes thick; forming the *gomme saccho-chicorine* of Lacarterie." (Fee.)

The *roasted root* is prepared by cutting the full-grown root into dice, and exposing it to heat in iron cylinders, along with about 1½ or 2% of *lard*, in a similar way to that adopted for coffee. When ground to powder in a mill, it constitutes the *chicory* of the grocers, (*chicory coffee, succory do.; radix chicorii torrefacta, r. c. t. contrita;*) so generally employed both as a substitute for coffee, and as an adulterant of that article. The addition of 1 part of *good fresh-roasted chicory* to 10 or 12 parts of *coffee*, forms a mixture which yields a beverage of a richer and fuller flavour, and of a deeper colour, than that furnished by an equal quantity of pure or unmixed coffee. In this way a less quantity of coffee may be used, and consequently a proportionate saving in its consumption may be effected. The use, however, of a larger proportion of chicory with coffee than that just named, imparts to the beverage an insipid flavour, intermediate between that of treacle and liquorice; whilst the continual use of roasted chicory, or highly chicorized coffee, seldom fails to weaken the powers of digestion and derange the bowels. Many of the worst cases of dyspepsia we have ever met with, have occurred in persons who have been heavy drinkers of adulterated coffee. "There can be no doubt that roasted chicory must, when taken largely, have a tendency to excite diarrhœa." (Pereira.)

Pur., &c. The ground chicory of the shops, like ground coffee, is almost universally adulterated. Pigments are added to it to *colour* it, and various vegetable substances to lessen its value. The following articles have been reported to have been detected in roasted chicory, or to have been known to be used to adulterate it:—*Venetian red, reddle,* and *red clay; roasted acorns, beans, carrots, damaged dog-biscuits, damaged bread, damaged wheat, horse chesnuts, mangel wurzel, parsnips, peas, rye,* and *sugar; coffee flights* (coffee husks), *coffina* (roasted lupins), *Hambro' powder* (roasted peas coloured with reddle), and the *marc of coffee; exhausted bark* (from the tan yards), *logwood dust, mahogany dust, &c.* It has also been asserted that the *scorched livers of bullocks, horses, and dogs,* have been applied to the same purpose; but of this there is not sufficient evidence. The only way to avoid being thus cheated or poisoned, is to buy the chicory *whole,* and to grind it at home.

Roasted chicory is highly hygrometric or absorbent of moisture, and should, therefore, be always kept in close vessels, (bottles or canisters,) the same as coffee. If the lumps become tough or soft, or the powder cakes together, it is unfit for use; but in some cases it may be recovered, by exposing it on a plate in an oven until it again becomes perfectly dry or brittle.

Tests.—1. Powdered chicory thrown on water turns it reddish-brown, and rapidly sinks, leaving light impurities either floating or diffused through the liquid.—2. The cold decoction tested with tincture, or solution of iodine, gives a brown colour; if it turns purple, blue, or black, it indicates the presence of roasted peas, beans, rye, or some other like substance, containing starch.—3. Persulphate or sesqui-chloride of iron, added in the same way, should not materially affect the liquid; if it turns it bluish or blackish, it indicates the presence of roasted acorns, oak-bark tan, or some other substance containing tannin.—4. Water soured with vinegar, digested on the powder, should not be blackened, or even materially darkened, by tincture of galls or a solution of red prussiate of potash; the contrary shows the presence of ferrugineous colouring matter.—5. The dry powder, when incinerated, should not leave more than 4½ to 5% of ash, which should be of a grayish or fawn colour; the contrary indicates the presence of reddle, red clay, ochre, or the like.—6. To the above may be added attention to the odour, colour, and appearance both to the naked eye and under the microscope; by the latter, adulteration may be easily detected. See *Coffee.*

CHILBLAIN. Syn. *Pernio,*—Lat. An inflammatory swelling, of a purple or lead colour, produced by the action of cold. Chilblains (*perniones*) exclusively attack the extremities of the body, and are generally confined to the fingers, toes, and heels. The *common symptoms* are itching and irritation, more or less intense, often accompanied with shooting pains, and tenderness, and tumefaction of the parts. Children, especially those of a scrofulous habit, and elderly persons, are generally the most liable to chilblains. The *common cause of chilblains* is holding the hands or feet to the fire after exposure to cold. The sudden change of temperature partially destroys the vitality of the minute surfacial vessels, and thus prevents the proper flow of blood through the part. The best *preventives of chilblains* are woollen socks or stockings, good waterproof shoes, woollen gloves, exercise, and friction. These act by promoting the circulation of the blood in the extremities, and protecting them from vicissitudes of temperature. *When chilblains have once formed,* the *best treatment* is friction with stimulants, as, spirits of wine and camphor, oil of turpentine, opodeldoc, dilute spirits, camphorated oil, hartshorn and oil, &c. Linnæus recommends bathing the part with dilute muriatic acid, just strong enough to faintly prick the skin. When the inflamed parts have ulcerated, they are commonly called *kibes.* In this state they should be dressed with a little resin cerate, or elemi ointment. If *fungous granulations* appear, they must be removed by touching them with nitrate of silver or blue vitriol. See *Chaps, &c.*

The following *remedies for chilblains* have been strongly recommended by different parties, and may all prove useful in their turns, as circumstances and convenience may suggest:—

1. *Sulphate of copper,* 1 oz.; *rosemary water,* 1 pint; dissolve.

2. *Sal ammoniac,* 1 oz.; *vinegar,* ½ pint.

3. *Sal ammoniac,* 1 oz.; *rum,* ½ pint; *camphor,* 1 dr. The affected part is wetted with the above night and morning, and when dry, is touched with a little simple ointment, cold cream, or pomatum.

4. *Soap liniment,* 2 oz.; *tincture of cantharides,* 1 oz.; *oil of cajeput,* 2 dr.

5. *Oil of turpentine,* 2 oz.; *camphor,* 3 dr.; *oil of cajeput,* 1 dr. The application of the last two is accompanied by gentle friction.

6. (Dr. Graves' Preventive.) *Sulphate of copper,* 20 gr.; *water,* 1 oz. As the first three.

7. (Lejeune's Balsam.) See *Chilblain Balsam.*

8. (Linnæus' remedy.) *Hydrochloric acid,* 1 oz.; *water,* 11 oz. As No. 3.

9. (Morton's Liniment.) *Calomel* and *camphor,* of each, 1 dr.; *spermaceti ointment,* 4 dr.; *oil of turpentine* and *cocoanut oil,* of each, 2 dr. As No. 5.

10. (*Russian remedy.*) The *rind* of perfectly ripe cucumbers, dried with the soft parts attached. For *use,* they are placed with the inner side, previously soaked in warm water, over the sore parts. (Med. Zeitung.)

11. (Swediaur's Paste.) *Bitter Almonds* 8 oz.; *honey,* 6 oz.; *powdered camphor* and *flour of mustard,* of each, ½ oz.; *burnt alum* and *olibanum,* of each, ¼ oz.; *yelks of* 3 *eggs;* beat to a paste. To be applied night and morning.

12. (Vance's Cream.) *Ointment of nitrate of mercury,* 1 oz.; *camphor,* 1 dr.; *oil of turpentine,* 2 dr.; *oil of olives,* 4 dr.; mix well together. To be applied, by gentle friction, 2 or 3 times daily. All the preceding preparations are intended for chilblains before they break. The *liniments of ammonia, camphor, opium, soap,* and *turpentine,* as well as the *compound camphor liniment* of the London Pharmacopœia, are also excellent preparations for the same purposes.

13. (Wahler's Ointment.) *Black oxide of iron, bole,* and *oil of turpentine,* of each, 1 dr.; *resin cerate,* 1 oz. For broken chilblains. We have found a mixture of equal parts of *calamine cerate* and *resin cerate* answer quite as well.

CHILDREN (Care of). See *Infancy, &c.*

CHILDREN (Diseases of). See the respective heads, and *Diseases.*

CHILLIES. See *Peppers.*

CHIMNEYS were not introduced into England until the reign of Queen Elizabeth, and for a considerable period, the principles of their construction were ill-understood. When the air inside and outside a chimney is at the same temperature, an equilibrium exists; there is no draught in the chimney, because the downward tendency of that within is counteracted by the upward pressure of that without. Let a fire be kindled in the grate; hot air is evolved, the chimney is heated, the air it contains suffers expansion, and a portion is expelled. The chimney now contains a smaller weight of air than it did before; the external and internal columns no longer equibalance each other, the warmer and lighter air is forced upwards from below, and its place is occupied by cold, and consequently heavier air. If the fire continues to burn, and the chimney retains its temperature, this second portion of air is disposed of like the first, and the ascending current continues, so long as the sides of the chimney are hotter than the surrounding air. Should the reverse happen to be the case, as sometimes occurs from sudden atmospheric changes, the column of air within the chimney rapidly contracts in volume, the deficiency is filled up from without, the column of air becomes heavier than one of a corresponding height on the outside of it, or in the apartment, and, obeying the common laws of gravitation, it falls out of the throat of the chimney or fire-place, just as a heavy body sinks in water, and has its place occupied by air from above. In this way, a descending current, of more or less intensity and duration is established, and, if there is a fire in the grate, the chimney "smokes," or, if the grate is empty, perhaps the smoke from neighbouring chimneys finds its way into our apartments. By the judicious arrangement of the *fire-place*, and the *throat* and *flue* of a chimney, an upward current may be constantly ensured so long as there is a fire in the grate, or the air of the apartment is warmer than the external atmosphere.

Count Romford was the first who scientifically investigated the construction of chimneys. He showed that more heat is obtained from the fire by reflection when the "covings" are placed in an oblique position. He also directed that the fire itself should be kept as near to the hearth as possible, and that the "throat" of the chimney should be constructed much narrower than was then the practice, in order to prevent the escape of so much heated air as happened with "wide throats." By contracting the open part of the fire-place immediately over the fire, as by lessening the width of the hobs, or by bringing the "throat of the chimney" closer to the fire, and by contracting the "throat of the chimney" itself, within certain limits, any desired amount of draught may be obtained. When the space above the fuel is too small, the "throat" too near the burning fuel, or the throat itself too contracted, the draught of a common chimney is often too strong, and much fuel and heat is wasted. When the reverse is the case, the draught is commonly too languid, the fire "draws badly," a portion of the smoke escapes into the room, and all the usual annoyances of a "*smoky chimney*" are suffered. By a proper attention to these conditions, a common fire-place may be adapted for the combustion of *bituminous* or "*easy-burning coal*," or of *anthracite*, and those varieties of coal, that require a considerable "draught." It may even be converted into a wind-furnace; whilst the inconvenience of *smoky chimneys* may be always avoided, and when existing, easily "cured." This is presuming, however, that a sufficient supply of air exists in front of the fire-place (*i.e.*, in the apartment), not only for the combustion of the fuel, but also for the upward current of the chimney. Many chimneys smoke simply from the apartment being so ill-ventilated that the supply here alluded to is not provided. One of the fire-places at our chambers once smoked most obstinately, notwithstanding all the efforts of the *smoke-doctors* to prevent it. It was during the cold weather when doors and windows are generally kept shut as close as possible. At last, in a fit of desperation, we caught up the poker and thrust it through an upper pane in one of the windows. The effect was magical. The *smoky chimney* immediately "drawed" excellently. The broken pane was replaced by one of perforated glass, and no further annoyance was experienced.

It may be further stated, as a rule, that the *greater the length* of a chimney, the *stronger will be the draught*. Hence, the chimneys of the upper rooms of a house often smoke, whilst the fires in the rooms beneath them burn pleasantly and vigorously. Such cases are commonly relieved by a chimney-pot or cowl, of which numerous varieties are now before the public. The more *crooked* or *tortuous* the course of a chimney, the less likely is it to be affected by eddies and gusts of wind from neighbouring buildings or hills.

Before the publication of the investigation of Count Rumford on this subject, smoky chimneys were very common; they are now comparatively rare. See *Fires*, *Smoke*, *&c.*

CHINA. In the purchase of *china*, *glass*, and *earthenware*, care should be taken to select those patterns which, in case of breakage, can be the most readily matched. Peculiar or rare patterns should be avoided, for if any such be broken, it will generally be found very difficult and expensive, and frequently impossible, to replace them.

China, *glass*, and *earthenware*, when very dirty, are *best cleaned* with finely-powdered fuller's earth and warm water, followed by rinsing in clean water. A little clean soft soap may be added to the water instead of fuller's earth. See *Packing*, *&c.*

CHINOIDINE. See *Quinoidine.*

CHINOLEINE. Syn. *Chinoiline*, *Leucoline.* An oily liquid obtained by distilling *quinine* with a strong *solution of caustic potassa.* It is colourless; strongly basic; slightly soluble in water; freely so in alcohol, ether, and volatile oils; reaction neutral; boils at 460° Fahr.; sp. gr. 1·081. It greatly resembles aniline, but is less volatile. With the acids it forms salts which are generally crystallized with difficulty.

CHINONE. Obtained by distilling

kinate or *cinchonate of potassa* along with *black oxide of manganese* and *sulphuric acid.* It forms golden-coloured crystals, which are soluble in water, volatile, and possess a very peculiar and characteristic odour.

CHIRAYITINE (Sulphate of). The substance sold under this name is sulphate of quinine. The *ophelia chirata*, *chiretta*, or *charayita* yields no alkaloid, but merely a bitter matter.

CHITINE. This name has been given to the hard insoluble matter forming the shells and elytra of insects.

CHITTICK'S REMEDY. Dr. Chittick's remedy for stone consisted of a *fixed alkali* administered in *veal broth.* (Paris.)

CHLORACETIC ACID. *Prep.* A little *concentrated acetic acid* (glacial) is introduced into a bottle of *dry chlorine*, and the whole exposed in the sunshine for several hours. The white crystalline matter which forms on the glass is dissolved out with the smallest possible quantity of *water*, and the solution added to the *liquid decanted from the bottle;* the whole is now placed under the air-pump, over capsules containing (separately), fragments of dry *caustic potassa* and *strong sulphuric acid;* at first, crystals of oxalic acid are deposited, and afterwards, *chloracetic acid*, in beautiful rhombic crystals; the latter are drained and pressed in bibulous paper, and dried *in vacuo*, as before.

Prop., &c. Colourless; deliquescent; odorous; acrid; bleaches; powerfully acid; melts at 115°; boils at 390° Fahr., and volatilizes unchanged; vapour highly irritating; the liquid acid destroys the cuticle; with the bases it forms salts (*chloracetates*) greatly resembling the common acetates. *Chloracetate of potassa* occurs as fibrous silky needles, permanent in the air. *Chloracetate of ammonia* and *chloracetate of soda* are both crystallizable and neutral. *Chloracetate of silver* forms small grayish scales, which are soluble, and easily altered by the light.

CHLORAL. Syn. *Bichlorinetted Aldehyde.* A peculiar liquid first obtained by Liebig, by the action of chlorine on alcohol.

Prep. (Liebig.) *Anhydrous alcohol* is placed in a tubulated retort, and *dry chlorine gas* passed through it, at first in the cold, but afterwards with the application of a gentle heat, until the chlorine passes undecomposed through the liquor on raising it to the boiling temperature; on cooling, the whole forms a crystalline mass of *hydrated chloral;* this is melted by a gentle heat, and agitated with three times its volume of *oil of vitriol;* on increasing the heat a little, an oily stratum of *impure chloral* rises to the surface. It is purified by boiling it for some time, (to drive off free hydrochloric acid and alcohol,) next distilling it with an equal volume of *oil of vitriol;* and lastly, rectifying it from some *powdered quicklime*, the process being stopped as soon as the surface of the lime becomes dry.

Prop., &c. Chloral is an oily liquid, possessing an ethereal smell; it is soluble in alcohol, ether, and water; with a small quantity of the latter it rapidly changes into a semi-solid crystalline mass (*hydrate of chloral,*) which is soluble in a larger quantity of water; boils at 202°; sp. gr. 1·502. It is decomposed by the caustic earths and alkalies. By age it is converted into a white, solid, translucent substance (*insoluble chloral*) which is reconverted by heat and by sulphuric acid into ordinary chloral.

Obs. In operating as above, the chlorine is most conveniently introduced by a tube inserted into the tubulature of the retort, and a long tube, bent upwards, should be connected with the beak to convey away the hydrochloric acid gas extricated, and to allow the volatilized alcohol and chloral to condense, and flow back into the retort.

CHLORANILE. Syn. *Tetrachlorokinone.* One of the products of the decomposition of *indigo.*

CHLORANILINE, and *Bichloraniline.* Substances obtained by distilling *chlorisatin* and *bichlorisatin* with *highly concentrated solution of caustic potassa.* The *first* forms large, colourless octahedrons; tastes and smells of aniline; is very volatile and fusible; neutral; distils unaltered; and forms salts with the acids remarkable for the extreme beauty of their crystals. By treating *aniline* with *chlorine gas*, a volatile, crystalline, non-basic compound is formed, to which the name of *trichloraniline* has been given.

CHLORATE. Syn. *Chloras*,—Lat. *Hyperoxymuriate*, *Hyperoxymurias*,—Obs. A compound of chloric acid with a base. The chlorates are very similar to the nitrates both in their general properties and composition. They are all decomposed at a red heat, metallic chlorides being formed, and oxygen gas given off. Like the nitrates, they deflagrate with inflammable subtances, but with greater facility and violence. A mixture of this kind will detonate with a slight blow or friction. All the chlorates are soluble in water.

Tests.—1. A mixture of a chlorate with sulphur, phosphorus, cyanide of potassium, prussiate of potash, or red sulphuret of arsenic, detonates with violence both by friction and percussion, and when moistened with concentrated sulphuric acid.—2. Mixed with hydrochloric acid and then with water, a liquid is formed which bleaches vegetable colours.—3. When heated they evolve oxygen.—4. Thrown on red-hot coals they deflagrate like saltpetre.—5. Concentrated sulphuric acid, in the cold, turns them of an orange colour, whilst a greenish-coloured gas is evolved.—6. A solution of a chlorate coloured light blue with indigo, is instantly decoloured by adding a few drops of a solution of sulphurous acid in water.—7. Neither nitrate of silver nor nitrate of baryta disturb their solutions. Owing to the violence with which the above reactions take place, the experiments should be made with minute quantities only.

Estim. (M. Choron.) *Protoxide of lead,* heated with *chlorate of potassa,* in a glass tube closed at one end, gives puce oxide of lead (Pb. O^2), mixed with a small quantity of minium. On this reaction is founded the new test for the chlorates. This consists in slowly heating to fusion an intimate *mixture of the chlorate* and *litharge,* in suitable proportion, covering it with a layer of *chloride of sodium;* in treating the fused mass with *dilute nitric acid*; then in collecting on a filter the puce oxide obtained, by aid of which the quantity of chlorate employed may be approximately calculated.

CHLORETHERAL. A substance accidently formed by M. d'Arcet in the preparation of Dutch liquid. Little is known about it.

CHLORHYDRIC ACID. See *Hydrochloric Acid.*

CHLORIC ACID. Syn. *Acidum Chloricum,*—Lat. *Hyperoxymuriatic Acid, Acidum Hyperoxymuriaticum,*—Obs. An acid compound of chlorine and oxygen, discovered by Chenevix, but first obtained in a separate form by Gay-Lussac.

Prep. 1. *Chlorate of baryta* is dissolved in 16 times its weight of *water;* and *dilute sulphuric acid* added until all the baryta is precipitated; the clear liquid is then concentrated by evaporation until it acquires a yellow oily consistence.

2. *Chlorate of potassa* is boiled with a *solution of hydrofluosilicic acid,* until insoluble hydrofluosilicate of potassa ceases to be formed; when the clear liquid is decanted and digested with a little *silica,* to remove excess of hydrofluosilicic acid; lastly, it is evaporated as before. Filtration through paper or other organic matter must be avoided.

Prop., &c. Liquid; yellowish; smells like nitric acid; sets fire to paper and other dry organic matter. Heat resolves it into chlorine and oxygen. It may be readily detected by neutralizing it with soda or potassa, and then applying the tests for chlorates. (See *above.*)

CHLORIDE. Syn. *Chloruret; Chloridum, Chloruretum,*—Lat. A compound of a chloride and a base. The principal commercial chlorides are those of *ammonium* (sal ammoniac), *antimony* (butter of antimony), *barium* (hydrochlorate of baryta), *calcium* (hydrochlorate of lime), *gold* (terchloride), *mercury* (calomel and corrosive sublimate), *tin* (dyer's spirits), and *zinc* (disinfecting solution of zinc).

Prep. The majority of the chlorides may be made by simply dissolving the *base* or its *carbonate, oxide,* or *hydrate,* in *hydrochloric acid* (previously diluted with about twice its weight of *water*), and evaporating and crystallizing the solution, in the usual manner. A few are prepared by the direct action of *chlorine* on the *bases.* In the crystalline form they frequently contain combined water, in which case they may be regarded either as *chlorides* or *hydrochlorates.* By depriving them of this water by heat, or in any other manner, they can be no longer called by the latter name. See the *respective bases.*

Char., &c.—1. With the exception of those of lead, silver, and mercury (*calomel*) the neutral chlorides are *soluble* in water.—2. Most of them are colourless.—3. Some are volatile, as those of ammonia, mercury, antimony, &c.—4. Heated with a little *peroxide of manganese* and *sulphuric acid,* chlorine is evolved.—5. A mixture of a *chloride* and *chromate of potassa,* treated with *oil of vitriol* in a tubulated retort, at a gentle heat, evolves a deep brownish-red gas, (*chromate of perchloride of chromium,*) which condenses into a fluid of the same colour in the receiver. This liquid mixed with *ammonia,* in excess, assumes a yellow colour, which is changed to a reddish yellow on the addition of an acid.—6. The *soluble chlorides* may be readily detected by their solutions, slightly acidulated with nitric acid, giving a white curdy precipitate with a solution of nitrate of silver, (*chloride of silver,*) insoluble in nitric acid, freely soluble in liquor of ammonia, and blackened by the light.—7. The *insoluble chlorides* may be tested by digesting them in a little liquor of potassa, when a solution of chloride of potassium will be formed, which may be treated as a liquid chloride; or the chloride may be dissolved in nitric acid, and tested with nitrate of silver as before. See *Chlorine.*

CHLORIDE OF LIME. See *Lime.*

CHLORIDE OF ZINC. Syn. *Butter of Zinc, Hydrochlorate of do., Muriate of do.; Zinci Chloridum, Z. Hydrochloras, Z. Murias, &c.,*—Lat. *Prep.* 1. By heating *metallic zinc* in *chlorine.*

2. By distilling a mixture of *zinc filings* and *corrosive sublimate,* equal parts; as in the preparation of chloride of antimony.

3. (*Zinci Chloridum,*—Ph. L.) *Hydrochloric acid,* 1 pint; *water,* 1 quart; add *zinc* (in small pieces), 7 oz.; when the effervescence is nearly finished, apply heat until bubbles cease to be evolved; decant the clear, and evaporate to dryness; fuse the resulting mass in a lightly covered crucible, by a red heat, pour it out on a flat smooth stone, and when cold, break it into small pieces, and preserve it in a well-stoppered bottle.

4. (Ph. Bor., 1847.) *Hydrochloric acid* (sp. gr. 1·120), 5 oz.; *hydrated carbonate of zinc,* 2 oz., or q. s. to saturate; filter through powdered glass, evaporate, with constant stirring, to dryness, reduce the mass, still warm, to powder, and at once bottle, as before.

5. (Righini.) *Solution of chloride of barium,* any quantity; add *solution of sulphate of zinc* as long as a precipitate falls; filter, evaporate, and crystallize; preserve the crystals as before.

6. (*Liquor Zinci Chloridi,* — Ph. D.) *Hydrochloric acid* and *water,* of each, 2½ pints; *sheet zinc,* 1 *lb.;* dissolve, filter through calico, add of *chlorinated solution of lime,* 1 *fl. oz.,* and evaporate, by boiling, to a pint; when cold, pour it into a bottle, add of *prepared chalk,* 1 oz., and *water,* q. s. to make the whole measure 1 quart; agitate occasionally for 24 hours, decant or filter, and preserve the liquid in a stoppered bottle. Sp. gr., 1·593.

7. (E. Parrish.) *Granulated zinc,* 4 *lb.; hydrochloric acid,* 4 *lb.,* or q. s.; *water,* 9 quarts; dissolve, avoiding excess of acid. The solution contains 1 in 12 of chloride of zinc. Recommended as of the proper strength for a disinfectant.

Prop., &c. When pure, a colourless, amorphous mass or crystals; generally a whitish-gray semi-transparent mass, having the consistence of wax; fusible; volatile at a strong heat, condensing in acicular crystals; freely soluble in alcohol, ether, and water; highly deliquescent; coagulates albumen and gelatin, and corrodes animal substances. The solution possesses the same properties in a minor degree.

Pur. "From the aqueous solution, hydrosulphuric acid or ferrocyanide of potassium being dropped in, a precipitate is thrown down. What is thrown down by ammonia or potassa from the same solution is white, and is *redissolved* by either precipitant in excess. The precipitate thrown down by the *carbonate* of either ammonia or potassa, is (also) white, but is not redissolved when these are added in excess." (Ph. L.)

Ant. See *Zinc.*

Uses, &c. Dry chloride of zinc is chiefly used as a caustic, for which it is highly recommended by Voght, Canquoin, and others. It is more powerful than chloride of antimony, and its action extends deeper than does nitrate of silver, whilst it exercises an influence over the vital actions of neighbouring parts. The sore is generally healthy after the separation of the eschar, and no constitutional disorder ensues. (See *Canquoin's caustic.*) It has been given in scrofula, epilepsy, chorea, &c.; and combined with hydrocyanic acid, in facial neuralgia. *Dose.* ½ gr. to 2 gr.; *externally,* as a lotion, 2 to 3 gr. to water, 1 oz. In large doses it is poisonous.

The *liquid chloride* is also used as a caustic, but chiefly as a *disinfectant* and *deodorizer,* of which it is one of the very best; possessing, as it does, the power of rapidly decomposing *hydrosulphuret of ammonia* and the organic matter of miasmata which convey disease. In the recent sudden outbreak of cholera in this metropolis, we had several opportunities of seeing the efficacy of chloride of zinc as a disinfectant fully tested and demonstrated. In streets where the inhabitants were more than decimated by this awful pestilence, cases occurred of parties passing unscathed through the distressing ordeal of close proximity to the dying and the dead, not merely in the same house, but, in some cases, even in the same rooms, in which the immunity they enjoyed from cholera was solely attributable to the liberal use of this solution of chloride of zinc. Over chloride of lime it possesses the advantage of being nearly odourless, and when newly prepared, exerting little or no action on steel knives and other instruments; whereas, the former not merely affects respiration, but decolours and rusts everything within its reach. Its use as *antiseptic* in the preservation of timber, and other organic substances, is well known.

After a description of the peculiar value of this chloride as a *disinfectant* and *deodorizer,* it is only proper, in a matter so intimately connected with hygiène, that the public should be cautioned against purchasing either a spurious or an inferior article, which would inevitably lead to disappointment, and fail to destroy the morbific matter, on which the progress of pestilential diseases, and cholera more particularly, depends. The solution of chloride of zinc manufactured by Mr. Gray, under the name of "*Crew's Disinfecting Fluid*," we can most unreservedly recommend, as being what its maker asserts, "the cheapest" and "the strongest" offered to the public. The sample before us has the specific gravity 1·616, which represents 53·78 per cent. of real chloride of zinc. In this concentrated form it may be diluted with *fully* 200 *times its bulk of water* before use; an advantage which, as regards portability and economy in transit, cannot be too highly appreciated. A great deal of the chloride of zinc of the shops scarcely deserves the name. See *Disinfectants*, *Zinc*, *&c.*

CHLORINE. Syn. *Chlorinium*,— Lat. *Oxymuriatic Acid*, *Oxygenized do.*, *Dephlogisticated Marine do.*, *Acidum Oxymuriaticum*, *&c.*,—Obs. An elementary substance discovered by Scheele in 1774, and at first supposed to be a compound body. In 1809, MM. Gay-Lussac and Thènard suggested the probability of it being a simple substance; but it was reserved for Sir H. Davy, shortly afterwards, to demonstrate the truth of the suggestion of these foreign chemists.

Prep. 1. Strong *hydrochloric acid* is poured on half of its weight of *finely-powdered peroxide of manganese*, previously placed in a glass flask or retort; chlorine gas is immediately evolved even in the cold, but much more rapidly on the application of a gentle heat, and is collected in *clean dry bottles* by displacement. The tube conducting the gas is so arranged as to reach to the bottom of the bottle, and the chlorine, being heavier than the air, displaces the latter without mixing with it. The bottle is known to be full by the gas, easily perceived by its green colour, overflowing the top of the vessel. The bottle is then closed up with an accurately-fitting stopper, previously greased, and an empty one put in its place, which is subsequently treated in like manner. To free the gas entirely from *hydrochloric acid*, it is passed through *water;* and to render it quite *dry*, it is passed over *fused chloride of calcium.* When the presence of moisture is no object, chlorine may be collected over a saturated solution of common salt in the pneumatic trough.

2. *Hydrochloric acid*, diluted with an equal weight of *water*, is poured upon half its weight of *chloride of lime*, and the gas collected as before. The above are the processes commonly adopted for small experiments in the laboratory.

3. (Commercial.) *Oil of vitriol* diluted with *water*, q. s., is poured upon a mixture of *common salt* and *binoxide of manganese*, previously placed in a retort. The proportions ordered by different authorities vary; the following are the principal:—

Brand .	3 *manganese*	8 *salt*	4 *water*	5 *sulphuric acid.*
Graham .	6 ,,	8 ,,	as much dilute acid as contains	13 *of oil of vitriol.*
Liebig .	1 ,,	3 ,,	2 *water*	2 *sulphuric acid.*
Thènard.	2 ,,	3 ,,	4 ,,	4 ,,
Ure . .	2 ,,	3 ,,	2 ,,	2 ,,

4. (Tennant Dunlop.) From *common salt*, *nitrate of soda* (or *nitric acid*), and *oil of vitriol*, in suitable proportions, heated together; chlorine, oxide of azote, and hydrochloric acid are evolved, and the mixed gases passed through a condenser charged with *sulphuric acid* of sufficient strength to absorb the oxide of azote, after which the chlorine and hydrochloric acid are separated by passing the mixed gases through water. The separated products are *chlorine*, *hydrochloric acid*, and *nitrous sulphuric acid.* The oxide of azote is separated from the last by the addition of *water* and heat, and when disengaged, the gas is caused to traverse a condenser with a sufficient quantity of *air* and *steam* to transform it into *nitric acid.* In this way both the same nitric and sulphuric acid (for the condenser) may be used over and over again, with scarcely any loss. (Patent dated 1847.)

5. (Julius Seybel.) Under this patent, sulphate of soda and chlorine are formed by one operation. *Common salt* is decomposed by *sulphuric acid*, in closed vessels of lead, or lined with lead, heat being applied externally; and the hydrochloric acid vapour thus formed is made to act on manganese immersed in water, such vapour being conducted below and permitted to escape upwards through the water and manganese.

Prop., *&c.* Chlorine is a gaseous substance, possessing a yellowish green colour, a pungent suffocating odour, and an astringent taste; water at 60° Fahr. absorbs about twice its volume; the solution (*chlorine* *water*) is gradually converted into hydrochloric acid by the action of the light; sp. gr. 2·47; 100 cubic inches weigh 76·6 (76½) gr.; phosphorus, copper leaf, powdered antimony and arsenic, and several other substances thrown into chlorine immediately inflame. Under a pressure of 4 atmospheres, it is condensed into a yellow limpid liquid; moist chlorine gas cooled to 32° Fahr. condenses into yellow crystals containing 35½ parts of chlorine, and 90 parts of water; no degree of cold, however, can liquefy the perfectly dry gas. The most remarkable properties of chlorine are, its power of destroying almost all vegetable and animal colours, and the putrid odour of decomposing organic matter; hence its value as a bleaching agent, and as a disinfectant and fumigation. With the bases chlorine forms an important series of compounds called *chlorides*, or *chlorurets*. Chlorine has such a strong attraction for the metals that it displaces oxygen in nearly all cases at a red heat.

Tests.—1. Chlorine is readily distinguished from other gases by its colour, odour, and bleaching properties.—2. Its aqueous solution dissolves gold leaf, and instantly blackens a piece of silver plunged into it.—3. It rapidly destroys the colour of iodide of starch, solution of indigo, litmus, and turmeric.—4. A simple method of detecting free chlorine is to hold a rod, dipped in water of ammonia, over it, when white fumes of sal ammoniac will be formed; this, coupled with the property of bleaching colours, may, in most cases, be taken as evidence of the presence of this substance. (See *Chlorometry.*) The other tests for aqueous chlorine are the same as for solutions of the chlorides. (See *above.*)

Ant. The fumes of chlorine are eminently irritating and poisonous. The best antidotes are said to be ammoniacal gas, or the vapours of warm water, of wine, or of ether. The writer of this article once suffered severely from getting a full inspiration of this gas, by the bursting of a large vessel employed in its manufacture, and which was full at the time. For a minute or two he was completely overcome; but, on being removed into the fresh air, he rapidly recovered, and, with the exception of a *violent* and *convulsive* cough, which lasted several hours, felt even better than he did before. The gas appeared to have acted both as a mental and bodily stimulant. Every known antidote was tried in this case, but without any apparent advantage. The effects gradually wore off, after the lapse of seven or eight hours. See *Chloric*, *Chlorous*, *Hypochlorous*, *Hypochloric*, and *Perchloric Acids*, *&c.*

CHLORINE (Liquid). See *Solutions.*

CHLORISATINE. A body closely resembling *isatine*, formed by acting on that substance with *chlorine.*

CHLORITE. Syn. *Chloris*,—Lat. A salt formed of *chlorous acid* and a base. The alkaline chlorites may be made by passing a current of *chlorous acid gas* into a solution of the *pure alkalies.* They are soluble and remarkable for their bleaching and oxidizing properties.

CHLOROBENZOL. From *benzol* and *chlorine*, by exposing them to the rays of the sun. Solid; crystalline; fusible; insoluble in water; by distillation it is converted into *hydrochloric acid*, and a volatile liquid named *chlorobenzide.*

CHLORO-CARBONIC ACID. Syn. *Chloro-carbonous Acid, Phosgene Gas.* From a mixture of equal volumes of perfectly dry *carbonic oxide* and *chlorine*, under the influence of sun-light. The volume of the two gases is reduced to one-half, and a pungent, suffocating, acid, gaseous compound is formed, which is decomposed by contact with water.

CHLORO-CHROMIC ACID. *Bichromate of potassa*, 3 parts; *common salt*, 3½ parts; are intimately mixed together, put into a glass retort, and *oil of vitriol*, 9 parts, added; heat is next applied and maintained as long as dense red vapours are given off. The product in the receiver is a heavy deep-red liquid, greatly resembling bromine in appearance. Water resolves it into hydrochloric and chromic acid.

CHLOROCINNOSE. By acting on *oil of cinnamon* with *chlorine*, and purifying the product by crystallization from alcohol. Brilliant, colourless needles; fusible; volatile; and unaffected by boiling oil of vitriol.

CHLOROFORM. See *Terchloride of Formyle.*

CHLORO-HYDROSALICYLIC ACID. By acting on *hydruret of salicyle* with *chlorine*, in the cold, and purifying the product by solution and crystallization in hot *alcohol.*

Prop., *&c.* Tabular crystals, nearly colourless, with a pearly lustre; insoluble in water; freely soluble in alcohol, ether, and alkaline lyes; fusible and volatile, the fumes condensing under the form of needle-like crystals of snowy-whiteness; taste, hot and pungent; odour, peculiar and disagreeable. Its salts are called *chloro-hydrosalicylates.* They may be readily prepared by direct solution of the base in the acid, or by double decomposition. *Chloro-hydrosalicylate of potassa* occurs in small red crystalline scales, which are very soluble in water; *chloro-hydrosalicylate of barium* or *baryta* forms an insoluble, crystalline, yellow powder.

CHLORO-HYPONITRIC ACID and *Chloronitric Acid*, are two peculiar compounds, of little practical interest, evolved when a mixture of *nitric acid* and *hydrochloric acid* is exposed to heat.

CHLORO-KINONE. When *kinic acid* is submitted to distillation, with an ordinary *chlorine mixture*, an acid liquor (*formic acid*) and a crystalline sublimate are obtained. The latter is a mixture of *chloro-kinone, bichloro-kinone, trichloro-kinone*, and *tetrachloro-kinone* (chloranile.) "They are all yellow crystalline substances, which can be separated only with great difficulty."

CHLOROMETRY. Syn. *Chlorimetry.* The process of testing the decolouring power of the compounds of chlorine. It is principally applied to those met with in commerce,—the *chlorides of lime, potash,* and *soda.* The graduated tubes, &c., employed for this purpose are called *chlorometers* or *chlorimeters*, and have been already noticed under the heads, *alkalimetry*, &c.

1. (Dalton's test; sulphate of iron test.) *Pure protosulphate of iron* (previously dried by strong pressure between the folds of cloth or bibulous paper), 78 grs. are dissolved in *distilled water*, 2 *oz.*, and a few drops of *hydrochloric* or *sulphuric acid* added. Exactly 50 gr. of the *chloride of lime* to be examined are next weighed, and well mixed in a glass or wedgwood mortar with *tepid water*, 2 *oz.;* and the mixture poured into a graduated tube or chlorimeter. The tube is next filled up to 0, or zero, with the "washings" of the mortar, and the whole well mixed, by placing the thumb over the orifice and shaking it. The *solution of chloride of lime*, thus formed, is next gradually and cautiously added to the *solution of sulphate of iron*, previously noticed, until the latter is *completely peroxidized*, which may be known when it ceases to be affected by a solution of *red prussiate of potash.* When a drop of the latter test, placed upon a white plate, ceases to give a blue colour on being touched with the point of a glass stirrer or rod dipped in the liquor under examination, enough of the *solution of the chloride* has been added. The number of measures thus consumed must now be carefully read off from the graduated scale of the chlorimeter, from which the richness of the sample may be estimated as follows:—As 100 of the *chlorimeter divisions* contain exactly 50 gr. of the *chloride under examination*, each measure will contain only $\frac{1}{2}$ gr., and, consequently, the *number of measures consumed,* will represent *half that number of grains* of the *chloride* examined; and the weight of the chloride thus used will have contained 10 gr. of *chlorine*—the constant quantity of that substance required to peroxide the test solution of sulphate of iron. Thus:—If 80 measures of the liquor in the alkalimeter have been consumed, this quantity will represent 40 gr. of *chloride of lime,* and 10 gr. of *chlorine.* By dividing 1000 by this number, the per centage of chlorine will be obtained. In the present instance this would be—

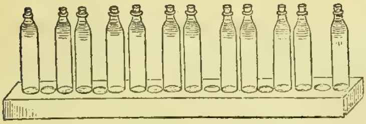
$$\frac{1000}{40} = 25\%.$$

Obs. The above method admits of much greater accuracy, if the *chloride of lime, dissolved in tepid water,* is placed in a Schuster's alkalimeter, previously weighed, and the solution made up to exactly 1000 gr. when cold. The quantity consumed may here be ascertained with great exactness. Every grain of the solution will now be only equal to $\frac{1}{20}$ of a grain of the chloride examined. The quantity of the solution consumed is determined by very accurately weighing the alkalimeter both before and after the operation. The loss represents the quantity that has been used.

A modification of this plan has been suggested by Mr. Crum. He proposes to make the solution of the sulphate of iron in a stoppered bottle, and to add the chloride in the state of powder from a weighed parcel.

2. (Crum's process.) Equal weights of *water* and *hydrochloric acid* are mixed together, and *cast-iron borings* digested in the diluted acid until saturation is complete; a large excess of iron being purposely employed, and the liquid kept at the heat of boiling water for some time. *One measure of the solution,* marking 40° on Twaddle's scale (sp. gr. 1·200), is then mixed with *an equal quantity of acetic acid* (sp. gr. 1·048). This forms the *test liquid.* When mixed with 6 or 8 parts of water, it is quite colourless, but chloride of lime occasions the production of peracetate of iron, which gives it a red colour.

The above proof-solution is next poured into 12 *two-oz. vials,* of *exactly equal diameters,* to the amount of $\frac{1}{8}$th of their capacity; these are filled up with bleaching liquid of various strengths; the first at $\frac{1}{12}$th of a degree of Twaddle, the second $\frac{2}{12}$ths, and so on up to $\frac{12}{12}$ths of 1°. They are then well corked up, and, after agitation, arranged side by side on a tray, furnished with holes to receive them. (See Engr.)



To ascertain the strength of an unknown sample of bleaching liquor, the proof solution of iron is put into a phial, exactly similar to the 12 previously used, and in precisely the same proportion, ($\frac{1}{9}$th.) The phial is then filled up with the bleaching liquor, well shaken, and placed beside that one of the 12 already prepared, which it most resembles in colour. The number on that phial expresses the strength the sample under examination, in $\frac{1}{12}$ths of a degree of Twaddle's hydrometer.

Table *exhibiting the quantity of Bleaching Liquid, at* 6° *on Twaddle's scale* (sp. gr. 1·030), *required to be added to a weaker liquor, to raise it to the given strengths. Adapted from Mr. Crum's table by* Mr. Cooley.

Strength of sample in $\frac{1}{12}$°.	Required Strength.	Proportions required.	
		Given Sample.	Liquor at 6°.
		Parts.	Part.
Water.	$\frac{8}{12}$°	8	1
1	do.	$9\frac{1}{4}$	1
2	do.	11	1
3	do.	$13\frac{1}{2}$	1
4	do.	17	1
5	do.	23	1
6	do.	35	1
7	do.	71	1
Water.	$\frac{6}{12}$°	11	1
1	do.	$13\frac{1}{2}$	1
2	do.	17	1
3	do.	23	1
4	do.	35	1
5	do.	71	1
Water.	$\frac{4}{12}$°	17	1
1	do.	23	1
2	do.	35	1
3	do.	71	1
Water.	$\frac{3}{12}$°	23	1
1	do.	35	1
2	do.	71	1

Obs. The preceding method is admirably suited for weak solutions, such as are employed for bleaching textile fabrics, and is well adapted (from its simplicity) to the purposes of practical men. Indeed, it is quite astonishing to see with what ease and accuracy it is applied by unlettered operatives. This gives it great practical value. It is now in extensive use in the bleaching houses of Scotland.

According to Mr. Crum, the range of strength within which cotton is "safe," is very limited. A solution at 1° of Twaddle's scale (sp. gr. 1·005), is not "more than safe," whilst one at $\frac{1}{2}$° is scarcely sufficiently strong for the first operation on stout cloth, unless it is packed more loosely than usual. (Trans. Glasgow Phil. Soc.)

3. (Indigo test.) One part of the *best indigo* is dissolved in 9 parts of *strong sulphuric acid*, by the aid of a gentle heat; this solution is then mixed with *distilled water*, in such proportion, that 1 volume of *chlorine gas* shall exactly decolour 10 volumes of *this solution.* Each measure so decoloured is called a *degree*, and each degree is divided into *fifths.* 5 gr. of the *best chloride of lime*, dissolved in 500 gr. *measures of water*, possess the above power, and indicate 10° or *proof;* or in other words, will decolour 10 times its volume of the indigo solution.

Obs. This method of chlorimetry was first proposed by Gay-Lussac, but is objectionable, and liable to error, from the indigo solution altering by keeping. When, however, the proper precautions are used, it may be safely trusted for weak bleaching liquors. The following test, also proposed by Gay-Lussac, is free from these objections.

4. (Gay-Lussac's process.) This depends on the power which *arsenious acid* possesses of being peroxidized, or converted into *arsenic acid*, in the presence of chlorine and water.

Pure arsenious acid, 100 gr., are dissolved in about 4 fl. oz. of pure *hydrochloric acid*, (free from sulphurous acid,) and the solution diluted with *water* until on being poured into a graduated 10,000 grains-measure-glass, it occupies the volume of 7000 grains-measure marked on the scale. Each 1000 grains-measure of this liquid now contains 14·29 gr. of *arsenious acid;* corresponding to 10 gr. of *chlorine*, or $\frac{1}{10}$th gr. of *chlorine* for every division or degree of the scale of the chlorimeter. This forms the "*arsenious acid test liquor.*"

100 gr. of the *chloride of lime to be examined*, and next dissolved in *water* as

before, and poured into a tube graduated up to 2000 grains-measure. The whole is now well shaken, in order to obtain a uniformly turbid solution, and half of it (1000 grains-measure) transferred to a graduated chlorometer, which is, therefore, thus filled up to 0°, or the zero of the scale, and contains exactly 50 gr. of the chloride of lime under examination; whilst each degree or division of the scale contains only ½ gr.

1000 grains-measure of the *arsenious acid test liquor* are now poured into a glass beaker, and a few drops of *solution of sulphate of indigo* added in order to impart a faint, but distinct blue colour to it; the glass is then shaken so as to give a circular movement to the liquid, and whilst it is whirling round, the *chloride of lime solution from the chlorometer*, is gradually and cautiously added, until the *blue tinge* given to the arsenious acid test liquor is destroyed; care being taken to stir the mixture well during the whole process, and to stop as soon as the decolorization is completed.

Let us suppose now, that in order to destroy the *blue colour* of the 1000 grains measure of the "*arsenious acid test-liquor*," 90 divisions or degrees of the *chloride of lime solution* have been employed. These 90 divisions therefore contained the 10 gr. of chlorine required to destroy the colour of the arsenious acid test solution; and since each division represents ½ gr. of *chloride of lime*, 45 gr. of chloride of lime, (10 gr. of chlorine,) were present in the 90 divisions so employed, from which the per centage strength may be ascertained. For—

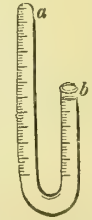
45 : 10 : : 100 : 22·22

The chloride of lime examined, therefore, contained 22¼ per cent. (nearly) of chlorine.

Obs. This method is extremely simple and trustworthy when properly employed; but to ensure accuracy, certain precautions must be adopted. Instead of pouring the *test liquor* into the solution of the sample, (as in alkalimetry,) the *solution of the sample* must be poured into the test-liquor. If the contrary plan were adopted, the *hydrochloric acid* of the "*arsenious acid test liquor*" would disengage chlorine gas so fast that much would be lost, and the result rendered incorrect. By pouring, on the contrary, the *chloride of lime solution* into the *arsenious acid solution*, the chlorine is disengaged in small portions at a time, and meets with an abundance of arsenious acid to react on. The *mixture of chloride of lime* should also be employed turbid.

5. (Ure's process.) This consists in adding *liquor of ammonia*, of a known strength, tinged with *litmus*, to a solution of a given weight of the *chloride under examination*, until the whole of the chlorine is neutralized, which is known by the colour being destroyed. From the quantity of ammonia consumed the strength of the sample is estimated. During the above process *nitrogen* is evolved, and the estimation of the volume thus liberated has been proposed as *another easy method of chlorimetry* by Dr. Ure.

This gentleman mixes the two solutions in an inverted and graduated syphon tube over mercury. (See Engr.) The shut end (*a*) and the open end (*b*), are both graduated to one scale; for example, to $\frac{1}{100}$ of an inch, or to grain or 10 grain measures. The tube is filled with *mercury*, and then 10 measures of it are displaced at the open end, by inserting a *wooden plug*. This space being filled with a *solution of a given weight of chloride of lime*, the liquid is turned up into the shut end, by covering the open end with the finger and inverting the tube; a few drops of water may be sent up after it to wash the mercury. The *liquor of ammonia* being now let up causes a reaction, and the evolution of a quantity of *nitrogen* exactly equivalent to the *chlorine* present. The action may be accelerated by holding the sealed end of the tube over the flame of a spirit lamp. The mercury is protected from the chlorine by the ammonia; and should any notion be entertained of such an action, the ammonia may be let up first. Dr. Ure says that he has made "innumerable researches over mercury, with a detached apparatus of this kind, which combines precision with rapidity of result."



CHLORONAPHTHALIC ACID. Formed by the action of *chlorine* on *naphthalin*. It unites with the metallic oxides forming coloured salts (*chloronaphthalates*) remarkable for their extreme beauty.

CHLORONICEIC ACID. *Benzoate of potassa* is dissolved in *water*, the solution *slightly* alkalized with *potassa*, and a stream of *chlorine* passed through it; the deposit which forms consists of *chlorate of potassa* and *chloroniceate of potassa;* the two are separated by taking advantage of their different degrees of solubility, and the new acid is obtained from the *chloroniceate* by the action of a *free acid.*

Prop., &c. Cauliflower-like crystals, fusible at 302°, and boiling at about 420° Fahr. It may be distilled without decomposition.

CHLORONICINE. Formed by treating *nitrochloronicene* with *hydrosulphuret of ammonia.* It forms brown flakes, slightly soluble in water.

CHLORONITRIC ACID. Syn. *Chloro-azotic Acid.* According to Baudrimont, this is formed by the mutual action of *nitric* and *hydrochloric acids*, and is the effective solvent in *nitro-hydrochloric acid* or *aqua regia.* See *Chloro-hyponitric Acid.*

CHLORONITROUS ACID. Syn. *Chloronitrous Gas.* Formed by the mutual action of *nitric acid* and *hydrochloric acid* or *common salt.* It is best obtained by treating *fused chloride of sodium, potassium,* or *calcium,* in powder, with as much *strong nitric acid* as is sufficient to wet it, when this gas is evolved. It has an orange colour, smells like chlorine, bleaches, and is soluble in water. According to Mr. E. Davy, the solvent power of aqua regia depends on chloronitrous acid gas dissolved in the liquid. (See *above.*)

CHLOROPHENISIC ACID. Formed by the action of chlorine on the hydrate of oxide of phenyle or substances containing it.

Prep. The *hydrated oxide of phenyle* or *those portions of crude coal-oil which boil between* 360° and 400° Fahr., are saturated with *chlorine gas*, and distilled in the open air; the first and last portions being rejected; the product is *again* treated with *chlorine* until the whole solidifies; the crystals are drained and dissolved in a *hot dilute solution of ammonia;* as the solution cools crystals of *chlorophenisate of ammonia* are deposited; this salt dissolved in *water*, decomposed with *hydrochloric acid,* well washed, and, lastly, distilled, yields pure *chlorophenisic acid.*

Prop., &c. Delicate, colourless, silky needles; very fusible; volatile at common temperatures; pungent; sparingly soluble in water; freely soluble in alcohol, ether, and hot oil of vitriol. Its salts (*chlorophenisates*) are well-defined, and are easily formed. By the action of chlorine, in great excess, *chlorophenisic acid* is converted into an analogous compound called *chlorophenusic acid,* which forms *chlorophenusates* with the bases.

CHLOROPHENOL and *Trichlorophenol.* Substances formed when an *alcoholic solution of isatin* is treated with excess of *chlorine.*

CHLOROPHYLL. Syn. *Chlorophile, Chlorophyle.* The green colouring matter contained in the leaves, stalks, unripe fruit, and juices of most plants. It is extracted by *ether*, and purified by successive solutions in *alcohol* and *hydrochloric acid;* from the last it is precipitated pure by *water*, and is then collected and dried.

Prop., &c. A dark green mass, producing a grass-green powder. It is soluble in ether, alcohol, acids, alkalies, and oils. If an earthy or metallic salt be mixed with the alcoholic solution, and an alkaline carbonate be added, the earth or oxide is thrown down in combination with this colouring matter, forming a *green lake,* possessing considerable permanency and beauty. Pelletier and Caventou, who first discovered chlorophyll, obtained it by simply pressing the leaves, washing in water, and afterwards treating it with alcohol. This plan is still adopted when it is not wanted quite pure.

CHLOROPICRIN. An oily liquid, discovered by Stenhouse, formed when a *solution of picric* or *chrysammic acid* is distilled with *hypochlorite* (chloride) *of lime,* or with a *mixture of chlorate of potassa* and *hydrochloric acid.* It has a peculiar, penetrating odour; boils at 238° Fahr.; sp. gr., 1·665.

CHLOROSALICINE and *Bichlorosalicine.* Compounds formed by the action of *chlorine* on *salicine.*

CHLOROSALIGENINE and *Bichlorosaligenine.* Formed by the decomposition of the last two by *synaptase.*

CHLOROSAMIDE. A peculiar yellow, resinous compound, produced by the action of *dry ammoniacal gas* on pure *chlorohydrosalicylic acid.* It is nearly insoluble in water; soluble in alcohol and in hot ether; hot rectified spirit decomposes it; the boiling ethereal solution deposits chlorosamide under the form of fine yellow iridescent crystals in cooling.

CHLOROSIS. Syn. *Green Sickness.* A disease which principally affects young unmarried females.

Symp. Languor, listnessness, fatigue after the least exercise, palpitation of the heart, flatulency, indigestion, acidity of stomach and bowels, constipation (generally), appetite for unnatural food, general debility, &c. As the disease advances, the skin, at first pale, assumes a peculiar greenish tint, the respiration becomes affected, the feet and legs swell, and various organic affections of the viscera ensue. During the early stages of this disease, the catamenia are usually pale and scanty, and return at irregular intervals, and as it progresses, they disappear altogether.

Treat. This should be tonic and restorative. That recommended under *anæmia* and *diseased appetite* may be adopted with advantage.

CHLOROSULPHURIC ACID. Formed indirectly during the process of preparing *Dutch liquid* from *impure olefiant gas.* It is decomposed by water.

CHLOROTHALLE. Syn. *Thallochlor, Chlorothallic Acid.* The green colouring matter of *cetraria islandica* or *Iceland moss.* It is soluble in alcohol, ether, some oils, and petroleum; and is distinguished from *chlorophylle,* which in many particulars it resembles, by being insoluble in hydrochloric acid. It possesses feeble acid properties.

CHLOROUS ACID. Syn. *Peroxide of Chlorine* (?), *Acidum Chlorosum,* — Lat. *Prep.* 1. From *chlorate of potassa,* 4 parts; *arsenious acid,* 3 parts; *nitric acid,* 12 parts; (diluted with) *water,* 4 parts; heated together in a glass flask, furnished with a bent tube, and placed in a water-bath. It must be collected in the same way as chlorine, or passed into *water,* when it forms *liquid chlorous acid.*

2. *Chlorate of potassa,* in fine powder, made into a paste with *strong sulphuric acid,* is put into a retort and heated in a water-bath, hot but not boiling, and the gas which is given off, collected as before.

Prop., &c. Chlorous acid is a greenish yellow gas, non-condensable by cold, and only sparingly soluble in water; the *aqueous solution* undergoes gradual decomposition, yielding chlorine and chloric acid. Chlorous acid possesses powerful oxidizing and bleaching properties; with the bases it unites forming salts called *chlorites.* These are all soluble in water, and bleach like the acid. They may be recognised by the evolution of chlorous acid gas when acted on by an acid. The use of the arsenious acid is to deoxidize the nitric acid employed in the process.

CHLOROVALERISIC ACID. Prepared by passing *dry chloric gas* for some time into *pure valerianic acid,* in the dark, applying a little heat when the gas begins to be languidly absorbed.

Prop., &c. Semifluid; acrid; odourless; heavier than water; perfectly fluid above 86° Fahr.; a strong heat decomposes it; with water it forms a liquid hydrate; the latter forms with the bases salts called *chlorovalerisates.*

CHLOROVALEROSIC ACID. By acting on *chlorovalerisic acid,* for some time, with *chlorine,* in the sunshine. It greatly resembles chlorovalerisic acid, but is more pungent. Both are soluble in ether and alcohol.

CHLORURETS. See *Chlorides.*

CHOCOLATE. Syn. *Chocolata,*—Lat. Roasted cacao or chocolate beans or nuts, made into a paste by trituration in a heated mortar, with sugar and aromatics. It is poured into tin moulds, whilst still pasty or semifluid, and left until cold. In this form it is called *cake chocolate* or *chocolate paste.* When these lumps are reduced to coarse powder, by grinding, it is known under the name of *chocolate powder.*

Chocolate, prepared as above, without the addition of aromatics, is known in the trade as "*plain chocolate.*" The *Spaniards* flavour it with *vanilla, cloves,* and *cinnamon,* and frequently scent it with *musk* and *ambergris.* With these additions it is termed "*Spanish chocolate.*" In general they add too large a quantity of the last four articles. The *Parisians,* on the contrary, use little flavoring, and that principally *vanilla.* They employ the best *caracca nuts,* and add a considerable quantity of refined sugar. So prepared it is called "*French chocolate.*"

Pur., &c. The chocolate commonly sold in England is prepared from the cake left after the expression of the oil, and this is frequently mixed with the roasted seeds of ground peas, and maize or potato flour, to which a sufficient quantity of inferior brown sugar, or treacle and mutton suet, is added to make it adhere together. Inferior sweet almonds are also employed in the same way. In this way is made the article marked in the shops at 8*d.*, 9*d.* and 10*d.* the pound. A large quantity was lately sold so low as 5*d.* per *lb.;* whereas good nuts in their unprepared state cost, at wholesale, more than double the money.

Qual., &c. Chocolate is nutritive and wholesome, if taken in moderation, but is sometimes apt to disagree with weak stomachs, especially those that are easily affected by oily substances or vegetable food. When this is the case, by adopting the simple plan recommended under "*butter,*" chocolate may generally be taken with impunity, even by the dyspeptic. The quantity of aromatics mixed with the richer varieties of chocolate, improve the flavour, but render them more stimulant and prone to produce nervous symptoms and head complaints.

Chocolate should never be made for the

table before it is wanted, because heating it again injures the flavour, destroys the froth, and separates the body of the chocolate, the *oil of the nut* being observed, after a few minutes' boiling, or even standing long by the fire, to rise to the top. This is one of the principal reasons why chocolate offends the stomach.

The South American beans are esteemed the best for making chocolate. Like wine, it improves by age if kept in a dry but not too warm a place.

Chocolate is *taken* in the solid form, or made into a beverage; or, combined with *sugar*, is made into various articles of confectionery. (See *below.*)

Obs. Chocolate beans are roasted in a similar way to coffee berries, due care being taken to stop the process as soon as the aroma is well developed. They are then turned out, cooled, and fanned from the husks. On the *large scale*, chocolate is made in mills, worked by steam power; on the *small scale*, the beans may be roasted in a frying-pan, or a portable coffee-roaster.

Chocolate for the table is prepared by scraping the *chocolate* fine, (from one to two squares to a pint to suit the stomach,) and throwing it into the boiling *milk-and-water*, and "milling" it well. It is served up with the froth. The sugar may either be put in with the scraped chocolate, or added afterwards, at pleasure.

The proportions used for the best "*French chocolate*" are said to be—2 *beans of vanilla*, and 1 *lb.* of the *best refined sugar*, to every 3 *lb.* of the *choicest cacao nuts*.

The following forms are said to be commonly adopted for "*Spanish chocolate*:"—

1. *Caracca nuts*, 11 *lb.; sugar* (white), 3 *lb.; vanilla*, 1 *oz.; cinnamon* (cassia), ¼ *oz.; cloves*, ½ dr.

2. *Caracca nuts*, 10 *lb.; sweet almonds*, 1 *lb.; sugar*, 3 *lb.*; *vanilla*, 1¼ *oz.*

3. *Caracca nuts*, 8 *lb.; island cacao*, 2 *lb.; white sugar*, 10 *lb.; aromatics*, as above.

4. *Island cacao*, 7 *lb.; farina*, q. s. to absorb the oil. Inferior.

Vanilla chocolate (*chocolate à la vanille*) is a variety of Spanish chocolate highly flavoured with vanilla. The following proportions have been recommended:—

1. *Caracca nuts*, 7 *lb.; Mexican vanilla*, 1 *oz.; cinnamon*, ½ *oz.*; *cloves*, 3 in no.

2. *Best chocolate paste*, 21 *lb.; vanilla*, 4 *oz.; cinnamon*, 2 *oz.; cloves*, ½ dr.*; musk*, 10 gr.

The *vanilla* used in making chocolate, is reduced to powder by rubbing it with a little *sugar*, before adding it to the paste. (See *below.*)

CHOCOLATE (Medicated). Preparations of chocolate intended either as nutritious articles of food for convalescents, or as vehicles for medicine, are common among the pharmacopœial and magistral formulæ of the Continent. The following are a few examples:—

CHOCOLATE. Syn. *Simple Chocolate, Hygienic do., Homœopathic do; Chocolata, C. Simplex, C. Salutis,*—Lat. *Chocolat de Santé*, —Fr. *Prep.* (P. C.) *Caraque* and *Maraignan cacao*, of each, 96 ℔; *sugar*, 160 ℔; *cinnamon*, 1 oz. (to 2 oz.); triturated together in the usual manner, and formed into cakes or powder.

CHOCOLATE (Aromatic). *Prep.* (Weiglebt.) *Cacao beans* and *sugar*, of each, 16 oz.; *cinnamon*, ½ oz.; *cloves*, 2 dr.; *cardamons* and *vanilla*, of each, 1 dr.

CHOCOLATE (Chalybeate). Syn. *Ferrugineous Chocolate; Chocolata Chalybeata, C. Martis,*—Lat. *Prep.* 1. (Trousseau.) *Spanish chocolate*, 16 oz.; *carbonate of iron*, ½ oz.; mix, and divide into 1 oz.-cakes. One at a time; in anæmia, amenorrhœa, chlorosis, &c.

2. (Pierquin.) *Iodide of iron*, 2 dr.; *chocolate*, 16 oz. For ½ oz. cakes; as above, and in scrofulous and glandular affections.

CHOCOLATE (Guarana). Syn. *Paullinia Chocolate; Chocolata Paulliniæ, C. Guaranæ,*—Lat. *Prep.* From *guarana* and *white sugar*, of each, 1 *oz.*, triturated together, and afterwards thoroughly mixed with good *plain chocolate*, 18 *oz.* Recommended as a restorative in debility, chlorosis, and other diseases of debility, especially those of a nervous character.

CHOCOLATE (Iceland Moss). *Chocolata Cetrariæ Islandicæ, C. Lichenis,*—Lat. *Prep.* 1. (P. C.) *Simple chocolate* (P. C.), 32 parts; *sugar*, 29 parts; *dried jelly of Iceland moss*, 11 parts; mix.

2. (Cadet.) *Chocolate*, 4 ℔; *sugar*, 2 ℔; *Iceland moss*, (freed from its bitter, and powdered,) 1½ ℔; *tragacanth* and *cinnamon*, of each, 4 oz.; *water*, q. s.; to be beaten in a warm mortar, or ground with a muller on a warm slab to a paste. Recommended in pulmonary affections, general debility, weakness of stomach, &c.

CHOCOLATE (Purgative). Syn. *Chocolata Purgans, C. Cathartica,*—Lat. *Prep.* 1. *Jalap*, 1 *oz.; chocolate*, 9 *oz.;* mix, and divide into 1 dr. cakes. *Dose.* 1 to 2, as a purge.

2. *Jalap*, 2 oz.; *calomel* and *sugar*, of each, 1 oz.; triturate together, then add *chocolate*, 20 oz.; for 1 dr. cakes.

3. *Scammony*, 2 dr.; *chocolate*, 3 oz.; for 1 dozen cakes. The last two are given in

worms. *Dose*, (for an adult,) 1 cake, taken fasting.

CHOCOLATE (Salep). Syn. *Chocolata cum Salep*,—Lat. *Prep.* 1. (P. C.) *Chocolate*, 16 oz.; *powdered salep*, ½ oz.

2. (Cadet.) *Cacao paste* and *sugar*, of each, 1℔; *powdered salep*, 1 oz. *Arrow-root chocolate* and *tapioca chocolate* are made in the same manner. See *below.*

CHOCOLATE (Vanilla). Syn. *Chocolata cum Vanilla*,—Lat. *Prep.* 1. (P. C.) *Chocolate*, (plain,—P. C.) 16 oz.; *vanilla*, ½ dr.

2. (Cottereau.) *Cacao paste*, 6 *lb.; sugar*, 10 *lb.; vanilla*, 11 dr.

CHOCOLATE (Vermifuge). Syn. *Chocolata Vermifuga*,—Lat. See *above.*

CHOCOLATE (White). Syn. *White Cocoa, Carrageen do.; Chocolata cum Chondro, Pasta Cacao cum Chondro, P.C. c. Lichene Carragheno*,—Lat. *Prep.* 1. As *Iceland moss chocolate*, but employing *carrageen moss.*

2. (Ph. Dan.) *Roasted* and *decorticated cacao seeds* (reduced to a subtile mass in a warm iron mortar) and *powdered white sugar*, of each, 2℔; *powdered carrageen*, (debitterized,) 3 oz.

3. (Cottereau.) *Sugar*, 6 *lb.; rice flour*, 1⅝ *lb.; potato starch* and *butter of cacao*, of each, ½ *lb.; gum arabic*, ¼ *lb.* (dissolved); *tincture of vanilla*, ½ fl. oz.; *boiling water*, q. s.; triturate to a stiff paste. The above are highly nutritious, and are recommended as an article of diet for convalescents and debilitated persons.

CHOKE DAMP. The term applied by miners to *carbonic acid* and other irrespirable gases and vapours evolved in mines. See *Carbonic Acid, Fire Damp, Ventilation, &c.*

CHOLEIC ACID. Syn. *Tauro-cholalic Acid.* A peculiar fatty acid which, in combination with soda, constitutes a principal ingredient in *bile.* When exposed for some time to the action of *caustic potassa*, it evolves ammonia, and is converted into *cholalic acid*, (the *cholic acid* of some authors.)

CHOLERA. This word, which, from its derivation, can be only applied correctly to a bilious affection of the stomach and bowels, has been of late years very loosely extended to a malignant disease, the most marked characteristic of which is a total suspension of the functions of the biliary organs. Both these affections are briefly noticed below.

CHOLERA (English). Syn. *Common Cholera, Bilious do.; Cholera Morbus*,—Lat. A disease characterised by bilious vomiting and purging, accompanied by more or less pain and debility. It most frequently occurs towards the end of the summer and early in the autumn, when the increased heat of the sun stimulates the liver to an inordinate secretion of bile, by which the whole system becomes overloaded with it. Among secondary and accidental causes, are sudden changes of temperature, checked perspiration, and the use of indigestible food, and food and beverages in a state of incipient decomposition. It is usually accompanied by fever, thirst, and severe colic, and, *sometimes*, by cold sweats, extreme debility, feeble pulse, &c., under which the patient sinks in 24 hours.

Treat. In most cases this complaint is not dangerous and yields to proper treatment in a few days. As soon after the commencement of the attack as possible, some mild aperient, (as *castor oil*,) should be administered, and its action accelerated by drinking copiously of diluents, as barley-water, toast and water, water gruel, &c. *Opiates* may be employed, both topically and by the mouth. A *teaspoonful* or two of *laudanum*, rubbed over the region of the stomach and bowels is a simple application which will generally allay the pain. 10 to 20 drops of *laudanum*, mixed with a table-spoonful of *good brandy*, or a few grains of *cayenne pepper*, may also be taken every hour, if the pain is severe. Should the stomach reject the medicine, or the vomiting be apparently increased by drinking warm diluents, a few spoonfuls of *ice-cold water*, or of a *mixture of lemon juice and water*, may be taken instead, until the sickness abates. When the violence of the symptoms have abated, tonics and bitters, (as *gentian, calomba, orange peel*, &c.,) may be advantageously had recourse to.

CHOLERA (Malignant). Syn. *Asiatic Cholera, Blue do., Pestilential do., Spasmodic do.; Cholera Asiatica, C. Maligna, &c.*,—Lat. In consequence of the important investigations touching the *causes* and *treatment* of Asiatic cholera now in progress, induced by the recent fearful outbreak of this disease in different parts of London, we propose to defer a notice of the subject until an opportunity occurs of collating the authorities, opinions, and data, already published, and shortly expected to be laid before the public. (See *Pestilential Diseases.*) In this place, therefore, we shall merely notice a few of the many remedies which have been recommended for this terrible malady, in order that our readers may know their composition, and be able to prepare them, if desirous, or called on to do so.

1. (American remedy). Equal parts of *maple sugar* and *powdered fresh-burnt charcoal*, made into a stiff paste with *lard*, and divided into pieces the size of a *filbert*. *Dose*. One, occasionally, swallowed whole.

2. (Austrian specific.) The proportions of the ingredients in the following formulæ are founded on Herapath's analysis of this celebrated preparation, and are given in the nearest available whole numbers :—

a. Sulphuric acid, (sp. gr. 1·845,) 20 gr.; *nitric acid*, (sp. gr. 1·500,) 12 gr.; *sugar* and *gum*, of each, 15 gr.; *distilled* or *pure soft water*, q. s. to make the whole *weigh exactly* 1 oz.

b. Sulphuric acid, 3 dr.; *nitric acid*, 2 dr.; *simple syrup*, 6 dr.; *water*, q. s. to make the whole weigh exactly 10 oz. A single drop of essential oil of lemon may be added.

Dose, &c. One tablespoonful is ordered to be taken in water, on the first appearance of premonitory symptoms, followed by the *free* use of very *cold water*. In half an hour a *second dose* is to be taken. This, (as asserted,) is generally sufficient to arrest the progress of the disease. A tablespoonful is then to be added to a pint of *cold water*, and drank *ad libitum*. In more obstinate cases it is said that 4 or 5 doses are generally required to effect a cure. When *collapse* sets in, double doses are ordered to be given, and to be repeated after every attack of vomiting until the sickness and cramp abate. After the vomiting abates, the doses are still to be repeated until 5 or 6 doses are retained by the stomach. Should *quiet* sleep or drowsiness come on, it is not to be interfered with. The free use of cold water or soured water is to be allowed until perspiration sets in and the warmth of the body returns. According to the report, the use of *warm liquors*, *wines*, *spirits*, &c., must be carefully avoided, as so much *poison*.

Obs. A bottle of the above remedy was handed to Mr. Wm. Herapath, the eminent chemist of Old Park, Bristol, by the superintendent of the Birmingham police, who had received it from the head of the Austrian police, as being in general use in Austria, under the sanction of the medical department of the government, and being found to act almost as a specific in cholera. In 1831-2, it was first tried on some criminals, with perfect success, and soon afterwards with similar results on thousands of the general public. In 1849 the Austrian government ordered its use in the public establishments of the empire, since which not a single case of failure had occurred in which it had been *fairly* tried. (Vide *Lancet*, July, 1851; the *Times*, Sept. 27, 1853; and several other publications.

3. (Mr. Buxton's Remedy.) From *dilute sulphuric acid*, (spirit of vitriol,) 25 drops; *water*, 1 fl. oz. For a draught; as the last.

4. (College of Physicians and Board of Health; for Premonitory Diarrhœa.) *Chalk mixture*, 1 oz.; *aromatic confection*, 10 to 15 gr.; *tincture of opium*, 5 to 15 drops; to be repeated every 3 or 4 hours, or oftener, if required, until the looseness is arrested.

5. (Dr. Graves's Astringent Pills.) *Acetate of lead*, 20 gr.; *opium*, 1 gr.; *conserve of roses*, q. s.; for 12 pills. *Dose*. One every ½ hour or hour, at first; then one every two hours.

6. (Homœopathic Preventive.) *Camphor*, 1 dr.; *rectified spirit*, 6 dr.; dissolve, and preserve it in a well-corked bottle. *Dose*. 2 drops on a *lump of sugar*, sucked as a lozenge two or three times a day.

7. (Homœopathic Remedy.) As the last, repeating the dose every 10 or 15 minutes, followed by draughts of ice-cold water, until the symptoms abate.

8. (Mr. Hope's Remedy.) *Red nitrous acid*, 2 dr.; *peppermint water*, or *camphor julep*, 1 oz.; *tincture of opium*, 40 drops; mix. *Dose*. One to two teaspoonfuls in a cupful of thin gruel every 3 or 4 hours.

9. (Liverpool Preventive Powders.) *Bicarbonate of soda*, 20 gr.; *ginger*, 10 gr.; for a dose. One to be taken in a glass of water after breakfast and supper daily.

10. (Police Remedy; Mr. B. Child's do.) *Rectified sulphuric ether* and *tincture of opium*, of each, 30 drops; for a *dose* for an adult; especially during the early stages.

11. (Mr. Ross's Astringent Pills.) Each pill contains 1 gr. of *nitrate of silver*, made up with *crumb of bread*, q. s. *Dose*. One pill, to be repeated after the interval of half an hour or an hour, should the symptoms continue unabated.

12. (Dr. Stevens's Saline Powders.) *Bicarbonate of soda*, ½ dr.; *common salt*, 20 gr.; *chlorate of potassa*, 7 gr.; for a dose.

13. (Common Remedies of the Shops.) These generally consist of *chalk mixture*, with a little *laudanum*, and some aromatic or carminative, as *cassia*, *cinnamon*, *cardamoms*, *nutmeg*, or *peppermint*. In a few, some astringent, as *tincture of catechu*, or extract of *logwood*, is added.

CHOLESTERINE. This substance is found in the bile, brain, nerves, blood, &c., and forms the principal ingredient of *biliary calculi*.

Prep., *&c.* The *calculi* (gall-stones) are reduced to powder, and boiled for some time in strong *alcohol;* the solution, filtered whilst hot, deposits *crystals of cholesterine* on cooling. It forms brilliant colourless plates; is tasteless and inodorous; insoluble in water; soluble in ether, and freely so in hot alcohol; it melts at 278° Fahr.; resists saponification; and has, for the most part, the character of a fat.

CHOLESTROPHANE. A peculiar compound formed when *amalic acid* is treated with *oxidizing* agents.

CHOLIC ACID. Syn. *Glyco-cholalic Acid.* A peculiar acid found in combination with soda, and associated with choleic acid in the bile.

Prep. Perfectly dried *ox-bile*, is digested in *absolute alcohol*, in the cold, and after filtration *ether* is added; at first a brownish resinous mass is deposited, and after some time, stellated crystals of cholate or glycocholate of soda and potassa, (*crystallized bile*, of Platner;) a solution of these crystals, decomposed by *dilute sulphuric acid*, yields a solution of *cholic acid*, from which crystals may be obtained by evaporation.

Prop., *&c.* Delicate white needles; bitter tasted; soluble in water, and in alcohol, and slightly so in ether; boiled with solution of potassa, it is converted into *glycocine* or *gelatine sugar* and *cholalic acid;* boiled with concentrated sulphuric or hydrochloric acid, it yields *glycocine* and a new white amorphous compound, named *choloidinic acid.* Cholic acid forms salts termed *cholates*, or *glyco-cholates.* It differs from *choleic acid* chiefly in not containing sulphur.

CHONDRINE. Gelatine obtained from *cartilage.* It differs from ordinary gelatine, in being precipitable by acetic and the mineral acids, and by alum, persulphate of iron, and acetate of lead.

CHROMATE. Syn. *Chromas*,—Lat. A salt of *chromic acid.*

Prep. The *insoluble chromates*, as those of *baryta*, *zinc*, *lead*, *mercury*, *silver*, *&c.*, may be made by mixing a *soluble salt of those bases*, with *neutral chromate of potassa.* The first three are red; the fourth, orange; and the fifth, deep red or purple. The *soluble chromates* may all be made by direct solution of the *base* in the acid, or by double decomposition. The *chromates of commerce* are prepared from either *chrome ore* or *chromate of potassa.* See the *respective bases.*

Char. The chromates are characterised by their *yellow* or *red colour*, the latter predominating when the acid is in excess; and except those with the alkaline bases, they are, for the most part, insoluble in water.

Tests.—1. On boiling a chromate in hydrochloric acid mixed with alcohol, chromic acid is first set free, and then decomposed, forming a green solution of chloride of chromium. Sulphuretted hydrogen and sulphurous acid operate similar changes.—2. With acetate of lead, the chromates give a yellow precipitate;—3, with nitrate of silver, a reddish-violet;—4, with nitrate of mercury, a red one.

CHROME ALUM. The potassio-sulphate of chromium. It is prepared in the same way as common alum, by replacing the *alumina salt* with the corresponding one of *chromium.* See *Alums.*

CHROME GREEN. See *Green Pigments.*

CHROME RED. See *Red Pigments.*

CHROME YELLOW. See *Chromate of Lead.*

CHROMIC ACID. Syn. *Peroxide of Chromium ; Acidum Chromicum*, — Lat.

Prep. 1. By conducting *gaseous fluoride of chromium* into a *silver* or *platinum vessel*, the sides of which are *just moistened with water*, and the aperture covered with a piece of *moist paper*, the acid will be deposited under the form of red acicular crystals, which will nearly fill the vessel. When the process is skilfully conducted the product is of exquisite beauty and chemically pure.

2. (Warrington.) *Cold saturated solution of bichromate of potassa*, 2 parts; *pure oil of vitriol* (strongest), 3 parts; both by volume; mix. As the liquor cools the chromic acid is deposited under the form of brilliant crimson-red prisms; the mother liquor is then poured off and the crystals, placed between two tiles of glass or porcelain, are submitted to strong pressure for some time, under a bell-glass or jar, when the acid will be found sufficiently dry. It may be deprived of a little adhering moisture, by placing it over sulphuric acid for a short time in vacuo.—Nearly pure. According to Schröffer, however, it contains about 6% of potassa, and nearly 1% of sulphuric acid.

3. (Commercial.) On the *large scale*, chromic acid is prepared by either of the following formulæ:—

a. To a *saturated solution of chromate of potash*, 100 parts, add *oil of vitriol* (sp. gr. 1·845), 49 parts; and let the whole cool. This is the common process. The product contains sulphate of potassa, but this does not much interfere with its value as a bleaching agent.

b. (Ure.) To a *boiling saturated solution of bichromate of potash,* add as much *oil of vitriol* as will convert the potash into a bisulphate. Let the whole cool, and be then washed with a *little water,* and stirred, when the liquid decanted from the granular mass will be "nearly pure chromic acid." It still retains some potassa.

c. From *chromate of baryta* and *dilute sulphuric acid,* in equivalent proportions; after a few hours the clear liquid is decanted.

d. (Reuben Phillips.) From *chromate of baryta* decomposed by *concentrated nitric acid.* The chromic acid is separated from the nitrate of baryta, by decantation, or which is still better, by filtration through glass or asbestos. It is then evaporated to dryness, when the nitric acid is volatilized, and pure chromic acid left behind. The volatilized nitric acid may be condensed, and again used for the same purpose. The *only precautions* necessary to insure the purity of the chromic acid prepared by this plan, are—to use a *sufficient quantity of nitric acid,* and to take care that the *nitric acid is sufficiently concentrated* and pure.

"The chromate of baryta may be easily prepared by mixing together *solutions of the chloride of barium,* and any of the *soluble chromates;* before it is used for the preparation of pure chromic acid, it should be washed several times." (Chemist, iii, 266.) See *Chromate of Lime.*

Chemically pure chromic acid, as well as the *crude commercial acid,* may be prepared by the last method.

e. (Chas. Watt, Jun.) From *chromate of lime,* by the action of an equivalent proportion of *sulphuric acid* diluted with *water.* This process has the great recommendation of cheapness, and Mr. Watt says that he employed it in the factory of Messrs. Hawes, for above two years, with *perfect success.*

Prop., &c. Chromic acid forms ruby-red crystals, soluble in water and alcohol. It is acrid, irritant, and caustic; stains the skin yellow, and when concentrated destroys it; decomposed by the action of light and contact with organic matter. Hence it should be kept in stoppered glass bottles, and its solution filtered through asbestos or powdered glass only. The ease with which it parts with a portion of its oxygen, and passes into the state of the green sesquioxide, constitutes its value as a bleaching agent. It is largely employed in the arts, in calico-printing, bleaching of textile fabrics, tallow, oils, &c., and in dyeing. "A solution of chromic acid in oil of vitriol is preferable as an oxidizing agent to every other at present known." (Ure.) It has been recently highly extolled as a caustic in surgery, as "when rightly managed, it does not spread beyond the prescribed limits; and so soon as its erosive operation is finished, passes into the state of inert, pulverulent sesquioxide."

CHROMIUM. A metal discovered by Vauquelin in 1797.

Prep. 1. (Vauquelin.) Dry *chloride of chromium* is mixed with *oil,* the paste placed in a crucible lined with *charcoal,* the cover luted on, and the whole exposed for an hour to an intense heat.

2. (Liebig.) Heat the *compound of terchloride of chromium* and *ammonia* to redness, and expose it to a current of *dry ammoniacal gas.*

3. *Crude oxide of chromium,* 5 parts; *powdered charcoal,* 4 parts; expose the mixture to an intense heat, in a lined crucible, as before.

Tests. The salts of *sesquioxide of chromium* are recognised as follows:—1. Caustic alkalies precipitate the hydrated oxide, easily soluble in excess of the precipitant.—2. Ammonia, the same, but the precipitate is *nearly insoluble.*—3. The carbonates of potassa, soda, and ammonia, throw down a green precipitate of carbonate and hydrate, slightly soluble in a large excess.—4. Sulphuretted hydrogen causes no change.—5. Hydrosulphuret of ammonia precipitates the hydrate of a bluish-green colour.

Remarks. The product of the first process has a whitish-yellow colour, and a metallic lustre; that of the rest is a black powder. Sp. gr. 5·9. Metallic chromium has not been applied to any use in the arts. Ulgren found a peculiar substance in the chrome iron ore from Röros, to which he gave the name of *aridium,* considering it to be a new metal; a fact not yet satisfactorily decided.

CHROMIUM (Chlorides of). Two chlorides of chromium are described by chemists:—

1. *Protochloride of Chromium.* From the violet coloured *sesquichloride of chromium,* placed in a glass or porcelain tube, heated to redness, and exposed to a *stream of perfectly dry and pure hydrogen* gas. A white foliated mass, soluble in water (evolving much heat), and yielding a blue solution, which absorbs atmospheric oxygen with astonishing rapidity, acquiring a deep-green colour, and passing into the state of *oxychloride of chromium.* It is the most powerful reducing or deoxidizing agent known.

2. *Sesquichloride of Chromium, Chloride of do.—a.* Dissolve *hydrated oxide of chromium* in *hydrochloric acid,* and evaporate to dryness.

b. Digest *chromate of lead* in *hydrochloric acid* mixed with a little *alcohol,* and throw down the excess of lead with *sulphuretted hydrogen.*

c. Pass *dry chlorine* over a *mixture of sesquioxide of chromium* and *charcoal,* heated to redness, in a porcelain tube. The chloride collects as a sublimate, of a peach or purple colour in the cool part of the tube.

Obs. By the first process the product is a green powder, which when heated to 400° becomes purplish-red, and then forms pure, *dry chloride of chromium.* This process should be performed in a tube filled with carbonic acid gas. The product of the third process is also chemically pure. According to M. Péligot, it is totally insoluble in water, under ordinary circumstances, even at a boiling heat. It dissolves, however, and assumes the deep green hydrated state in water containing an exceedingly minute quantity of *protochloride of chromium* in solution. The hydration is marked by the evolution of much heat, and may be referred to the peculiar class of actions which are included under the name of *Katalysis* by modern chemists.

CHROMIUM (Fluorides of). Syn. *Hydrofluorates of Chromium.* Two of these deserve notice here:—

1. *Sesquifluoride of Chromium.* From *hydrated oxide of chromium* dissolved in *hydrofluoric acid* and the solution evaporated. A crystalline green mass.

2. *Perfluoride of Chromium, Gaseous do.; Fluorchromic Acid.* From *fluor spar,* 3 parts; *chromate of lead,* 4 parts; *fuming* (or the strongest) *sulphuric acid,* 5 parts; mixed cautiously, in a silver or leaden retort. A red-coloured gas is evolved, which acts rapidly on *glass,* forming *fluosilicic acid gas,* and upon *water,* forming *hydrofluoric acid* and *chromic acid.* The moisture of the atmosphere is sufficient to effect the decomposition last referred to; the former substance escaping as gas, and the latter being deposited in small crystals. See *Chromic Acid.*

CHROMIUM (Oxides of).—1. *Protoxide of Chromium, Brown Oxide of do.* From a solution of *protochloride of chromium* by adding a solution of *potassa.* A brownish-red powder. By substituting *ammonia* for potassa, as the precipitant, *hydrated protoxide of chromium,* under the form of a pale greenish powder, is obtained. Protoxide of chromium forms pale blue-coloured salts with the acids, which absorb oxygen with avidity, whilst the metal passes into a higher state of oxidation.

2. *Sesquioxide of Chromium, Oxide of do.—a.* To a solution of *chromate of potassa* add a solution of *protonitrate of mercury,* as long as a precipitate forms; this must be collected, well washed in water, and heated to redness in an earthen crucible.

b. From *bichromate of potassa* exposed to a strong red heat, and then washed with *water* until all the potassa is removed.

c. From *bichromate of potassa* mixed with half its weight of *sulphur,* and then treated as above.

d. From *chromate of potassa,* (perfectly dry,) 48 parts; *gunpowder,* 9 parts; *sal ammoniac,* 7 parts; reduced to fine powder, and pressed into conical moulds of glass or porcelain, which are then inverted, so as to leave the compressed powder on a porcelain or wedgewood-ware slab; it is then set fire to at the apex and allowed to burn itself out; as soon as the residuum is cold it is elutriated and dried. Very bright coloured. All the above are anhydrous.

e. (Hydrated.) By adding equal parts of *hydrochloric acid* and *alcohol* or *sugar,* to a *boiling solution of chromate of potassa* in water, in small portions at a time, until the red tint disappears, and the liquid assumes a green colour; *pure ammonia,* in excess, is next added, and the precipitate which subsides is collected, and washed with water.

f. From a *solution of sesquioxide of chromium* in *potassa* or *soda,* a *green gelatinous hydrate* gradually separates on standing.

Prop., &c. The *anhydrous oxide* is a rich crystalline green powder, insoluble in both water and acids; fused with borax and glass it imparts a beautiful green colour; *the hydrated oxide* is soluble in the acids and in alkaline lyes; with the first, it forms salts which have a green or purple colour. These compounds may be made by direct solution of the *hydrated sesquioxide* in the *dilute acids.* The sulphate combines with the sulphates of potassa and ammonia, giving rise to salts (*chrome alums*) which crystallize in magnificent octahedrons of a deep claret colour. The finest crystals are obtained by spontaneous evaporation.

Sesquioxide of chromium is a feeble base and its salts easily suffer decomposition. It is much used in the manufacture of coloured glasses and enamels, and in dyeing; and it forms a beautiful green pigment. The *emerald* owes its colour to this oxide.

Obs. The above appear to be the only oxides of chromium. A *protosesquioxide* or *deutoxide of chromium* has been described by Berzelius and others, which appears to be composed of the protoxide and sesquioxides of that metal. See *Chromium* and *Chromic Acid.*

CHROMULE. Syn. *Chromyle.* The green colouring matter of the leaves of plants. See *Chlorophylle.*

CHRYSAMMIC ACID. *Prep.* Add *aloes*, 1 part; to *nitric acid* (sp. gr. 1·37), 8 parts; and heat the mixture in an open vessel. When the first violent action is over, introduce the whole into a retort, and distil to two thirds; then add 4 parts more of *nitric acid*, and keep the mixture nearly at the boiling point for some days, or as long as gas is disengaged. If *water* is now added, *impure chrysammic acid* is thrown down, whilst *chrysolepic acid* and *oxalic acid* remain in the solution. The washed precipitate is purified by combining it with potassa, crystallizing the resulting potash salt, dissolving the crystals in water, and decomposing the new solution with *nitric acid*, when a golden yellow powder is deposited, which is pure *chrysammic acid.*

Prop., *&c.* Soluble in alcohol, ether, and hot acids; explodes by heat; and forms salts with the bases called *chrysammates. Chrysammate of potassa*, prepared as above, is a beautiful crystalline carmine red powder, and when slowly produced it forms beautiful small greenish golden crystals. *Chrysammate of soda* and *chrysammate of magnesia*, resemble the potash salt. *Chrysammate of ammonia* forms superb dark-green crystals, which give a deep purple solution. All the other salts of this acid are of great beauty, (green, orange, or red,) and most of them exhibit a golden lustre under the burnisher.

CHRYSANILIC ACID. *Indigo*, (in powder,) is boiled with a *highly concentrated solution of caustic potassa*, until almost entirely dissolved, and then allowed to cool out of contact with the air; the crystals deposited (*chrysanilate of potassa*) are next dissolved in *water*, the solution filtered, and a *mineral acid* (hydrochloric) added in slight excess. It may be further purified and obtained in crystals by solution in alcohol.

CHRYSENE. A beautiful yellow crystalline powder, obtained by M. Laurent, along with *pyren*, by the destructive distillation of *pitch.* It is insoluble in water and alcohol, and nearly so in ether; fuses by heat and sublimes unchanged; warm oil of vitriol dissolves it, and then assumes a magnificent deep green colour; boiling nitric acid converts it into an insoluble red resin-like substance.

CHRYSOLEPIC ACID. Obtained from the mother-liquor which has deposited chrysammic acid. It forms golden-yellow crystalline scales, of sparing solubility. It greatly resembles *picric acid. Chrysolepate of potassa* occurs under the forms of small yellow prismatic crystals.

CHRYSOPHANIC ACID. From *lichen parietinus* (Linn.) or *yellow wall parmelia.* It crystallizes in beautiful golden-coloured needles, and may be sublimed in close vessels without decomposition.

CHURRUS. See *Extracts* and *Hemp* (Indian).

CIDER. Syn. *Cyder; Pomaceum*,—Lat. Cider is the fermented juice of the apple, and is a very ancient beverage. Pliny calls cider and perry the "wine of apples and pears."

The *attention of the cider farmer* should be first directed to the *culture of the apple tree.* The situation most appropriate for an ORCHARD, is one on rising ground, rather dry than moist, and unexposed to sea air or high winds. The *soil* should be strong, but not too heavy, and should be rich in the alkaline and earthy bases, especially the phosphates. The *selection of the proper varieties of the apple* for grafting, is also a point on which particular care should be taken. It is found that the juices of different kinds of apples vary in the quantity of saccharine matter which they contain, as well as in other particulars that influence the quality and flavour of the cider prepared from them. In general, those varieties should be chosen that yield a juice *rich in sugar*, and contain *no undue amount of acid*, and which, after the period of active fermentation is past, furnishes a liquor which clarifies itself, and keeps well. This quality of the juice may generally be determined from its specific gravity. The heaviest and clearest is the best; other points being equal. The following table, by M. Convercher, may here be advantageously inserted:—

Varieties of Apple.	Sp. gr.
Green rennette, or queen apple	1·094
English rennette	1·080
Red rennette	1·072
Musk rennette	1·069
Fouillet rayé	1·064
Orange apple	1·063
Rennette of Caux	1·060

English writers generally class *cider apples* into—*bitter*, *sweet*, and *sour*. The *first* are the best; their juice has the greatest specific gravity, is the richest in sugar, ferments the most freely, clarifies spontaneously the quickest, and keeps the best after fermentation. They contain a minute quantity of extractive matter which is not present in other apples. The juice of *sweet apples* ferments tumultuously, clears with difficulty, and the resulting cider does not keep so well as that produced from the first variety. The juice of *sour apples* contains less sugar and more acid than the other two, and consequently not only produces the weakest, but the worst cider; it, however, "fines" well, although it "stores" badly. *Sour* and *rough-tasted apples* are usually preferred by *farmers* for making cider. This preference, which is very decided among the farmers of the West of England, may be readily accounted for. The sour and rough-tasted apples contain less sugar and more malic acid than some of the other varieties, and the presence of this acid impedes the conversion of the alcohol of the cider into vinegar; a change which their rude mode of operating renders otherwise inevitable. But cider made with such apples never equals in quality that prepared *at a low temperature* from fruit *abounding in sugar*, provided equal skill is exercised in the manufacture, as in the process of converting malt-worts into beer.

The *process of making cider* varies in different places, but in every case essentially consists of—the *collection of the fruit;* the *expression* and *fermentation* of the *juice;* and the *storing* and *management of the fermented liquor.*

The *collection of the fruit* should not be commenced before it has become sufficiently mature, and should be performed with greater care than is commonly bestowed upon it. The apples after being gathered are usually left for 14 or 15 days in a barn or loft, to mellow or mature, during which time a considerable portion of the *mucilage* is decomposed and *alcohol* and *carbonic acid* developed. If this "ripening" is allowed to go too far, loss arises; notwithstanding the vulgar prejudice in its favour. The *spoiled apples* are then separated from the *sound ones*, as they not only impart a bad flavour to the cider, but impede its spontaneous clarification. *Unripe apples* are also avoided, as they do not contain sufficient sugar to undergo the vinous fermentation, whilst they contribute to render the liquor rough and acidulous, and watery.

The *expression of the juice* is the next step in the process of cider-making. The apples are *crushed* or *ground* in mills consisting of two fluted cylinders of hard wood or cast iron, working against each other. The common practice is next to sprinkle the pulp with $\frac{1}{6}$th to $\frac{1}{4}$th of its weight of *spring* or *river water*, and then to allow it to remain in tubs or wooden cisterns for 12 or 14 hours, during which time incipient fermentation commences, and the breaking up of the cells of the membrane takes place, by which the subsequent separation of the juice is facilitated. This plan, though general among farmers, is prejudicial to the quality of the future liquor; as not only is a portion of the newly formed alcohol lost, but the skins and pips often impart to it a disagreeable flavour. By employing more efficient crushing or comminuting machinery, this system of vatting is rendered quite unnecessary. A machine furnished with a revolving circular rasp, similar to that used in making potato starch, is admirably adapted to this purpose.

The *pulp of the crushed* or *ground apples* is now placed on a kind of wicker frame, or in hair-cloth or coarse canvass bags, and after being allowed to drain into suitable tubs or receivers, is subjected to powerful pressure, gradually applied, in the cider press. The liquor which runs off *first*, is the best, and is usually kept separately; whilst that which follows, especially the portion obtained by much pressure, tastes of the "pips" and skins.

The *expressed juice* or *must*, obtained as above, is next put into clean casks with large bung holes, and freely exposed to the air in the shade, where they are placed on "stillions," with flat tubs under them to catch the waste. They are now constantly attended to, and kept quite full, in order that the yeast, as it forms, may froth over and be carried off from the surface of the liquor. After 2 or 3 days for *weak cider*, and 8 or 10 days for *strong cider*, or as soon as the sediment has subsided, the liquor is "racked off" into clean casks, which have been (according to the common practice) previously *sulphured* with a *cooper's match.* The casks containing the "*racked cider*" are then stored in a cellar, shaded barn, or other cool place, where a low and regular temperature can be insured, and are left to mature or ripen. By the following spring the cider is commonly fit for use, and may be "re-racked" for sale.

The *marc*, or pressed pulp, is generally again sprinkled with $\frac{1}{3}$ or $\frac{1}{2}$ its weight of *water*, and re-pressed. The resulting liquor, when fermented, forms a weak kind of cider, (*cider moil, water moil,*) which is reserved for domestic use in the same way as table-beer. The refuse-pulp (*apple marc, pomace, pommage, apple cheese,*) is used as food for pigs and store cattle, and is very acceptable to them.

The *storing* and *management of cider* are matters of vast importance to the cider farmer, the factor, the wholesale dealer, and the bottler. The principles by which these should be directed are precisely similar to those which are explained under the heads *Brewing*, *Fermentation*, and *Malt Liquors;* and which, indeed, refer, with slight modifications, to all fermented liquors.

Preparatory to *bottling cider*, it should be examined, to see whether it is clear and sparkling. If not so, it should be *clarified*, in a similar way to beer, and left for a fortnight. The night before it is intended to put it into bottles, the bung should be taken out of the cask, and left so until the next day, and the filled bottles should not be corked down until the day after; as, if this is done at once, many of the bottles will burst by keeping. The *best corks* should alone be used. *Champagne bottles* are the variety generally chosen for cider. It is usual to *wire* down the *corks*, and to *cover them* with *tinfoil*, after the manner of champagne. A few bottles at a time may be kept in a warm place to ripen. When the cider is wanted for immediate use, or for consumption during the cooler portion of the year, a small piece of *lump sugar* may be put into each bottle before corking it; or, what is the same thing in effect—the bottles may be corked within 2 or 3 hours after being filled. In summer, and for long keeping, this practice is, however, inadmissible. The *bottled stock* should be stored in a cool cellar, when the quality will be greatly improved by age. Cider for bottling should be of good quality, sound and piquant, and at least a twelvemonth old. When out of condition it is unfit for bottling.

Qual., &c. Cider, when of good quality, and in good condition, is doubtless a very wholesome liquor. Cider consumers, living in the cider districts, appear to enjoy almost an immunity from cholera, and often from other diseases which are common in other parts of the kingdom. At the same time, however, it is right to mention, that the dry colic or belly-ache (*colica pictonum*) is far from uncommon in these districts, but is wholly confined to those who drink *early*, *hard*, or *inferior cider*, made from harsh unripe fruit. We believe, that in most cases, it may be referred to the acid of the common cider having acted on the lead, pewter, or copper of the articles or utensils with which it has come in contact, and of which it has dissolved a very minute portion. The *best cider* contains from $8\frac{0}{0}$ to $10\frac{0}{0}$ of *absolute alcohol; ordinary cider*, from $4\frac{0}{0}$ to $6\frac{0}{0}$.

Concluding Remarks. Much of the excellence of cider depends upon the temperature at which the fermentation is conducted; a point utterly overlooked by the manufacturers of this liquor. Instead of the apple-juice, as soon as it is expressed from the fruit, being placed in a cool situation, where the temperature should not exceed 50° or 52° Fahr., it is frequently left exposed to the full heat of autumn. In this way much of the alcohol formed by the decomposition of the sugar is converted into vinegar, by the absorption of atmospheric oxygen, and thus the liquor acquires that peculiar and unwholesome acidity, known in the cider districts by the name of "*roughness*." When, on the contrary, the fermentation is conducted at a low temperature, nearly the whole of the sugar is converted into alcohol, and this remains in the liquor, instead of undergoing the process of acetification. The acetous fermentation, by which alcohol is converted into vinegar, proceeds most rapidly at a temperature of about 90° Fahr., and at lower temperatures, the action becomes gradually slower, until at 46° to 50° Fahr., no such change takes place. (Liebig.) It is therefore evident, that if the saccharine juice of apples, or any other fruit, is made to undergo the *vinous fermentation* in a cool situation, *less* of the spirit resulting from the transformation of the sugar will be converted into acetic acid, and, consequently, *more* will be retained in an unaltered state in the liquor, to improve its quality, and by its conservative and chemical action, to preserve it from future change. This is the principal cause, other circumstances being alike, of the difference in the quality of the cider made by persons living in the same district. The one has probably a cooler barn and cellar than the other to store his liquor in, and is more careful to keep the pulp and juice cool during the early part of the process. In Devonshire, the pressing and fermentation are conducted in situations where the temperature varies little from that of the external air, and fluctuates with all its changes; the result is, that Devonshire cider, of the best class, will rarely keep more than 4 or 5 years, and seldom improves after the second or third year, whilst the cider of Herefordshire and Worcestershire, where these operations are more carefully attended to, will keep for 20 or 30 years.

As the juice of apples contains less sugar in proportion to the amount of acid and nitrogenized matter than that of grapes, the addition of some of this article renders it more suitable for the production of a vinous liquor. Potato sugar has been used for this purpose, but good West India sugar is preferable. We have tasted cider made with this addition, and which had been stored in fresh emptied rum puncheons, that had all the pungency and vinosity of foreign wine.

When the pressing the apples for the juice is deferred until late in the season, it sometimes happens that the fermentation is slow of being developed. Though the juice has been set on the old system, in November or December, the working sometimes hardly commences until March. At this time the cider is sweet; it now rapidly becomes pungent and vinous, and is soon ready to be racked for use. When the fermentation continues, it is usual to rack it again into a clean cask that has been *sulphured*, and to leave behind the 'head' and sediment; or two or three cans of cider are put into a clean cask, and a match of brimstone burned in it: it is then agitated, by which the fermentation of that quantity is completely stopped. The cask is then nearly filled, the fermentation of the whole is checked, and the cider shortly afterwards becomes fine. In operating in this way, care must be taken that the sulphuring be not *overdone*, as it is apt to impart a slight flavour to the liquor, which is readily detected by an experienced cider taster. If, on the first operation, the fermentation is not checked, the process of "racking" is repeated until the liquor becomes clear, and is continued from time to time till the cider is in a quiet state and fit for drinking.

A common practice in Devonshire is to add a stuff called "*stum*," sold by the wine-coopers, or an article called "*antiferment*," sold by the druggists, for the purpose of checking the fermentation, but a much better plan is that described above.

To *improve the flavour of weak cider*, or to render *ordinary cider more vinous*, various plans are followed by the cellarmen and bottlers. An excellent one is to add to each hogshead 1½ gall. of *good brandy or rum*, with 2 *oz.* of *powdered catechu* (dissolved in water), 10 *lb.* of *good moist sugar* or *honey*, ½ *oz.* each, of *bitter almonds* and *cloves*, and 4 *oz.* of *mustard seed*, (all in powder). These must be well "rummaged" into the liquor, and the whole occasionally stirred up for a fortnight, after which it must be allowed to repose for 3 or 4 months, when it will usually be found perfectly "bright," and no bad substitute for foreign wine. Should this not be the case, the liquor must be "fined" with a pint of isinglass finings, or a dozen eggs, and allowed to rest for a fortnight. If the cider is preferred *pale*, the catechu must be omitted, and instead of isinglass, a quart of skimmed milk is to be used as "finings." When desired of a *pinkish tint*, 1 *oz.* of *cochineal* (in powder,) may be added, instead of the catechu.

About 13 cwt. of November apples commonly yield one hogshead of cider. In Devonshire, about 6 sacks or 24 bushels are the common quantity for the hogshead of 63 gallons.

The best cider made at the present day is that of Normandy, Herefordshire, and New Jersey (U. S.), and next, that of Devonshire and Somersetshire. The last is very inferior. See *Antiferment*, *Fermentation*, *&c.*

CIDER (Champagne). This name is given in the United States of America to a fine pale variety of cider, much used for "bottling," which has a great resemblance to inferior champagne. The best variety comes from New Jersey. The name is also applied in this country in a similar manner. The following is a good form for a made-cider of this class:—

Prep. Good *pale vinous cider*, 1 hhd.; *proof spirit*, (pale,) 3 gall.; *honey* or *sugar*, 14 *lb.*; mix well, and let them remain together in a temperate situation for 1 month; then add *orange-flower water*, 3 pints; and in a few days fine it down with *skimmed milk*, ½ gall. This is very pale. A similar article, bottled in champagne bottles, silvered, and labelled, is often sold to the ignorant for champagne.

CIDER (Made). An article under this name is made in Devonshire, chiefly for the supply of the London market, it having been found that the ordinary cider will not stand a voyage to the metropolis without some preparation. The finest quality of made cider is only ordinary cider racked into a clean and well sulphured cask; but the mass of that which is sent to London, is mixed with *water*, *treacle*, and *alum*, and then fined down; after which it is racked into well-matched casks. The cider sold in London under the name of *Devonshire cider*, would be rejected even by the farmers' servants in that county.

CIDER (Raisin). This is made in a similar way to raisin wine, but without employing sugar, and with only 2 *lb.* of *rai-*

sins to the *gall.*, or even more, of *water.* It is usually fit for bottling in 10 days, and in a week longer is ready for use.

CIDERKIN. Cider moil.

CIDER MOIL. See *Cider.*

CIDER SPIRIT. See *Brandy.*

CIGARS. These well-known articles of luxury require no description. Their adulteration, and the influence of their use upon health, are referred to under the heads *Smoking* and *Tobacco.* See *those articles,* and *Aromatized Cigars.*

CIGARS (Medicinal). Syn. *Medicinal Cigarettes, Medicated Do.* The administration of medicinal agents in the form of cigars, is of recent introduction, and as yet, in only very limited use. The medicinal substance, if of a suitable description, as the leaves of plants, is made up into small rolls, like cheroots, and then smoked in the usual manner. In some cases, common cigars, or paper cigars, are medicated by moistening them in a preparation of the article to be administered. When the narcotic property of the tobacco would prove injurious, it is first exhausted by soaking and washing it in water.

CIGARS (Aromatic). Syn. *Aromatic Cigarettes; Cigarettæ Aromaticæ,*—Lat. *Cigarettes Aromatiques,* — Fr. *Aromatic spices, lavender flowers, &c.*, made into small cigars. For their odour; and in tooth-ache, face-ache, &c.

CIGARS (Aromatized). Syn. *Scented Cigars, Perfumed Do.; Cigarræ Aromaticæ,* —Lat. *Prep.* 1. By moistening ordinary cigars with a strong *tincture of cascarilla,* to which a little *gum benzoin* and *storax* may be added. Some persons add a small quantity of *camphor,* or of *oil of cloves* or *cassia.*

2. By soaking the tobacco, of which the cigars are to be made, or the cigars themselves, for a short time, in a very *strong infusion of cascarilla,* and then allowing them to dry by a very gentle heat.

3. By simply inserting very small shreds of *cascarilla bark* between the leaves of the cigar, or in small slits made for the purpose.

Obs. The above yield a very agreeable odour when smoked; but are said to intoxicate quicker than unprepared cigars of equal strength and quality. They lose much of their fragrance by age.

CIGARS (Arsenical). Syn. *Cigarræ Arsenicales,*—Lat. *Prep.* Dissolve *arseniate of soda,* 1 part; in *water,* 30 parts; dip white unsized paper into the solution, and form it into small rolls, 3 or 4 inches long. In pulmonary consumption; 4 or 5 whiffs as many times a-day.

CIGARS (Balsamic). Syn. *Balsamic Cigarettes; Cigarræ Balsamicæ, Cigarettæ B.,*—Lat. *Thick unsized paper* is soaked in a *solution of saltpetre,* and dried; after which it is brushed over *first* with *tincture of cascarilla,* and when again nearly dry, with *compound tincture of benzoin;* in about half an hour, it is cut into pieces ($1\frac{1}{2} \times 4$ inches), and rolled into cigarettes. In hoarseness, loss of voice, asthma, &c.

CIGARS (Belladonna). Syn. *Belladonna Cigarettes; Cigarettæ Belladonnæ,*— Lat. *Belladonna leaves* made into cigarettes of 1 dr. each. As an anodyne and antispasmodic; in troublesome coughs, hooping cough, tooth-ache, sore throat, tic doloreux, &c.

CIGARS (Belladonna,—Compound). Syn. *Cigarræ Belladonnæ Compositæ,*—Lat. From *belladonna leaves,* 4 parts; moistened with *tincture of opium* (Ph. L.), 1 part; dried, and made into 1 dr. cigarettes, as before. *Uses.* As the last.

CIGARS (Camphor). Syn. *Camphor Cigarettes; Cigarettæ Camphoræ,* — Lat. *Cigarettes de Camphire,*—Fr. *Prep.* 1. *Bibulous paper,* moistened with 2 or 3 drops of *essence of camphor,* and rolled into cigarettes. For *use,* they are loosely placed in a tubular cigar-holder.

2. (Raspail.) These are made by loosely filling a *quill* or *large straw* with *small fragments of camphor,* closing the open end with a little *cotton wool* or bibulous paper, and piercing the closed end with a pin, to allow the passage of air. Both the above are used cold, by drawing the air through them into the mouth, which then becomes very slightly charged with the vapour of camphor. In cold weather, the vaporization is promoted by holding the cigarette for a few minutes in the warm hand. "The eccentric Raspail recommended these cigarettes as a sort of panacea, or at least as a means of preventing disease." The homœopathists regard them as prophylactic of cholera, and the common people hold them to possess the same virtue in reference to contagious diseases generally, but especially typhus and scarlet fever. They should not be employed oftener than 3 or 4 times a day.

CIGARS (Henbane). Syn. *Cigarræ Hyoscyami,*—Lat. As *Belladonna Cigars.*

CIGARS (Mercurial). Syn. *Cigarræ Mercuriales,*—Lat. *Prep.* (M. Paul Bernard.) *Ordinary cigars* are deprived of their narcotic properties by soaking them in *water,* and are then wetted with a *weak solution of corrosive sublimate,* to which a little *opium* is generally added. The proportions may be, of *corrosive sublimate*, 1 gr.; *rectified spirit*, 20 drops; dissolve; add *laudanum*, 15 drops; with this solution, 6 cigars are to be equally moistened to within about 1½ inch of the mouth end, and then set aside to dry.

Used by persons afflicted with syphilitic affections of the throat and palate, as a convenient method of mercurial fumigation. For those accustomed to the use of tobacco, mild cigars, undeprived of their nicotine, may be employed for the purpose.

CIGARS (Stramonium). Syn. *Cigarræ Stramonii,*—Lat. From *Stramonium* (thorn apple) *leaves.* Smoked in asthma.

CINCHONA. Syn. *Cinchona,*—Lat. To give a mere notice of the various species of the genus cinchona, that furnish the barks of commerce, and the disputes of the numerous writers on medical botany and pharmacology, who profess to have investigated the subject, would occupy more space than could be devoted to this head in the present work. Volumes have, indeed, been written on it. We shall therefore confine ourselves to transferring to our pages the most useful portions of the notices of the *cinchonæ* which occur in the British Pharmacopœias, with slight abridgements. Those desirous of further pursuing the subject, are referred to the "*Medical Botany*" of Dr. Lindley, and the "*Elements of Materia Medica,*" of Dr. Pereira, where they will find all that is known respecting the cinchonæ collected together, and the various authorities, collated and explained.

PALE CINCHONA BARK. Syn. *Crown Bark, Gray do., Jesuit's do., Lance-leaved do., Loxa do., Pale do., Peruvian do., Quill do.; Cinchona Pallida, Coxtex Cinchonæ Pallidæ,*—Ph. L.D. and U.S. *C. C. Condamineæ,*—Ph. E. *C. C. Lancifoliæ,*—Ph. L. 1836. From "*cinchona condaminea.*" "Slender, quilled, brown on its external surface, often covered with lichens, and split with very many fissures, for the most part transverse, and sometimes in a circular direction; of a cinnamon-brown colour on its internal surface. In taste, astringent and bitter." (Ph. L.)

RED CINCHONA BARK. Syn. *Red Bark, Oblong-leaved do.; Cortex Ruber, Cinchona Rubra, Cortex Cinchonæ Rubræ,*—Ph. L.E.D. and U.S. *Cinchona Oblongifolia,*—Ph. L. 1836. From "uncertain species of cinchona." "Thick, either flat or curled, rough in the inner side, with wrinkles, furrows, or warty projections; reddish brown, or of a chesnut colour; bitter in taste." (Ph. L.)

YELLOW CINCHONA BARK. Syn. *Calisaya Bark, Heart-leaved do., Royal do., Yellow do.; Cinchona Flava* (Regia),—Ph. L. *C. Flava,*—Ph. E.D. and U.S.—*Cinchona Cordifolia,*—Ph. L. 1836. From "cinchona calisaya." "Thick, for the most part covered with very fine sharp fibres, either flat or curled. This species is ashy or brownish on its outer surface, rugose in its long direction, and cleft with deep fissures either transversely or circularly. It is generally naked, and of a brownish cinnamon tint. It has an extremely bitter taste. About 3 dr. of sulphate of quinine should be obtained from 1 lb. of this bark by the aid of sulphuric acid." (Ph. L.)

Pur., &c. The officinal species of cinchona bark are frequently imported mixed with other kinds, that contain less of the febrifuge principle. The most common adulteration is, however, the admixture of the same drug that has been exhausted of its active portions in the manufacture of *sulphate of quinine, cinchonine,* and *tincture, infusion, decoction,* and *extract of bark.* This is especially practised on the powder on account of the fraud being less easily detected when the drug is in the pulverulent state. The following substances have been used by fraudulent dealers either as SUBSTITUTES for cinchona bark, or to REDUCE THE PRICE of the *ground bark:—roots of bistort, calamus aromaticus, avens, water-avens, geum montanum,* and *tormentil; oak bark,* that of *several kinds of willow, horse chesnut, ash,* and the *sloe bush; mahogany sawdust,* the *dried herbs of yellow loosestrife, bugle, water-horehound,* and *self-heal;* the barks of *pinknea pubescens, unnona febrifuga, swietenia febrifuga, cedrela tuna, magnolia glauca, m. acuminata, m. tripetala, achras sapota, rubus trivialis,* and *r. villosus;* and, in fact, any trash that will possibly produce a powder at all resembling that of bark, or that can be made so by grinding and the addition of colouring.

Tests. The only certain method of ascertaining the quality of cinchona bark, and of detecting fradulent admixture, is by an assay for the alkaloid. See *Quinometry.* The *tannic acid* which exists in every species of cinchona bark, may be recognised by its precipitating the *sesquichloride of iron* of a green colour, *gelatine* of a whitish colour, and a *solution of tartar emetic* of a *dirty* white.

Uses, &c. All the cinchona barks are tonic and febrifuge, and may be given *in powder,* from 20 gr. to 60 gr., or more, if the stomach will bear it, every two to four hours, in agues or intermittent fevers, gangrene, &c.; and in *infusion* or *decoction*, as a tonic in debility, dyspepsia, &c. Since the introduction of the cinchona alkaloids, the employment of bark in substance has considerably lessened.

CINCHONA RED. Syn. *Red Cinchonic.* The insoluble red colouring matter of cinchona bark. It is an inodorous, reddish-brown substance, nearly insoluble in cold water, more soluble in hot water, and readily soluble in alcohol, ether, and alkaline lyes; acids also favour its solution.

CINCHONIA. Syn. *Cinchonine, Cinchonina, Cinchonium.* An alkaline principle extracted from *pale cinchona bark*, in the same way as *quinine* is from *yellow cinchona bark.*

Prep. 1. Add *liquor of ammonia* to a *dilute solution* of *hydrochlorate* or *sulphate of cinchonia*, as long as a precipitate falls; wash this precipitate with cold water, then digest it in *ether;* lastly, dissolve it in *alcohol*, and crystallize. The crystals are free from quinine, and chemically pure.

2. (*Commercial.*)—*a.* From the mother-liquors from which sulphate of quinine has been obtained. The salt of quinine being the least soluble of the two, crystallizes out of the liquor first, and after its separation, the liquid is operated for fresh crystals, which are the cinchonia salt; from these the alkaloid is obtained as above, the other part of the process being omitted. Contains a little quinine and quinoidine.

b. (*Direct.*) *Bruised pale bark*, 1 *lb.*, is boiled in *water*, 1 gall., to which *sulphuric acid*, $\frac{1}{2}$ *fl. oz.* has been previously added; the decoction is repeated with about half the quantity of liquid, and so on till *all* the soluble matter of the bark is extracted. The decoctions are then mixed together, and strained, and *powdered slaked lime* is added, in a proportion somewhat greater than necessary to saturate the *acid;* the precipitate that ensues (*cinchonia* and *sulphate of lime*) is collected, dried, and boiled for some minutes in *strong alcohol*, which is then decanted off while still hot, and *fresh portions* successively added, and the operation repeated until it ceases to act on the residuum, which is merely sulphate of lime. The different *alcoholic solutions* are then put into a retort or still, and considerably evaporated, during which, and especially on cooling, *acicular crystals* of *cinchonia* are deposited. The whole is now collected, and the crystals, if yellow or discoloured, again dissolved in *boiling alcohol*, and by recrystallization obtained colourless.

Prop., &c. These are, for the most part, similar to those of quinine; but it is less powerfully febrifuge, and rather less soluble in water and alcohol than that alkaloid. It readily separates from its hot alcoholic solution as it cools, under the form of small, colourless, and beautifully brilliant transparent, four-sided prisms. It is nearly insoluble in *cold* water; *boiling* water takes up only the $\frac{1}{2500}$th part; rectified spirit dissolves only about 3%,—strong alcohol more.

Cinchonia is distinguished from *quinine* by—1. The insolubility of itself and salts in ether;—2. By the form of its crystals;—3. By its solution in alcohol or acidulated water, possessing the property of right-handed rotary polarization;—4. By evolving white fumes, when fused, which condense on cold substances in the form of a loose sublimate, which when viewed by a lens, is found to consist of small brilliant needle-like crystals;—5. By evolving an aromatic odour during its sublimation, which is peculiar and characteristic.

Cinchonia is distinguished from *quinidine* by its solution in chlorine water giving a white precipitate with ammonia.

Cinchonia forms *salts* with the acids, all of which may be made in the same manner as the corresponding salts of quinine. The *neutral sulphate, bisulphate, disulphate, hydrochlorate, nitrate, iodide, iodate*, &c., have been formed and examined. Those of *commerce* are usually obtained from the *mother-waters of the sulphate of quinine manufacturers.* On the *small scale*, the alkaloid may be at once dissolved in the *dilute acid.* They are all exceedingly bitter. (See *below.*)

In *medicine*, the preparations of cinchonia are nearly superseded by those of quinine, and are seldom inquired for in trade. See *Quinine, Quinometry, &c.*

CINCHONIA (Sulphate of). Syn. *Disulphate of Cinchonia; Cinchoniæ Sulphas, C. Disulphas*,—Lat. Soluble in 6$\frac{1}{2}$ parts of alcohol of sp. gr. 0·85; in 11$\frac{1}{2}$ parts of absolute alcohol; and in 54 parts of water at 60° Fahr. See *Cinchonia.*

CINCHONIA (Bisulphate of). Syn. *Neutral Sulphate of Cinchonia; Cinchoniæ Bisulphas*,—Lat. Prepared by dissolving *sulphate of cinchonia* in *water acidulated with sulphuric acid*, and evaporating the solution so that crystals may form. Efflorescent, rhomboidal octahedra; much more soluble than the last. See *Cinchonia.*

CINCHONIC ACID. See *Kinic Acid.*

CINCHO-TANNIC ACID. The soluble red colouring matter of cinchona bark. It differs from ordinary tannic acid in its greater solubility, and in striking a green colour with the sesquioxide of iron.

CINCHOVATINE. Syn. *Cinchovine.* From *cusco bark* or *ash cinchona.* It is identical with *aricine* (which see.)

CININE. See *Santonine.*

CINNABAR. The native red sulphuret of mercury. *Factitious cinnabar* is vermillion.

CINNAMEINE. Syn. *Oil of Balsam of Peru. Prep.* 1. Add an *alcoholic solution of balsam of Peru* to a like *solution of potassa.* A compound of resin and potassa is precipitated, and *cinnamate of potassa* and *cinnaméine* are left in solution. On adding water, the latter separates and floats upon the surface.

2. Add *balsam of Peru,* 2 parts; to *liquor of potassa* (sp. gr. 1·300), 3 parts; both by volume; apply a gentle heat, when a yellowish brown oil will separate and float above a heavy black liquid, containing the potassa. The former must be collected and purified by cautious distillation.

Prop., &c. A reddish brown, acrid, odourless, oily fluid; heavier than water; soluble in alcohol and ether; insoluble in water. By exposure to air, it combines with the elements of water and forms a soft resin (*resin of balsam of Peru; styracine; hydrate of cinnaméine.*) By distillation with hydrate of potassa, both the above substances are converted into *cinnamic acid,* and a neutral substance, which also assumes two forms (*peruvine* aud *styrone.*) According to Richter, oil of balsam of Peru (*cinnaméine*) is composed of two distinct oils —one, (*myrospermine,*) soluble in alcohol; the other, (*myroxiline,*) insoluble in alcohol.

CINNAMIC ACID. Syn. *Cinnamonic Acid.* A substance discovered by Dumas and Peligot in oil of cinnamon. It crystallizes out of the oil when long exposed to the atmosphere. By exposing the oil in a *jar of oxygen gas,* it is rapidly converted into a white crystalline mass of *hydrated cinnamic acid.*

Prep. 1. Dissolve *oil of balsam of Peru* in *potassa water,* evaporate to dryness, dissolve the residuum in *boiling water,* and add an excess of *hydrochloric acid.* The cinnamic acid is deposited in crystals as the solution cools, and may be purified by resolution and crystallization.

2. By cautiously distilling *balsam of tolu* by a gentle heat. It first fuses, and a little water and volatile oil come over, followed by *cinnamic acid,* in the form of a heavy oil, which condenses on the cooler parts of the neck of the retort, as a white crystalline mass. Towards the end of the process some empyreumatic oil distils over. The acid is purified by pressure between the folds of filtering paper and solution in boiling water. On cooling, minute colourless crystals of cinnamic acid are deposited. Pure balsam of tolu yields about $\frac{1}{8}$th of its weight of this acid.

Prop., &c. Colourless transparent scales, or prisms; scarcely soluble in water; freely so in alcohol; fuses at 240°; volatilizes unchanged at 555°Fahr. Distilled with a strong solution of *bichromate of potash* and *oil of vitriol,* it is converted into *benzoic acid.* It forms salts with the bases, called *cinnamates* or *cinnamonates,* which greatly resemble the corresponding benzoates.

CINNAMIC ACID (Anhydrous). A crystalline powder, fusing at 260° Fahr. See *Acids* (Organic).

CINNAMOL. Syn. *Styrol.* An oily liquid obtained by distilling *cinnamic acid* with an excess of *quicklime* or *baryta.* Liquid storax treated in the same manner yields a like product (*styrol.*)

CINNAMON. Syn. *Cinnamomum,*—Lat. The "bark of *cinnamomum zeylandicum,* (Rees,)" or "*laurus cinnamomum,* (Linn.)" "Slender, closely rolled, the smaller quills being enclosed in the larger ones." (Ph. L.) Oil of cinnamon (*oleum cinnamomi*) is officinal in the Pharmacopœias.

Obs. From the high price of this drug it has become a general practice to substitute the bark of cassia (*cassia; cortex cinnamomum cassia;*) for it, which so closely resembles it in flavour, that the "uninitiated" regard them as the same. Cassia is, however, not only *thicker* and *coarser* than cinnamon, but its fracture is short and resinous, and its flavour is more biting and hot, whilst it lacks the peculiar sweetish taste of cinnamon. The thickness of cinnamon seldom exceeds that of good drawing paper. The same remarks also apply to the oil and powder. In pharmacy it is, unfortunately, a general practice to employ cassia and its preparations whenever those of cinnamon are ordered. Both these drugs are wholesome aromatics. The principal consumers of cinnamon are the chocolate makers of France, Spain, Italy, and Mexico. The Germans, Turks, and Russians, prefer chocolate flavoured with cassia. "Some cinnamon, sent to Constantinople by mistake, proved unsaleable at any price, whilst cassia, worth about sixpence per pound, was in great request." (Pereira.)

CINNAMYLE. The hypothetical radical of cinnamic acid and the other compounds of the *cinnamyl-series.*

CIPIPA. See *Tapioca Meal.*

CISSAMPELINE. A new alkaloid discovered by Wiggers in *cissampelos pereira*, or *pereira brava.* It is soluble in ether and in acetic acid; is precipitated by carbonate of soda; and is highly basic.

CITRACONIC ACID. Formed by the action of heat on *citric acid* and on *itaconic acid.* It has not been applied to any practical purpose. *Citribic acid, citricic acid,* and *citridic acid,* are other acids derived from citric acid, and are "identical with the citraconic, itaconic, and aconitic acids." (Brande.)

CITRATE. Syn. *Citras,*—Lat. A salt formed of citric acid and a base. The principal citrates are *citrate of ammonia* (soluble and crystallizable); *citrate of potash* (very soluble and deliquescent); *citrate of soda* (large crystals, soluble); *citrate of baryta* (beautiful shining silvery bushes, scarcely soluble); *citrate of lime* (see *Citric Acid*); *magnesia, alumina,* and *protoxide of manganese,* each form 2 salts with citric acid, one soluble, the other insoluble; *citrate of protoxide of iron* (scarcely soluble and crystallizable); *percitrate of iron,* or *citrate of sesquioxide of iron* (soluble and brown); *ammonio-citrate of iron* (garnet coloured, very soluble); *citrate of zinc* (scarcely soluble); *citrate of lead* (insoluble white powder); *citrate of copper* (green powder); *citrate of silver* (brilliant white powder); *potassio-citrate of antimony* (dazzling white prisms). See the respective bases.

Prep. All the ordinary citrates may be made by adding either the *hydrate,* or *oxide,* or the *carbonate of the base,* to a *solution of the acid in water,* until the latter is neutralized, when crystals may generally be obtained by gentle evaporation.

Prop., &c. The alkaline citrates and those with the least basic metallic oxides, (as peroxide of iron,) are soluble in water; those with the earths, insoluble. When heated they froth, blacken, and are decomposed. When an anhydrous citrate is decomposed by an alcoholic solution of hydrochloric acid, the citric acid is principally transformed into hydrated aconitic acid. They give a white precipitate with acetate of lead, in excess, sparingly soluble in ammonia, but readily soluble in citrate of ammonia; and also a white precipitate with nitrate of silver, which by the application of heat, froths up, deflagrates, and leaves an abundant ash, which, on increasing the heat, becomes pure silver. Citric acid, or a citrate, added, in excess, to a solution of neutral acetate of lead, gives rise to a precipitate of citrate of lead, readily soluble on the addition of ammonia.

CITRIC ACID. Syn. *Acid of Lemons, Concrete do.; Acidum Limonis; Acidum Citricum,*—Ph. L. E. D. & U. S. An acid peculiar to the vegetable kingdom, and found in the juices of several kinds of fruit, especially those of the genus *citrus.*

Prep. The citric acid manufacture consists in separating it from the mucilage, sugar, and other foreign matter with which it is combined.

1. (Scheele's process,—Ph. L. 1836.) Take of *lemon juice,* 4 pints; *prepared chalk,* 4½ oz.; *diluted sulphuric acid,* 27½ fl. oz.; *distilled water,* 2 pints. Add the chalk by degrees to the lemon juice, made hot, and mix well; set by, that the powder may subside, and, afterwards, pour off the the supernatant liquor. Wash the precipitate (*citrate of lime*) frequently with warm water; then pour upon it the diluted sulphuric acid, mixed with the distilled water, and boil the whole for 15 minutes, in glass, stoneware, or lead; press the mixture strongly through a linen cloth, and filter it. Evaporate the filtered liquor with a gentle heat, and set it aside that crystals may form. To obtain the crystals pure, dissolve them in water a second and a third time; filter each solution, evaporate, and set it apart to crystallize. The process of the Dublin (1826) and Edinburgh Colleges (1841) are similar, but the latter orders the *washed citrate of lime* to be squeezed in a powerful press, and also the filtered solution of citric acid to be tested with nitrate of baryta, and if "the precipitate is not nearly all soluble in nitric acid, to add a little citrate of lime to the whole liquor, till it stands this test."

2. (Ph. L. 1851.) Now placed in the *materia medica.*

3. (Ph. D. 1851.) Included in the *materia medica.*

4. (Dr. Price.) The *crude juice* is saturated with *ammonia, potassa,* or *soda,* (carbonates,) or with the *ammoniacal product distilled from gas liquor; chalk,* 150 parts, or *hydrate of lime,* 90 parts, are then added for every 192 parts of citric acid contained in the liquor, and the whole stirred well together; heat is next applied, and the ammonia distilled into another quantity of *lemon juice;* the citrate of lime thus obtained is then decomposed with *dilute sulphuric acid,* and the whole process conducted as before. When *potassa* or *soda* are used, the distillation is omitted, and the expressed liquor, after filtration, used to decompose fresh lemon juice.

Prop., &c. Citric acid forms rhomboidal prisms, which are clear, colourless, odourless, sour, and deliquescent in a moist atmosphere. It is an agreeable acid, at once cooling and antiseptic. It is much used in medicine as a substitute for lemon juice, and to form effervescing draughts, citrates, &c.

20 *gr. commercial citric acid*, in crystals, or 5 fl. dr. of *lemon juice*,

are equivalent to

29 gr. *crystals of bicarbonate potassa;*
24 „ *commercial carbonate of do.;*
17 „ *sesquicarbonate of ammonia;*
41 „ *crystals of carbonate of soda;*
24 „ *commercial sesquicarbonate of soda.*

The bicarbonate of potassa is that generally preferred for making *saline draughts* with citric acid; and when flavoured with a little *tincture of orange peel* and *simple syrup*, or *syrup of orange peel* alone, it forms a most delicious effervescing beverage.

Pur. Citric acid is frequently met with adulterated. When *pure*, it does not yield a crystalline precipitate; when added in *excess* to a solution of carbonate of potassa, such a precipitate indicates the presence of tartaric acid.

It is "devoid of colour, is entirely, or almost entirely, decomposed by heat. It is soluble in water and in spirit, and what is thrown down from its watery solution, by acetate of lead, is dissolved by nitric acid. No salt of potassa precipitates anything with citric acid except the tartrate. Added sparingly to cold lime-water, it does not render it turbid. 100 gr., dissolved in water, are saturated by 205·7 (205¾) gr. of crystallized carbonate of soda." (Ph. L.) "When a few drops of a solution of citric acid are added to lime water, a clear liquid results, which, when heated, deposits a white powder, soluble in acids without effervescence." (Liebig.) By the action of *nitric acid, citric acid* is converted into *oxalic acid.*

Tests. See *above*, and *Citrates.*

Concluding Remarks. The preparation of citric acid has now become an important branch of chemical manufacture, from the large consumption of this article in various operations in the arts. In conducting the different steps of the process, some little expertness and care are, however, necessary to ensure success. The *chalk* employed, which should be *dry*, and in fine powder, is added to the *juice*, from a *weighed* sample, until the latter is *perfectly neutralized*, and the quantity consumed is exactly noted. The precipitated *citrate of lime* is next *thoroughly washed* with water, and the *sulphuric acid*, diluted with 6 or 8 times its weight of water, whilst still warm, is poured upon it, and thoroughly mixed with it. The agitation is occasionally renewed for 8 or 10 hours or longer, when the *solution of citric acid* is poured off, and the *residuum of sulphate of lime* thoroughly washed with warm water, the washings being added to the *liquid acid.* This last is then poured off from the impurities that may have been deposited, and evaporated in a leaden boiler, over the naked fire, or by high-pressure steam, until it acquires the gravity of 1·13, when the process is continued, at a lower temperature, until a syrupy aspect is assumed, and a pellicle appears on the surface of the liquor. Without great care at this part of the process the whole batch may be carbonized and spoiled. At this point the concentrated solution is emptied into warm and clean crystallizing vessels, set in a dry apartment, where the thermometer does not fall below temperate. At the end of 4 days the crystals are found ready for removal from the pans. They are *thoroughly drained*, redissolved in *as little water as possible*, and after being allowed to stand for a few hours to deposit impurities, again evaporated and crystallized.

The acid of the *second crystallization* is usually sufficiently pure for the market; when this is not the case, a *third*, or even a *fourth crystallization* must be had recourse to. The mother-liquors from the several pans are now collected together, and a second or third crop of crystals obtained from them, by evaporation, as before.

A frequent cause of difficulty in obtaining crystals from the solutions, is the employment of *too little sulphuric acid* to decompose the *whole* of the *citrate of lime;* the consequence of which is, that a little of that salt is taken up by the free citric acid, and materially obstructs the crystallization. 40 parts of dry sulphuric acid are required to decompose 50 parts of chalk. Commercial sulphuric acid (*oil of vitriol*) is usually of the sp. gr. of 1·845, and it therefore requires 49 *lb.* of this acid for every 50 *lb.* of chalk employed in the process. In practice it is found that a *very slight excess* of sulphuric acid is preferable to a preponderance of undecomposed citrate of lime.

The first crop of crystals is called "*brown citric acid,*" and is chiefly sold to the calico printers. Sometimes a little *nitric acid* is added to the solution of the coloured crystals, for the purpose of whitening them; but in this way a minute quantity of oxalic acid is formed. A more general plan is to *bleach* the citrate of lime, by exposing it in shallow vessels to the sun's rays, covered with a weak solution of chloride of lime, and to rewash it before decomposing it with the sulphuric acid.

Good lemon juice yields about 5% of crystallized lemon acid; 2 gall. yield fully 1 *lb.* of crystals. If the imported citrate of lime be used, a given quantity must be exposed to a red heat for about an hour, and then weighed, when the per centage of lime present will be ascertained; every 28 *lb.* of which will require 49 *lb.* of sulphuric acid of 1·845 (or a corresponding quantity of acid of any other strength) for its complete decomposition.

CITRONELLE. See *Liqueurs.*

CITRONS. The fruit of the citron tree (*citrus medica*), is acidulous, antiseptic, and antiscorbutic; it excites the appetite, and stops vomiting; and like lemon juice, has been greatly extolled in chronic rheumatism, gout, and scurvy. Mixed with cordials, it is used as an antidote to the *manchineel poison.*

CITRON PEEL (Candied). As candied orange and lemon peel, which it for the most part resembles.

CIVET. Syn. *Civetta, Zibethum,*—Lat. A perfume, obtained from the civet cat, (*viverra civetta,*—Linn.,) a fierce carnivorous quadruped, somewhat resembling a fox, found in China and the East and West Indies. "Several of these animals have been brought into Holland, and afford a considerable branch of commerce, especially at Amsterdam. The civet is squeezed out in summer every other day, in winter twice a week; the quantity procured at once, is from 2 scruples to 1 drachm or more."

Civet is frequently adulterated with spermaceti and butter, and a similar substance to civet, but of a darker colour, obtained from the polecat. When *pure* it has an odour intermediate between that of musk and ambergris, but less refined; a pale yellow colour; an acrid taste; and the consistence of honey. It is used in perfumery.

CLAIRET. See *Liqueurs.*

CLARET RAGS. Syn. *Tournesol en Drapeau; Bezetta Cœrulea.* 1. *Pieces of clean linen coloured* with *auvergne* or *ground archel* (lichen parellus).

2. *Pieces of linen* dipped into the *juice of mulberries, blood-red grapes, lees of red wine, &c. Used* to colour jellies, confectionary, the rind of cheeses, &c.

CLARIFICATION. The act of clearing or making bright; commonly applied to the process of "*clearing*" or "*fining*" liquids by chemical means, instead of by filtration. The substances used for this purpose are popularly known as *clarifiers* or *finings.*

The substances employed in the clarification of liquids, operate by either mechanically embracing the feculous matter, and subsiding with it to the bottom of the vessel, or by inducing such a change in its nature or bulk, that it subsides by its own density, in each case, leaving the liquor transparent. Albumen, gelatine, the acids, certain salts, blood, lime, plaster of Paris, alum, heat, alcohol, &c., serve in many cases for this purpose. The first is used, under the form of *white of egg,* for the *clarification of syrups,* as it combines with the liquid when cold, but on the application of heat, rapidly coagulates and rises to the surface, carrying the impurities with it, forming a scum which is easily removed with a skimmer. It is also much used for *fining wines* and liqueurs, particularly the *red wines,* and more limpid cordials. *Gelatine,* under the form of isinglass, dissolved in water, or weak vinegar, is used to fine *white wines, beer, cider,* and similar liquors that contain a sufficient quantity of either spirit or astringency (*tannin*), to induce its precipitation. *Sulphuric acid* is frequently added to weak liquors for a similar purpose, either alone, or after the addition of white of egg, or gelatine, both of which it rapidly throws down in an insoluble form. A pernicious practice exists among some unprincipled parties, of using certain *salts of lead* and *potash* to clear their liquors; especially those that are expected to sparkle in the glass, as *cordial gin, &c.* For this purpose, a little *sugar of lead,* dissolved in water, is first mixed up with the fluid, and afterwards, a little more than ½ its weight of *sulphate of potash,* also dissolved in water, is added, and the liquor is again "roused" up. By standing, the sulphate of lead, formed by this mixture, subsides, and leaves the liquor clear. *Bullock's blood* is used in the same way as isinglass or white of eggs, for fining red wines, beer, and porter. *Lime, alum, alcohol,* the *acids,* and *heat,* act by curdling or coagulating the feculencies, and thus, by increasing their density, induce their subsidence. *Plaster of Paris* acts, partly like the above, and partly like albumen, or gelatine, by enveloping and forcing down the suspended matter. *Sand* is often sifted over liquors (especially *cordials* and *syrups*), for the simple purpose of acting by its gravity, but appears to be quite useless, as it sinks too rapidly. The *juices of plants* are clarified by heat, which coagulates the albumen they contain. *Marl* or *clay* is frequently used to clear *cider* and *perry.* A strip of isinglass is generally employed to clarify *coffee.* See *Wines, Brewing, Cordials, Coffee, Finings, Infusions, &c.*

CLAY. The characteristic constituent of clay is *alumina,* the oxide of a metal named *aluminum.* About 35 years ago, (1819,) Mr. Brande declared it as his *opinion* that this would be some day found to be the case; but it was not until some years later, (1846,) that Wohler demonstrated the fact. Recently, M. Deville has obtained *metallic aluminum* on a large scale, and this process has been repeated by M. Chapelle with perfect success. A mixture of *clay, common salt,* and *charcoal,* (all in fine powder,) is placed in a crucible, and exposed in a reverberatory furnace to a strong red heat, but *not* to whiteness; when cold, small metallic globules of aluminum are found in the mass. The metal thus obtained resembles silver in appearance and its fusing point. Its sp. gr. is, however, only 2·56 (about that of glass); it is not affected by either damp, or dry air, or by water, even when heated; nor by sulphuretted hydrogen, nitric acid, or weak sulphuric acid; it dissolves freely in hydrochloric acid at 60° Fahr.; and is both ductile and malleable. It promises to be of enormous value in the arts. See *Alumina* and *Aluminum.*

Comp., & Anal. See *Soils.*

CLEANING. The best way to clean a house is to *keep it clean* by a daily attention to small things, and not allow it to get into such a state of dirtiness and disorder as to require great and periodical cleanings. Some mistresses, and also some servants, seem to have an idea that a house should undergo "regular cleanings," or great "washing and scrubbing matches" once every three or six months, on which occasions the house is turned almost inside out, and made most uncomfortable. All this is bad economy, and indicates general slovenliness of habits. (Chambers.)

CLEANLINESS. See *Ablution, Bathing,* and *Sickness.*

CLOTHES. Economy and cleanliness require due attention to be paid to every article of clothing, but more especially to those which are the most exposed to dirt and the weather. The following remarks, having reference chiefly to woollen articles, may prove useful to the reader:—If very dusty, hang them on a horse or line, and gently beat them with a cane; then lay them on a clean board or table and well brush them, first with a stiff brush, to remove the spots of mud and the coarsest of the dirt, and next with a softer one, to remove the dust and to lay the nap properly. If clothes are wet and spotted with dirt, dry them before brushing them, and then rub out spots with the hands. The hard brush should be used as little as possible, and then with a light hand, as it will, if roughly and constantly employed, soon render the cloth threadbare. Spots of tallow-grease on the clothes may be taken off with the nail, or, if that cannot be done, have a hot iron with some thick brown paper, lay the paper on the part where the grease is, then put the iron upon the spot; if the grease comes through the paper, put on another piece, till it ceases to soil it. Moths may be prevented attacking clothes, by putting a few *cloves* or *allspice* into the box or closet with them. See *Clothes Balls, Scouring, &c.*

CLOTHING. See *Dress, Flannel, &c.*

CLOVE. Syn. *Caryophyllum,*—Ph. L. E. & D. The flower-buds of the *caryophyllus aromaticus,* (Linn.; eugenia caryophillata,—Thunb.,) or *clove tree,* collected before they open, dried, and smoked. *Cloves* are aromatic, stimulant, carminative, and stomachic; and according to some, possess febrifuge properties. They are chiefly used as an adjuvant in compound medicines. A few cloves kept in a closet or box prevent *moths* or *mould* attacking furs, woollens, &c.

It is a common practice to adulterate this spice in the same manner as cinchona bark. *Cloves* from which the *oil has been distilled,* are dried and rubbed between the hands, previously moistened with a little sweet oil, to brighten their colour, after which they are mixed up with fresh spice for sale.

Mother of cloves are the ripe fruit of the clove tree; they are frequently imported preserved, (*preserved mother of cloves,*) and are reputed stomachic and antispasmodic.

Oil of cloves (oleum caryophilli,—Ph. L.) possesses similar virtues to the unexpanded flower-buds, and is esteemed as a remedy for the toothache. All the above are used to flavour liqueurs and confectionary.

CLYSTERS. See *Enemas.*

COAK. Syn. *Coke.* Charred or carbonized coal. The principle of its manufacture is similar to that of charcoal. There are three varieties of coak:—

1. *Kiln-made coak, stifled coak.* Made by burning *pit-coal* in a pile, kiln, or stove. It has a dull black colour, and produces an intense heat when used as fuel. By con-

densing the bituminous vapours which are given off during the process, about 3% of *tar* may be obtained from common coal, and from some strong coal, by careful treatment, fully 10% of its weight. This tar, when inspissated, gives 75% of *pitch*, and 20 to 24% of *crude naphtha*, besides a considerable quantity of *ammonia*, which is made into *sal ammoniac.* The *screenings*, or dust coal, separated from the better kinds of bituminous coal, is the sort commonly used for making coak in ovens.

2. *Gas coak, distilled coak.* The *cinder* left in the gas-retorts. Gray; produces a weak heat, insufficient to smelt iron.

3. *Slate coak, mineral carbon.* From *bituminous slate*, burned in covered iron pots, in a similar way to that adopted for making bone-black; or in piles. Black and friable. *Used* to clarify liquids, but is vastly inferior to bone-black, and does not abstract the lime from syrups.

COAL. See *Anthracite* and *Pit-coal.*

COBALT Syn. *Regulus of Cobalt; Cobaltum,*—Lat. A metal discovered by Brandt, in 1733. It is found in ores, associated with arsenic and other metals, and is constantly present in meteoric iron.

Prep. 1. Dissolve *oxide of cobalt* in *hydrochloric acid*, and pass *sulphuretted hydrogen gas* through the solution, until all the arsenic is thrown down; filter and boil with a little *nitric acid*, then add *carbonate of potassa*, in excess, and digest the precipitate in a solution of *oxalic acid*, to remove any oxide of iron; wash and dry the residuum, (*oxalate of cobalt*,) and expose it to heat, in a covered crucible; the product is *pure metallic cobalt.*

2. Mix equal parts of *oxide of cobalt* or *roasted Cornish cobalt ore*, and *soft soap*, and expose them to a violent heat in a covered crucible.

Obs. Cobalt is a white brittle metal; unchanged in the air; feebly acted on by dilute hydrochloric and sulphuric acids; has a high melting point, and is strongly magnetic; sp. gr., 8·5. It is seldom employed in the metallic state, from the great difficulty of reducing its ores, but its oxide (*black oxide*) is largely employed in the arts. It forms salts with the acids, which are interesting from the remarkable changes of colour which they exhibit. See *Inks*, and *below.*

Tests. Solutions of the salts of cobalt are known as follows:—1. Liquor of ammonia gives a blue precipitate, slightly soluble in excess, giving a brownish-red colour.—2. Liquor of potassa gives a blue precipitate, turning to violet and red when the liquor is heated.—3. Carbonate of ammonia and carbonate of soda give a pink precipitate; that from the former is *soluble* in excess.—4. Cyanide of potassium gives a yellowish-brown precipitate, soluble in excess; and the clear solution, after being boiled, is unaffected when mixed with hydrochloric acid.—5. Sulphuretted hydrogen produces no change in acid solutions.—6. Hydrosulphuret of ammonia gives a black precipitate in neutral solutions.—7. Melted with borax, before the blowpipe, it gives a bead of a magnificent blue colour, almost verging on black, if much is present. Phosphate of soda and ammonia give a similar bead; but the colour is less intense.

COBALT (Acetate of). From the *carbonate* or *hydrated oxide* and *acetic acid.* It forms a *sympathetic ink* which turns blue when heated.

COBALT (Carbonate of). By adding an *alkaline carbonate* to a solution of the *nitrate* or *sulphate.* A pale peach-coloured powder, soluble in acids. It contains some hydrated oxide.

COBALT (Chloride of). Syn. *Hydrochlorate of do., Muriate of do.* By dissolving the *carbonate* or *hydrated oxide* in *hydrochloric acid;* the solution deposits deep rose-red crystals on standing, which contain water. By evaporating the solution by heat, *anhydrous* blue crystals of the chloride are obtained. Both of them yield a deep rose-red solution with water, which is turned green by a little acid. This solution forms a well-known *sympathetic ink*, the traces of which become *blue* when heated. If the solution contains either chloride of iron or chloride of nickel, the traces become *green.* (Klaproth.) The addition of a little nitrate of copper to the above solution forms a sympathetic ink, which by heat gives a very rich greenish-yellow colour. (Ure.) The addition of a very little common salt makes the traces disappear with greater rapidity, on the withdrawal of the heat. In each case, when the paper is laid aside, moisture is absorbed, and the writing once more disappears. If, however, much heat has been used, the traces become permanent.

COBALT (Nitrate of). As the last; it forms deliquescent crystals.

COBALT (Oxalate of). As the acetate, or by double decomposition.

COBALT (Phosphate of). As the last. An insoluble purple powder, which, when heated along with 8 times its weight of *gelatinous alumina*, produces a blue pigment, (*cobalt blue, cobalt ultramarine;*) almost equal in beauty to ultramarine.

COBALT (Protoxide of). Syn. *Oxide of Cobalt, Gray Oxide of Cobalt, Black do., Cobalt Black. Prep.* 1. By precipitating a solution of *sulphate* or *chloride of cobalt* with *carbonate of soda,* and washing, drying, and igniting the powder which subsides.

2. By boiling powdered *bright white cobalt ore* (from Cornwall) in *dilute nitric acid*, and adding a *solution of carbonate of potassa,* very gradually, until the clear liquor, after the impurities have settled, becomes of a rose colour; and then as long as a precipitate falls; wash and dry it, as before.

Prop., &c. A gray powder, turning black on exposure to the air; strongly basic; and forming salts with the acids, having a fine red tint. *Used* to make *blue colours* for painters, *stains* and *glazes* for enamellers, potters, &c. In *medicine,* it has occasionally been given as a remedy for rheumatism.

COBALT (Sesquioxide of). Syn. *Peroxide of Cobalt.* A black, insoluble, neutral powder, obtained by mixing *solutions of cobalt* and of *chloride of lime;* or, by heating the *protoxide* to redness in an open vessel.

COBALT (Sulphate of). By boiling *sulphuric acid* on the *metal,* or by dissolving the *oxide* in the *acid.* It forms reddish crystals, soluble in 24 parts of water.

COBALT (Sulphurets of). Two or three compounds of cobalt with sulphur (*sulphurets*) and with phosphorus (*phosphurets*) have been formed by chemists, but possess no practical interest.

COBALT BLUE. See *Blue Pigments* and *Ultramarine.*

COBALTO-CYANOGEN. Analogous in composition to ferrocyanogen, but containing *cobalt* in lieu of iron. *Cobalto-cyanides* and *hydro-cobalto-cyanic acid* and its salts, have been formed.

COCCULUS INDICUS. Syn. *Indian Berries, Indian Cockles, Levant Nut, Louse Grains; Bacca Orientalis, Cocculus Piscatorius, &c.,*—Lat. The fruit of the *anamirta cocculus* (menispermum cocculus,—Linn.), a shrub which abounds on the sandy shores of Malabar, and several other islands in the Indian Ocean. "The kernels should fill at least two thirds of the fruit." (Ph. E.)

Uses, &c. Cocculus indicus is poisonous to all animals, and to most vegetables. It is never employed *internally* in medicine, but an *ointment,* formed by mixing the powder with lard, has been used to destroy pediculi and in porrigo. Its active principle is *picrotoxine,* a peculiar crystalline substance possessing all the poisonous properties of the berry in an exalted degree, and of which it contains about 2^{0}_{0}. A small portion of the cocculus indicus imported is used by *poachers,* and a still smaller quantity to *destroy vermin,* the remaining, and by far the greater part, being employed to *adulterate beer* and *wine.* It forms a profitable article of trade to the wholesale druggist, who is enabled to sell it at an exorbitantly high price to brewers, from its being a contraband article. The use of this dangerous drug in brewing is no secret, as several unprincipled vagabonds, who have written treatises for brewers and publicans, have openly recommended its use. One of these very conscientious gentlemen states, that "it is impossible with pure malt and hops alone, to produce a strong-bodied porter;" he therefore recommends the use of "cocculus indicus, grains of paradise, and nux vomica." (Childe on Brewing.) Another author, with equal modesty, actually gives full directions for its use. He orders 3 *lb.* of cocculus to be used for every 10 quarters of malt, and adds, "it gives an *inebriating* quality, which *passes for strength of liquor;* it prevents second fermentation in bottled beer, and consequently, the bursting of the bottles in warm climates." (Morrice on Brewing.) Here is a wholesale system of slow poisoning, publicly recommended by men, who, like too many other moral criminals, remain unpunished by the law. The conscientious brewer, who understands the art which he professes, finds no difficulty in producing "a strong-bodied porter" from *malt and hops alone,* contrary to the wily assertions of Messrs. Childe and Morrice. It is only those whose cupidity induces them to put *too little* malt and hops, and *too much* water in their beer, that encounter any difficulty in so doing. The addition of cocculus indicus rather *deteriorates* than increases the "keeping qualities" of malt liquor. Honest brewers should know this. Yet, in defiance of proscription and heavy fines, the trade in this and other like articles continues unabated, though carried on clandestinely. The general way in which the fraud is managed, is to pack the drug in common soda barrels, and to place 3 or 4 inches of small crystals of Scotch soda at the bottom and top of the cask. In this way the package readily passes off as a cask of common soda, and even should it be opened, the alkali would first present itself to view, and thus satisfy the examiner. Another way commonly adopted, is to form it into an extract, known in the trade by the name of

B. E., or *black extract*, which is *ostensibly* prepared for tanners, but its real destination is the beer cask. See *Beer*, *Porter*, *&c.*

COCHINEAL. Syn. *Coccus Cacti*,—Ph. E. & D. *Coccus*,—Ph. L. The entire insects, dried. There are two varieties known in commerce—*silver cochineal*, which has a purplish-gray or silver-gray colour; and *black cochineal*, which is smaller, and of a reddish or purplish-black colour. The former is much the most valuable.

Adult. Genuine cochineal has the sp. gr. 1·25. It is commonly increased in weight by slightly moistening it with gum water, and then rouncing it in a bag, first with sulphate of baryta, and then with finely powdered bone black. In this way its sp. gr. is raised to 1·35, in consequence of being loaded by about 12% of useless foreign matter.

Uses, &c. Cochineal is principally used to prepare lake and carmine, and in dyeing. Its colouring principle is freely soluble in water. It imparts every variety of scarlet and crimson to textile fabrics previously prepared with alum, tin, and other mordants. It is also used to colour liqueurs, tinctures, and confectionary. It has been recommended as an antispasmodic and anodyne, in hooping cough and neuralgia. *Dose.* 10 to 60 gr., in powder, confection, or tincture.

COCHENILLINE. Syn. *Cochineal Red*, *Carminium*, *Carminia.* The colouring principle of cochineal. The *carmine* of commerce consists of cochenilline, combined with a little animal matter and an acid, from which it may be nearly purified by solution in *liquor of ammonia*, and precipitation by *acetic acid mixed with alcohol.* Cochenilline may also be prepared by evaporating a *watery infusion of cochineal* to the consistence of syrup, dissolving this in *proof spirit*, filtering, again evaporating, and dissolving the residuum in *liquid ammonia*, as before. *Another plan* is to digest *powdered cochineal*, first in ether, to extract the fatty matter; and then in *alcohol;* the alcoholic tincture, on evaporation, yields *pure cochenilline.* It is turned orange by acids, and violet by alkalies. It has been obtained under the form of reddish-purple crystalline grains by spontaneous evaporation.

COCINIC ACID. Syn. *Cocostearic Acid.* A crystalline fatty acid, obtained by the saponification of *cacao nut oil.*

COCOA. Syn. *Cacao*, *Patent Cocoa.* Roasted *cacao* or *chocolate beans*, together with the husks, reduced to powder by grinding. It is now more frequently prepared from the cake left after expressing the oil from the beans, which is then roasted and ground to a coarse powder, with various additions to lessen its value.

Uses, &c. Cocoa, or more correctly *cacao*, forms a very wholesome beverage, especially for breakfast, and in its general properties resembles chocolate. Much of the cheap stuff sold under this name, is, however, very inferior, being made with *damaged nuts* that have been pressed for the oil, mixed with *wheat* or *potato flour*, *barley meal*, *kitchen fat*, *mutton suet*, &c., as well as several of the other substances noticed under *Chicory.* Trash of this kind is frequently ticketed in the shop windows of London at 4½*d.* to 8*d.* a pound. The nut of the *palma cocos* is commonly confounded with that of the *theobroma cacao.* The *latter* is the small chocolate bean, whilst the *former* is a very large nut, filled with a refreshing milky juice. See *Chicory* and *Chocolate.*

COCOA (Flaked). *Ground cocoa* strongly compressed, and flaked with a sharp knife or machine.

COCOA (Patent). See *above.*

COCOA (Soluble). *Cocoa* ground to a very fine powder, and mixed with *sugar* and *meal.* It thus becomes emulsive with boiling water.

COCOA ELAINE. *Prep.* (Soames.) The *cocoa nut oil*, *lard*, or *butter*, of commerce, is made into small packages, (3½ in. × 1½ in. × 24 inches;) by wrapping it in strong linen cloth, of close texture, and next in an exterior wrapper of strong sailcloth; and a number of them placed side by side, in single rows, a small distance apart, are submitted to strong hydraulic pressure, commencing at 50° or 55° Fahr.; which is gradually raised to 64° or 65°, when the packages yield their oil with difficulty. The expressed oil is then violently agitated or "churned" with 1% to 2% of *oil of vitriol*, diluted with about 6 times its weight of *water.* It is then allowed to repose for 2 or 3 days, after which it is skimmed, decanted, and filtered through thick woollen cloth. *Used* to burn in lamps, as a substitute for cod-liver oil, and for other purposes. (Patent, dated 1839.)

COCOA STEARINE. *Prep.* (Soames.) The solid contents of the packages (see *above*) are scraped out into a well-tinned copper vessel, heated by steam, and kept in the liquid state sufficiently long for the impurities to subside, when it is poured into another vessel and allowed to cool; or if greater purity is desired, it is filtered whilst hot through thick flannel. *Used* to make soap, candles, &c. See *Oils* and *Fats.*

COD. The *gadus morrhua* of Linnæus, a fish common in the seas of the northern hemisphere, from about 40° to 75° of latitude. The flesh forms a most wholesome and excellent article of food. The best fish are very thick about the neck; and, when fresh, are marked by the "redness of the gills, freshness of the eyes, and the whiteness and firmness of the flesh." The fish so largely imported from Newfoundland (*Newfoundland fish*) are cod, beheaded, split open, gutted, and salted. They are caught by millions on the "*Grand Bank.*" *Cod-sounds* are pickled in brine and also made into isinglass. The *spawn* is made into *caviare*, and the *liver* is both pressed and boiled for its oil, (*cod-liver oil; Oleum jecoris aselli; Oleum morrhuæ*,—Ph. L.;) the former is the best method.

Cod is *generally cooked* by boiling it, but is sometimes baked, or cut into slices and broiled or fried. *Cod's head and shoulders* with *oyster sauce* is a favorite dish. *Shrimp* and *anchovy sauce* are also good additions.

Cod-liver oil has recently acquired much reputation for its remedial powers in pulmonary consumption, scrofulous and other glandular affections, chronic gout and rheumatism, certain skin diseases, and several other ailments. It is generally supposed that the iodine and bromine, which are present in minute quantities in this fish, are the substances to which it owes its efficacy. Dr. De Jongh refers its virtues to the presence of both *iodine* and the *elements of the bile*. Our own researches lead us to infer, that one of its most active constituents is *free phosphorus*. Good cod-liver oil contains fully 0·02 of this substance, as well as about 0·09 of phosphoric acid. Now, the marked action of minute doses of phosphorus on the nervous, vascular, and secreting organs, is well known to every experienced surgeon. The difficulty, however, of bringing it into a form adapted for administration, has hitherto prevented phosphorus being extensively employed as a therapeutic agent. This obstacle is removed by the employment of cod-liver oil. Nature has here provided a simple remedy, which the ingenuity of man has failed to produce artificially. This opinion is borne out by the facts, that cod-liver oil cures those forms of scrofula and other diseases which do *not* yield to iodine, and that those varieties of the oil are the most active which contain the *most* free phosphorus. We, therefore, think it reasonable to conclude, that the efficacy of cod-liver oil depends on the joint action of the minute quantities of iodine, phosphorus, and the elements of the bile, which it contains, and not on any one separately; and that no substance, at present known, can be used as a substitute for it.

The *pale oil* or *pale brown cod-liver oil* is the best. When good, it has the odour of a boiled cod's liver, and is far from being either rancid or nauseous. That sold by Messrs. Ansar, Harford, and Co., of the Strand, under the sanction of Dr. De Jongh, is, perhaps, the best in the market; and we have only to regret that the price at which it is vended to the public, is too high to admit of such general patronage as its excellence deserves.

CODEIA. Syn. *Codeine.* An alkaloid discovered by Robiquet associated with morphia.

Prep. Dissolve commercial *hydrochlorate of morphia* in *water*, precipitate with *ammonia*, evaporate and crystallize. The precipitate by digestion in *weak liquor of potassa* gives up its morphia. It may be further purified by solution in ether. By the addition of a little water to the ethereal solution, and spontaneous evaporation, it may be obtained quite pure and in a crystalline state.

Prop., &c. Freely soluble in alcohol and ether; soluble in 80 parts of *cold* and 17 parts of boiling water. Its solution in the latter, by slow evaporation, yields large transparent octahedrons. With the acids it forms crystallizable salts. These possess the singular property of producing a general and violent itching of the surface of the body when administered internally. The same symptoms frequently follow the exhibition of opium and muriate of morphia, and are referred to the presence of codeia. None of them are now employed in medicine in this country. The commercial muriate of morphia frequently contains 3^0_0 to 4^0_0 of codeia.

Tests. It is distinguished from *morphia* by not becoming blue on the addition of sesquichloride of iron, nor turning red with nitric acid; and by not being precipitated by ammonia, when dissolved in hydrochloric acid and mixed with a large quantity of water. Unlike *morphia,* it is insoluble in weak liquor of potassa, and is soluble in ether. The *salts of codeia* are known by tincture of galls throwing down a copious precipitate from their solutions; this does not occur with the salts of morphia. It is distinguished from *meconine* by its aqueous solution showing an alkaline reaction with test paper.

COFFEE. The berries of the *coffea arabica* (Linn.) or *coffee tree;* a shrub of the natural order *rubiaceæ*, indigenous in the low mountainous districts of Arabia Felix, and largely cultivated in various other parts of the world for its fruit. The name is also applied to an infusion or decoction of the roasted berries.

Prep., &c. The finest kind of coffee is that called *mocha*, but that in common use, is principally supplied from the *British plantations* in the West Indies. The selection being made, the berries are carefully roasted by a gradually applied heat, until the aroma is well developed, and the toughness destroyed. Too much heat is avoided, as the volatile and aromatic properties of the coffee, and, consequently, the flavour, are thereby injured; whilst, on the other hand, if the berries are roasted too little, they produce a beverage with a raw, green taste, very liable to induce sickness and vomiting. When properly roasted, coffee has a lively chocolate brown colour, and should not have lost more than 18% of its weight by the process. If the loss exceeds 20%, the flavour suffers in proportion. The roasted coffee should be placed in a very dry situation, and excluded from the air as soon as possible. It loses flavour by keeping, and also powerfully absorbs moisture from the atmosphere by reason of its hygrometric power. This arises chiefly from the presence of a peculiar principle called asamar by Reichenbach. In asthma it has been found particularly serviceable; and it has been extolled in gangrene of the extremities in drunkards. Calculous complaints are scarcely known in France and Turkey, where coffee is the principal beverage of the people. M. Devereaux was cured of gout of 25 years' standing, accompanied with chalk stones, by taking coffee freely, (Du Four;) and Sir John Floyer was cured of asthma, after 60 years' suffering, by the like simple means. "I have myself seen several cases in which coffee was really useful." (Laennec.) The nervous symptoms resulting from the excessive use of coffee, are chiefly referable to the imbibition of so large a quantity of *hot* liquor; any other beverage in equal quantity exercises the same debilitating action.

Pur. The ground coffee sold by the grocers is almost universally adulterated. The principal substances used for this purpose, are roasted chicory and roasted beans and corn. This fraud may readily be detected as follows:—

1. (*Chicory.*) A spoonful of pure coffee placed gently on the surface of a glass of cold water, will float for some time, and scarcely colour the liquid; if it contains chicory, it will rapidly absorb the water, and sinking to the bottom of the glass, communicate a deep reddish-brown tint as it falls. *Another* method of applying this test, is by *expertly* shaking a spoonful of the suspected coffee with a wine-glassful of cold water, and then placing the glass upon the table. If it is pure, it will rise to the surface, and scarcely colour the liquid, but if chicory is present, it will sink to the bottom, and the water will be tinged of a deep-red, as before.

2. (*Roasted corn, beans, &c.*)—*a.* These may be detected by the cold decoction striking a blue colour with tincture of iodine. Pure coffee is merely deepened a little in colour by this substance.—*b.* The brown colour of decoction or infusion of roasted coffee becomes greenish when treated with a per-salt of iron; and a brownish-green, flocculent precipitate is formed. The colour of chicory is only deepened, but not otherwise altered, and no precipitate is formed under the same treatment. A mixture of chicory and coffee retains a brownish-yellow colour after the precipitate has subsided, and the liquid appears brownish-yellow by refracted light. The addition of a little weak ammonia water aids the subsidence of the precipitate.

3. Under the microscope, the presence of *chicory* may be readily detected by the size, form, and ready separation of the cells of the cellular tissue, and by the presence and abundance of the pitted tissue or dotted ducts, and vascular tissue, or spiral vessels. *Roasted corn*, and other amylaceous substances, may also be detected, in the same way, by the peculiar size and character of their starch grains. See *Chicory*, *Starch*, *&c.*

Qual., &c. Coffee promotes digestion, and exhilarates the spirits, and when strong, generally occasions watchfulness, but in some phlegmatic constitutions induces sleep. Drank in moderation, especially if combined with sugar and milk, it is perhaps the most wholesome beverage known. The various qualities that have been ascribed to it by some persons, such as dispelling of causing flatulency, removing dizziness or the head, attenuating the blood, causing biliousness, &c., appear to be wholly imaginary. In a medical point of view it has been regarded as diuretic, sedative, and a corrector of opium. As a *medicine*, it should be strong, and is best taken only lukewarm.

Obs. The attention of the scientific world has been recently drawn to the value of *roasted coffee leaves*, as furnishing materials for a beverage unexcelled in excellence by the coffee-berry itself. The subject was first referred to by Mr. Brande, some years since, but although it was known that coffee leaves had been long so employed in Sumatra, the subject appeared to create little interest, until Mr. N. M. Ward, of Padang, threw fresh light on the matter in the pages of the 'Singapore Free Press,' and afterwards in those of the 'Pharmaceutical Journal.' It appears that the leaves, prepared for use, may be purchased for 1½*d.* per *lb.*, or packed ready for export at 2*d.* per *lb.* Samples of the prepared leaf were laid before the Pharm. Soc., Oct. 12th, 1853, and excited considerable interest. See *Caffeine*, *Chicory*, *&c.*

COFFEE (for the table). To produce this beverage in perfection, it is necessary to employ the best materials in its preparation—*fresh-roasted* and *fresh-ground.* The shape or description of the coffee-pot appears of little consequence, though one furnished with a *percolator* or *strainer*, that will permit a moderately rapid filtration, is, perhaps, preferable. That known as the *cafetière à belloy*, *à grecque*, or *coffee biggin*, is commonly used in France, and answers well. At least 1 *oz.* of *coffee* should be used to make 3 common-sized coffee-cupfuls, with 1 teaspoonful of *freshly roasted* and *ground chicory.* If desired *strong*, the quantity of both should be doubled. The prevailing fault of the coffee made in England, is its want of strength and flavour. The coffee-pot should be heated previously to putting in the coffee, which may be done by means of a little boiling water. The common practice of boiling coffee is quite unnecessary, for all its flavour and aroma is readily extracted by boiling hot water. Indeed, all the "useful and agreeable matter in coffee is *very soluble;* it comes off with the first waters of infusion, and needs no boiling." (Ure.) Water is capable of removing all the soluble aromatic portion of coffee, even at a temperature so low as 195° Fahr., as we have often proved by actual experiment with one of Beart's pneumatic filters, when a fluid, deliciously aromatic and sparkling, has been produced, and the grounds have only yielded a nauseous bitter flavour, and faint colour to fresh water, even by boiling. Should prejudice, however, induce the housewife or cook to *boil* her coffee, it should be only *just simmered for a minute*, as long or violent boiling injures it considerably.

When coffee is prepared in a common pot, the latter being first made hot, the boiling water should be poured over the powder, and not, as is commonly the plan, put in first. It should then be kept stirred for 4 or 5 minutes, when a cup should be poured out and returned again, and this operation repeated 3 or 4 times, after which, if allowed to repose for a few minutes, it will generally become fine of itself. In all cases, when a *percolator* is not used, the liquor should be well stirred up *several* times before finally covering it up to settle for use.

Coffee is sometimes clarified, which is done by adding a shred of isinglass, a small piece of clean eel or sole-skin, or a spoonful of white of egg. An excellent plan, common in France, is to place the vessel containing the *made coffee* upon the hearth, and to sprinkle over its surface half a cupful of *cold water*, which from its greater gravity descends, and carries the "foulness" with it. Another plan sometimes adopted is to wrap a cloth, previously dipped into *cold water*, round the coffee-pot. This method is commonly practised by the Arabians in the neighbourhood of Yemen and Moka, and rapidly clarifies the liquor, unless a very large quantity of chicory is present. It should be recollected that the use of isinglass, white of egg, and all like artificial finings, remove much of the astringency and vivacity of the liquor.

The French, who are remarkable for the superior quality of their coffee, generally allow an ounce to each large coffee-cupful of water, and they use the coffee both newly ground and roasted. A shred of saffron, or a little vanilla, is frequently added, whilst the *percolating coffee-pot*, before noticed, is generally employed. When the Parisian uses a common coffee-pot, he generally divides the *water* into 2 parts. The *first portion* he pours on boiling hot, and allows it to *infuse* for 4 or 5 minutes, he then pours this off as clear as possible, and boils the grounds for 2 or 3 minutes with the *remaining half* of the water. After the last has deposited the sediment it is decanted, and mixed with the infusion. The object of this process is to obtain the whole of the strength, as well as the flavour. The infusion is conceived to contain the latter, and the decoction the former; a plausible, but erroneous idea, since both of them were carried off by the first water. This plan has been recommended, with some modifications, by Mr. Donovan, and more recently by Dr. Davidson, in *L'Expérience*, and Soyer, in his *Gastronomic Regenerator.*

COFFEE (Essence of). A *highly concentrated infusion of coffee*, prepared by percolation with *boiling water*, gently and quickly evaporated to about $\frac{1}{3}$rd or $\frac{1}{4}$th of its bulk, and mixed with a thick *aqueous extract of chicory* and *syrup of burnt sugar*, so as to give the whole the consistence of treacle. The proportions of the dry ingredients should be—*coffee*, 4 parts; *chicory*, 2 parts; *burnt sugar*, 1 part. It should be kept in well corked bottles in a cool place. This resembles the advertised *essence of coffee* of Dunn and other makers. It is convenient for making *extemporaneous coffee;* but the beverage so made, though superior to much of that sold at coffee-houses and hotels, is inferior in flavour, aroma, and piquancy, to that we are accustomed to drink at home. We have ourselves prepared an essence of coffee, very concentrated, and which will keep in any climate, that possesses all these good qualities.

COFFEE (Searle's Patent). This is prepared by evaporating *skimmed milk* mixed with $\frac{1}{40}$th part of *sugar*, at a low temperature, and, when nearly solid, adding a *very concentrated essence of coffee*, and continuing the evaporation at a low temperature, (in vacuo, if possible,) until the mixture acquires the consistence of a *syrup*, (*coffee syrup*,) paste, (*coffee paste*,) or candy, (*coffee candy*). The last may be powdered, (*coffee powder, dry essence of coffee*).

COFFEE (Substitutes for). These are numerous, but are now of less interest than formerly, owing to the enormous reduction of the duty on foreign coffee which has taken place of late years. Among the principal are the following:—

1. *Acorn coffee.* From acorns deprived of their shells, husked, dried, and roasted. A good substitute.

2. *Almond coffee.* Rye or wheat roasted along with a few almonds. A very small quantity of cassia-buds improves it. A good substitute.

3. *Bean coffee.* Horse-beans roasted along with a little honey or sugar. When removed from the fire, a small quantity of cassia-buds are frequently added, and the whole is stirred until cold. Said to be a good substitute.

4. *Beech-mast coffee.* From beech-mast or nuts. Very wholesome.

5. *Beet-root coffee.* From the yellow beet-root, sliced, dried in a kiln or oven, and ground with a little foreign coffee. A good substitute; equal to chicory coffee.

6. *Corsican coffee.* From the seeds of the knee-holly.

7. *Currant coffee.* From the seeds washed out of the cake left in making currant wine.

8. *Egyptian coffee.* From chick-peas.

9. *German coffee, Succory do., Chicory do.* From chicory or succory. *Used* both for foreign coffee and to adulterate it.

10. *Gooseberry coffee.* From gooseberry seeds, as No. 7.

11. *Holly coffee.* From the berries.

12. *Lupin coffee, Hambro' do., Hambro' powder.* From roasted lupins.

13. *Raspings.* The raspings of the crust of loaves, procured at the bakers. Equal to rye coffee.

14. *Rice coffee.* From rice, as above. A good substitute.

15. *Rosetta coffee.* From fenugreek seeds moistened with lemon juice.

16. *Rye coffee, Dellenius' do., Hunt's breakfast powder.* Rye, roasted along with a little butter, and ground to powder. A good substitute.

17. *Sassafras coffee.* From the fruit or nut of the sassafras tree, or from the wood cut into chips. Very wholesome. Much recommended in skin diseases, &c.

18. *Sylvester's coffee, Iris coffee.* The seeds of the gladiolus luteus, iris pseudacorus, or yellow water flag. Said to be the best substitute known.

19. *Turner's coffee, Broom coffee.* From broom seeds roasted with a little butter.

20. *Whiskings, Coffee flights, Coffee marc.* The husks, &c., of roasted foreign coffee.

Obs. All the above are roasted before grinding them, with a little fat or lard. Those which are larger than coffee-berries are cut into dice about that size before being roasted. They possess none of the medicinal virtues of foreign coffee.

COINS. See *Medals* and *Electrotyping.*

COKE. See *Coak.*

COLCHICINE. Syn. *Colchicina, Colchicia.* A peculiar principle discovered by Gieger and Hesse in the seeds of the *colchicum autumnale* or common *meadow saffron.* It also exists in the cormi or bulbs.

Prep. Macerate the *bruised seeds* in *boiling alcohol*, add *hydrate of magnesia*, to throw down the alkaloid, digest the precipitate in *boiling alcohol*, and filter. By cautious evaporation colchicine will be deposited, and may be purified by re-solution and crystallization in alcohol.

Prop., &c. Odourless; bitter; soluble in water and alcohol; forms salts with the acids. It is very poisonous. $\frac{1}{10}$th of a grain, dissolved in spirit, killed a cat in 12 hours. It differs from veratrine in being *soluble* in water and crystalline, and in the non-production of sneezing when cautiously applied to the nose. Strong oil of vitriol turns this alkaloid of a yellowish-brown; nitric acid turns it of a deep violet, passing into indigo blue, green, and yellow. It is not used in medicine.

COLCHICUM. Syn. *Meadow Saffron; Colchicum Autumnale*,—Linn. The recent and dried corms or bulbs (*colchicum cormi*), as well as the seeds (*semina colchici*), are officinal in the three British Pharmacopœias. The corms are ordered to be "dug up in the month of July, or before the autumnal bud has projected." "The dry coatings having been torn off, cut the cormus transversely in thin slices, and dry, at first with a gentle heat, but afterwards slowly increased to 150° Fahr." (Ph. L.)

Dose, (of the corms,) 2 to 8 or 9 gr.; (of the seeds), 2 to 7 gr., made into a pill or bolus with syrup or conserve; chiefly, as a specific in gout, to alleviate or check the paroxysm. This drug forms the base of almost all the advertised *gout nostrums*. It is, however, an active poison, and its administration requires care. "After all that has been said respecting colchicum in gout, and admitting that it rarely fails to allay pain and check a paroxysm, I would record my opinion that he who would wish to arrive at a good old age, should eschew it as an *ordinary* remedy, and consider that he is drawing on his constitution for a temporary relief, with a certainty of becoming prematurely bankrupt in his vital energies." (Collier.)

COLCOTHAR. See *Red Oxide of Iron.*

COLD. Syn. *Frigus*,—Lat. The privation of heat. The term is also applied to the sensation and effects which this privation produces.

When the body of an animal is immersed in an atmosphere at a temperature below the healthy standard, a sensation of coldness is experienced, produced by the passage of the caloric or heat of the body into the colder medium. If this abstraction of caloric exceeds the quantity produced by the vital system, the temperature of the body decreases, until it sinks below the point at which the functions of life can be performed. This declination of the heat of the body is gradual; the *extreme sensation of coldness* changes into a *disinclination for voluntary motion;* next comes on *drowsiness*, followed by *numbness* and *insensibility*. At this point, if the sufferer is not rescued, and remedial measures had recourse to, death inevitably and rapidly ensues.

The *prevention* of the effects of cold consists in the use of ample food and clothing proportioned to the inclemency of the weather, the exposure to be endured, and the habits of the wearer. The circulation of the blood should be promoted by active exercise, and any disposition to sleep shaken off by increased bodily exertion. The principal endeavour should be to keep the *extremities* and *chest* warm, as, if this can be accomplished, no danger need be feared.

In cases of *asphyxia produced by intense cold*, the patient should be laid in a room remote from the fire, and bathed with *cold salt-and-water*, or *water* to which some *brandy* or *vinegar* has been added; after which the body should be wiped dry, and friction assiduously applied by the hands of the attendants (warmed); as many operating at once as can conveniently do so. *Gentle stimulants* should be administered by the mouth, and the bowels excited by some *mild stimulating clyster*. The lungs should also be inflated, and an effort made to re-establish the respiration. As soon as symptoms of returning animation are evinced, and the breathing and circulation restored, the patient should be laid in a bed between blankets, and a little *wine and water* administered, and perspiration promoted by heaping an ample quantity of clothing on the bed. Should the patient have suffered from hunger as well as cold, the appetite may be appeased by the administration of a limited quantity of *light food*, taking especial care to *avoid excess*, or anything indigestible or exciting. See *Animation* (Suspended), *Bronchitis, &c.*

COLD CREAM. See *Cosmetic Cerate.*

COLIC. Syn. *Colica*,—Lat. The bellyache or gripes. The name is popularly given to all severe griping abdominal pains, without reference to the cause. There are several varieties of this disease:—

1. *Accidental colic.* Produced by improper food and poisons. The treatment may be similar to that recommended for *bilious* or *flatulent colic.*

2. *Bilious colic.* In this variety the pain is intermittent and transient, accompanied by constipation, nausea, and vomiting. The fæces, if any, are bilious, dark-coloured and offensive. The *remedies* are, a full dose of *blue pill, calomel, colocynth*, or *aloes*, followed by a sufficient quantity of *epsom salts* or *glauber salts.* Warm fomentations are also serviceable.

3. *Flatulent colic.* Marked by constipation, and the irregular distension of the bowels by gas, accompanied by a rumbling noise, &c. It is commonly produced by the use of indigestible vegetables and slops. The *remedies* are, a full dose of *tincture of*

rhubarb combined with a few drops of *essence of peppermint*. If this does not afford relief, an *Abernethy pill* may be taken, washed down with a glass of any cordial water, as peppermint, cinnamon, or caraway. When the pain is extreme, warm fomentations to the belly, or a carminative clyster will generally give relief.

4. *Painter's colic, Plumber's do., Devonshire do., Lead do.; Colica pictonum.* The dry bellyache. It is marked by obstinate costiveness, acrid bilious vomitings, violent pains about the region of the navel, convulsive spasms in the intestines, and a tendency to paralysis in the extremities. It is most prevalent in the cider counties, and amongst persons exposed to the fumes of lead. The *remedies* are the same as for the spasmodic variety. Should these fail, after the bowels have been thoroughly evacuated, small doses of camphor and opium, may be administered, and *sulphuric beer* or *sweetened water* very *slightly* acidulated with sulphuric acid, had recourse to as a beverage. Mr. Benson, the managing director of the British Whitelead Works at Birmingham, says:—"Although during several weeks after the addition of the sulphuric acid to the treacle beer, drank at the works, little advantage seemed to be derived, yet the cases of lead colic became gradually *less frequent*, and since October of that year, or during a period of fifteen months, not a single case of lead colic has occurred amongst the people."—(Lancet.) See *Sulphuric Beer* and *Sulphuric Acid*.

5. *Spasmodic colic.* Marked by a fluctuating pain about the navel, which goes away and returns by starts, often leaving the patient for some time. The belly is usually soft, and the intestines may often be felt in lumps, which move about under the hand, or are wholly absent for a time. It is unaccompanied by flatulency. The *remedies* are *warm fomentations*, *warm clysters*, and *carminatives*, accompanied by small doses of *camphor* and *opium*.

6. *Stercoraceous colic.* Marked by severe griping pains and constipation of the bowels. The *remedies* are *powerful cathartics*, as full doses of *calomel*, *aloes*, *colocynth*, *jalap*, &c., followed by *purgative salts*, as *sulphate of magnesia*, or *sulphate of soda*.

COLLODION. Syn. *Collodium.* This article is an imperfect ethereal solution of crude *pyroxyline*, (the *gun cotton* of Schonbein, not *xyloidine*).

Prep. 1. (Ph. U. S.) *Nitrate of potassa*, (in powder,) 10 oz.; *sulphuric acid*, 8½ fl. oz.; triturate together in a wedgwood mortar until uniformly mixed; then add of *fine carded cotton*, (free from impurities,) ½ oz.; and by means of the pestle or a glass rod, saturate it thoroughly with the liquor for a period of about 3 or 4 minutes; next transfer the cotton to a vessel containing water, and wash it in successive portions of pure water, with agitation and pressure, until the washings cease to affect litmus paper or a solution of chloride of barium; it is then to be spread out and dried by a very gentle heat, and dissolved by agitation in a stoppered bottle with *rectified sulphuric ether*, 1 quart, to which *rectified spirit*, (alcohol,) 1 fl. oz., has been previously added.

2. (Mialhe.) *Nitrate of potassa*, 40 parts; *concentrated sulphuric acid*, 60 parts; *carded cotton*, 2 parts; proceed as last until the dry cotton is obtained, then take of the *prepared cotton*, 8 parts; *rectified sulphuric ether*, 125 parts; mix in a well-stoppered bottle, and agitate it for some minutes; then add, gradually, *rectified alcohol*, 1 part; and continue to shake until the whole of the liquid acquires a syrupy consistency. It may be now passed through a cloth; but a better way to prevent loss is to let it repose for a few days and then decant the clear portion.

3. *Gun cotton* and *rectified alcohol*, of each, 1 part; *rectified ether*, 19 parts; proceed as before.

Uses, &c. Collodion is chiefly employed as a dressing for wounds, and as a protection to abraided surfaces. On drying, it unites the former closely, and preserves the latter from the action of the air. It is impervious to water, and being transparent, it admits of the progress of the wound being inspected when necessary. Such is its adhesive power, that a piece of cloth cemented with it to the *dry* palm of the hand, will support a weight of 25 *lb.* to 30 *lb.* It is also used in *photography*. For success both in its manufacture and use, it is absolutely necessary to avoid the presence of water or moisture. See *Gun Cotton, &c.*

COLLODION (Compound). It has been proposed to medicate collodion in several ways; but the practice has not found much favour with the medical profession. The following are said to be useful preparations:

1. (*Collodion and Cantharidis; Collodion Cantharidale.*)—*a.* (Ilisch.) *Cantharidine*, 15 gr.; *gun cotton*, 20 gr.; *rectified ether*, 1½ oz.; *acetic ether*, ½ oz.; dissolve.

b. (Œttinger.) *Ether of cantharides* and *collodion*, equal parts. *Used* as an irritant.

2. (*Coloured Collodion; Collodium Tinc-

tum.) *Prep.* (Cutan. Hosp.) *Collodion*, 2 oz.; *palm oil*, 1 dr.; *alkanet root*, q.s. to colour, (say 15 gr.); digest and decant the clear. Colour bears a greater resemblance to the skin than that of common collodion, whilst it is more flexible; but it is weaker than the latter.

COLLUTORIES. See *Mouth Washes* and *Gargles.*

COLLYRIA. The word *collyrium* was originally applied to any solid or liquid medicament applied to the eyes. It is now, by common consent, restricted to *eye-waters.* The following are exceptions:—

COLLYRIUM (Dry). Syn. *Collyrium Siccum*,—Lat. *Prep.* 1. (Dupuytren.) *White sugar*, 1 dr.; *red oxide of mercury*, 10 gr.; *oxide of zinc*, 20 gr.; mix.

2. (Lagneau.) *Sugar candy*, 2 parts; *nitrate of potassa*, 1 part.

3. (Falconer.) *Chloride of barium*, 1 gr.; *sugar candy*, 1 dr.

4. (Radius.) *Calomel* and *white sugar*, of each, ½ dr.; *opium*, 10 gr.

5. (Recamier.) *Oxide of zinc* and *sugar candy*, equal parts.

6. (Velpeau). *Trisnitrate of bismuth* and *sugar candy*, equal parts.

7. (Wiseman.) *Acetate of soda*, 10 gr.; *powdered opium*, 1 gr.; *sugar candy*, ½ dr.

Obs. It is absolutely necessary that the ingredients in the above preparations should be reduced to an *inpalpable powder*, by care-porphyrization, or trituration in a wedgewood mortar. For use, a *small* pinch is placed in a quill or straw, and blown into the eye previously opened with the fingers. On the whole, they may be regarded as unnecessary preparations, and are unsafe, except in skilful hands.

COLOCYNTH. Syn. *Bitter Apple, Bitter Gourd, Bitter Cucumber; Peeled Colocynth; Colocynthis*,—Ph. L.E. and D. The decorticated fruit (*pulp*,—Ph. E. and D.) of the *citrullus* (*cucumis*,—Linn.) *colocynthis.* (Ph. L.) It is an acrid, drastic purge and hydragogue, and cannot be given alone with safety; but, in combination with other substances, it forms some of our most useful cathartic medicines.

COLOCYNTHINE. Syn. *Colocynthite, Colocynthium.* The bitter purgative principle of colocynth.

Prep. The *aqueous extract* or the *pulp of colocynth*, is digested in *alcohol*, and the tincture filtered and evaporated. The residuum is *colocynthine* combined with acetate of potassa. By agitation with a *little* water, the latter is removed. It may be purified by dissolving it in alcohol, and evaporation, as before.

Prop., *&c.* A yellowish brown translucent resinous substance, very soluble in alcohol, less so in ether, and only slightly so in water. It is intensely bitter, and acts as a highly drastic purgative. It is neither acid nor basic. Nitric acid converts it into *colocynthic acid.*

COLOPHENE. Formed by distilling *oil of turpentine* with *concentrated sulphuric acid.* A colourless, viscid, oily liquid; with a high boiling-point; and exhibiting a bluish tint by reflected light.

COLOPHONIC ACID. Syn. *Colopholic Acid.* Formed in the manufacture of rosin, by the action of the heat on the pinic acid of the turpentine. Brown; easily saponifiable; little soluble in alcohol.

COLOPHONY. See *Rosin.*

COLOURING. Syn. *Brandy Colouring, Brewer's do., Spirit do.; Caramel; Essentia Bina. Prep. Brown sugar* is melted in an iron vessel over the fire, until it grows black and bitter, stirring it well all the time, after which *water* is added, and it is boiled to a syrup.

Obs. Some persons use lime-water to dissolve the burnt sugar. Care must be taken *not* to *overburn* it, as a greater quantity is thereby rendered insoluble. The heat should not exceed 430°, nor be less than about 400° Fahr. The process, for nice experiments, is best conducted in a bath of melted tin, to which a little bismuth has been added to reduce its melting point to about 435°; a little powdered resin or charcoal, or a little oil being put upon the surface of the metal to prevent the oxidizement of the alloy.

COLOURING PRINCIPLES. See *Dyeing.*

COLOURS. See *Pigments, Stains, Washes, &c.*, and the individual articles.

COLOURS (Complementary). Two colours are said to be complementary to each other, which, by blending together, produce the perception of whiteness. According to Mayer, all colours are produced by the admixture of *red, yellow,* and *blue* light, in certain proportions, and by intercepting either one or more of these coloured rays in a beam of light, those which meet the eye, will consist of the remaining coloured rays of the spectrum. Thus, by intercepting the *red rays* in a beam of white light, the remaining yellow and blue rays will produce a *green colour;* by intercepting the *blue rays*, the remaining yellow and red will give an *orange;* and so on of other cases; so that *red* and *green, blue* and *orange*, are *complementary colours.* See *Accidental Colours, Dress, &c.*

COLOURS (Compound). The mixture of *blue* and *yellow* dyes, stains, or pigments, produce GREEN; *red* and *blue*, VIOLET, PURPLE, LILACS, *&c.; red* and *yellow*, ORANGE, CINNAMON, *&c.; red, yellow*, and *blue*, OLIVES; *red* and *blues*, or *green* or *black*, BROWNS of all shades; *black* mixed with *other dyes*, produces various shades of BROWN and OLIVE, and when pale, it constitutes GRAY, either by itself, or on the addition of a *faint blue.* In this way every shade of colour may be produced, provided the ingredients used are of a class that will not decompose each other. See *Pigments, Dyeing, &c.*

COLTSFOOT. This popular herb is the *tussilago farfara* of Linnæus. It is a demulcent bitter, and is slightly stomachic and tonic. It is much esteemed by the lower classes in coughs, shortness of breath, and other affections of the chest. The leaves form the basis of most of the *British herb tobaccos*, and have been recommended to be smoked in asthma and difficulty of breathing. *Dose.* One or two wineglassfuls of the tea or decoction (1 *oz.* to the *pint*) *ad libitum.*

COLUMBIC ACID. See *Tantalic Acid.*

COLUMBIUM. See *Tantalum.*

COMBINATIONS (Chemical). See *Equivalents* and *Affinity.*

COMENIC ACID. By boiling a solution of *meconic acid* in *water*, or in *dilute sulphuric acid*, for some time; or by exposing *dry meconic acid*, in a retort, to a heat of 400° Fahr. It is bibasic; its salts are called *comenates.* By exposure to a high temperature it is converted into *pyromeconic acid*, which sublimes and condenses in brilliant colourless plates.

CONCENTRATION. The volatilization of part of a liquid in order to increase the strength of the remainder. The operation can only be performed on solutions of substances of greater fixity than the menstrua in which they are dissolved. Many of the liquid acids, solutions of the alkalies, &c., are concentrated by distilling off their water.

In pharmacy, the term "*concentrated*" is commonly applied to any liquid preparation possessing more than the usual strength. Thus we have "*concentrated*" *infusions, decoctions, liquors, solutions, tinctures*, and *essences*, most of which are made of 8 times the common strength. This is generally effected by using 8 times the usual quantity of the ingredients, with a given portion of the menstruum, and operating by digestion or percolation; the latter being generally adopted when the articles are bulky. When the menstruum is water, a little spirit is added, to make the product keep. See *Decoctions, Infusions, &c.*

CONCRETE. A compact mass or cement, composed of pebbles, lime, and sand, employed in the foundations of buildings. The best proportions have been said to be—60 parts of *coarse pebbles*, 25 of *rough sand*, and 15 of *lime;* but Semple recommends 80 parts of *pebbles*, 40 parts of *river sand*, and only 10 parts of *lime.* The pebbles for concrete should not exceed about ½ *lb.* each in weight.

CONDIMENTS. Substances taken with the food, to season or improve its flavour, or to render it more wholesome or digestible. The *principal condiments* are *common salt, vinegar, lemon-juice, spices, aromatic herbs, oil, butter, sugar, honey*, and *sauces.* Most of these, in moderation, promote the appetite and digestion, but their excessive use tends to vitiate the gastric juice, and injure the stomach.

CONFECTION. Syn. *Confectio*,—Lat. Anything prepared with sugar; a sweetmeat, or candy. In *medicine*, the name is commonly applied to substances, usually pulverulent, mixed up to the consistence of a soft electuary, with powdered sugar, syrup, or honey. In the 'London Pharmacopœia,' (1836 and 1851,) both *conserves* and *electuaries* are included under this head, though there appears to be some little distinction between them.

In the *preparation* of confections all the dry ingredients should be reduced to very fine powder, and passed through a sieve, not coarser than 80 holes to the inch; and the pulps and syrups used to mix them up, should be perfectly homogeneous, and of a proper consistence. The mixture should be intimate and complete, in order that the characteristic constituents may be equally distributed throughout the mass. The consistence of the newly made confection should be sufficiently solid to prevent a separation of the ingredients, and yet soft enough to allow of it being easily swallowed without previous mastication.

Confections should be *preserved* in stone jars, covered with writing paper, and placed in a cool and not too dry a situation. Without this precaution, they are apt to mould on the top. If at any time the mass *ferments* and swells up, the fermentative process may be arrested by placing the jar in a bath of boiling water, for an hour or two, or until the whole becomes pretty hot; when it should be removed from the heat, and stirred occasionally until cold. Should the sugar crystallize out of the confection, or "*candy*," as it is called, the same method may be followed. Or, the mass may be well rubbed in a mortar until the hard lumps of sugar are broken down, and a uniform consistence again produced. On the large scale it may be passed through the mill.

As *remedial agents*, the officinal confections possess little value, and are chiefly useful as vehicles for the administration of more active medicines. See *Conserves* and *Electuaries*.

CONFECTION (Acorn). Syn. *Confectio Seminum Quercûs*,—Lat. *Prep.* (Bories.) *Powdered acorns*, 3 oz.; *red coral* and *catechu*, of each, 1½ oz.; *confection of dog-rose*, 10 oz.; *syrup of red roses*, q. s. to make a confection. *Dose.* 1 dr., every 4 hours; in chronic diarrhœa, &c.

CONFECTION (Alkermes). Syn. *Confectio Alkermes*, — Lat. *Prep.* (Ph. L. 1745.) *White sugar*, 1 ℔; *rose-water*, 6 fl. oz. (¼ pint;) *clarified juice of alkermes*, 3 ℔; *oil cinnamon*, 10 or 12 drops; mix. It was formerly a common practice to add a little *gold-leaf*, rubbed small, so as to float about in it; also to scent it with *musk* and *ambergris*.

CONFECTION (Almonds). Syn. *Conserve of Almonds; Confectio Amygdalæ*,——Ph. L. *Conserva Amygdalarum*,—Ph. E. *Confectio Amygdalarum*, — Ph. D. 1826. *Prep.* (Ph. L.) *Sweet almonds*, 8 oz.; *white sugar*, 4 oz.; *powdered gum arabic*, 1 oz.; macerate the almonds in *cold* water, then remove the skins, and beat them with the other ingredients until reduced to a smooth confection. The Edinburgh form is similar.

Uses, &c. To prepare *emulsion* or *milk of almonds*. A little of this paste or powder, triturated with a sufficient portion of water, and strained through a piece of calico, forms emulsion of almonds. "This confection will keep longer sound, if the *almonds*, first decorticated, (blanched,) dried, and rubbed into the finest powder, be mixed with the *acacia* and *sugar*, separately powdered, and the mixed ingredients be kept in a well-stoppered bottle." (Ph. L.) The same effect may be arrived at by simply well-drying the blanched almonds before mixing them with the gum and sugar. The addition of even a small quantity of water or syrup, causes the confection "to become soon mouldy, or rancid, or both." (Brande.)

CONFECTION (Alum). Syn. *Confectio Aluminis*, — Lat. *Prep.* 1. (St. B. H.) *Alum*, (in fine powder,) 1 dr.; *conserve of roses*, 6 dr.

2. (Foy.) *Alum*, 1 dr.; *conserve of roses*, 1 oz. *Dose.* 1 dr., 2 or 3 times a day; in lead colic, and as an astringent in diarrhœa and other affections.

CONFECTION (Aromatic). Syn. *Aromatic Electuary; Confectio Aromatica*,——Ph. L. & D. *Electuarium Aromaticum*, —Ph. E. *Sir Walter Raleigh's Cordial, Confectio Cardiaca*,—Obs. *Prep.* 1. (Ph. L.) *Nutmegs*, *cinnamon*, and *hay-saffron*, of each, 2 oz.; *cloves*, 1 oz.; *cardamoms*, ½ oz.; *prepared chalk*, 16 oz.; *white sugar*, 2 ℔; reduce the whole to a very fine powder, and keep it in a closed vessel. When wanted for use, mix it with water to the consistence of a confection.

2. (Ph. E.) *Aromatic powder* (Ph. E.), 1 part; *syrup of orange peel*, 2 parts; mix.

3. (Ph. D.) *Aromatic powder* and *simple syrup*, of each, 5 *oz.; clarified honey*, 2 *oz.; powdered saffron*, ½ *oz.;* mix, and add, *oil of cloves*, 30 drops.

4. (Commercial.)—*a. Hay saffron, cassia*, and *turmeric*, of each, 4 *oz.; cardamoms*, 1 *oz.; starch*, 8 *oz.; precipitated chalk*, 2 *lb.; white sugar*, 4 *lb.; oil of nutmeg*, 2 dr.; *oil of cloves*, 3 dr.; reduce the dry ingredients to fine powder, and pass it through a "80 hole sieve," then add the oils, and after well mixing them in, pass the whole through a coarse sieve (about 40 holes to the inch), to ensure perfect admixture.

b. Hay saffron, 4 *oz.; turmeric*, 3 *oz.; powdered starch*, 8 *oz.; precipitated chalk*, 2 *lb.; white sugar*, 4 *lb.; oils of cloves* and *cassia*, of each, 3 dr.; *oil of nutmeg*, 2 dr.; *essence of cardamoms*, 1 *oz.;* boil the saffron and turmeric in 1 gallon of water, placed in a *bright copper pan*, for 10 minutes, then, without straining, add the chalk, starch and sugar; mix well, and continue stirring until the mixture becomes quite stiff, then break it up, dry it thoroughly by the heat of a steam or water bath; next reduce it to *fine* powder, which must be passed through a fine sieve, as before; the oils and tincture are now to be added, and after being well mixed, and passed through a coarse sieve, it should be placed in a jar or bottle, and bunged up close. Very bright coloured.

Obs. In the wholesale *trade* this article is kept under two forms—*one*, in *powder*, as ordered by the College, and commonly called for distinction sake "*pulvis confectionis aromaticæ;*" the *other*, mixed up ready for use. In preparing the latter, it is a common plan to make a strong infusion or decoction of the saffron, and to use it to mix up the other ingredients, adding the aromatics last. (See 4, *b.*) When the price of *precipitated chalk* is an objection to its use, *prepared chalk* may be used instead.

There is much anxiety evinced by the wholesale druggists to prepare this confection of a rich colour, without an undue expenditure of saffron, which is generally economised on account of its costliness. This confection is cordial, stimulant, antacid, and carminative. *Dose.* 10 to 60 gr., either as a bolus or stirred up with a glass of water; in diarrhœa, acidity of stomach, heartburn, and any like affection, if accompanied by looseness of the bowels. In diarrhœa, English cholera, and flatulent colic, ¼ gr. of powdered opium may be added to each dose.

CONFECTION (Bark). Syn. *Confectio Cinchonæ*,—Lat. *Prep.* 1. *Yellow bark* and *white sugar*, of each, 1 oz.; *capsicum*, 1 dr.; *simple syrup*, 4 oz.

2. (St. B. Hosp.) *Yellow bark*, 6 dr.; *ginger*, ½ dr.; *treacle*, 3½ oz. *Dose.* 1 to 6 dr., where the use of bark is indicated.

CONFECTION (Cassia). Syn. *Confectio Cassiæ*,—Ph. L. *Prep.* (Ph. L.) *Prepared cassia*, ½ ℔; *manna*, 2 oz.; *prepared tamarinds*, 1 oz.; *syrup of roses*, 8 fl. oz.; mix with heat, and evaporate to a proper consistence. *Dose.* 2 dr. to 6 dr., or more, as a laxative.

CONFECTIO (Catechu). Syn. *Confectio Catechu Composita*,—Ph. D. *Prep.* (Ph. D.) *Compound powder of catechu*, 5 *oz.; simple syrup*, 5 fl. oz. *Dose.* 10 gr. to 20 gr.; as an astringent, in diarrhœa, &c.; either alone or combined with chalk.

CONFECTIO (Copaiba). Syn. *Confectio Copaibæ*,—Lat. *Prep.* (Berton.) *Copaiba* and *powdered cubebs*, of each, 2 oz.; *alum*, 1 oz.; *opium*, 5 gr.; mix well.

2. (Swediaur.) *Turpentine*, 1 oz.; *copaiba*, ½ oz.; mix; add *mucilage of gum arabic*, 1 oz.; triturate to an emulsion, and further add, *conserve of roses*, 4 oz.

3. (Traill.) *Copaiba*, 2 oz.; *oatmeal*, q. s. to form an electuary; then add, *conserve of roses*, 1 oz.

4. (Voght.) *Copaiba* and *powdered cubebs*, of each, 4½ dr.; *yelk of* 1 *egg; conserve of roses*, ½ oz. All the above are excellent medicines in gonorrhœa. *Dose.* 1 to 3 dr. three or four times a day, made into boluses, and covered with the fresh emptied skin of a prune before being swallowed; in gonorrhœa, gleet, &c.

CONFECTION (Cream of Tartar). Syn. *Confection of Bitartrate of Potassa; Confectio Potassæ Bitartratis*,—Lat. *Prep.* 1. *Cream of tartar* and *powdered sugar*, of each, 1 oz.; *simple syrup*, 2 oz.; 1 *nutmeg*, grated. *Dose.* 2 dr. to 6 dr.

2. (St. B. Hosp.) *Bitartrate of potassa* and *simple syrup*, of each, 3 oz.; *ginger*, 1 dr. *Dose.* 1½ dr. to 5 dr. Both are laxatives well adapted for women and children.

CONFECTION (Damocrates'). See *Mithridate.*

CONFECTION (Hemlock). Syn. *Confectio Conii*,—Lat. *Prep.* (Marshall Hall.) *Fresh hemlock leaves* beaten up with an equal weight of *sugar*. *Dose.* 10 to 20 gr., as a bolus, 2 or 3 times daily, where the use of hemlock is indicated. The *confection* of other *narcotic plants* may be made in the same way.

CONFECTION (Hips). Syn. *Conserve of Hips; Confection of Dog Rose, Conserve of do.; Confectio Rosæ Caninæ*,—Ph. L. *Conserva Rosæ Fructûs*,—Ph. E. *Conserva Cynosbati*,—Ph. L. 1788. *Prep.* (Ph. L.) *Fruit of the dog rose*, without the seeds (carpels) 1 ℔; pound it to a pulp, add, gradually, *powdered white sugar*, 20 oz.; and beat them together until thoroughly incorporated.

2. (Ph. L. 1836.) As above, but employing a gentle heat.

3. (Ph. E.) *Pulp of hips*, 1 part; *white sugar*, 3 parts; as No. 1.

4. (Wholesale.) *Pulped hips*, 2 cwt.; *fine white sugar*, 3 cwt.; incorporate them without applying heat.

Obs. Both this and the confection of red roses have a brighter colour, if made without heat, or touching metallic vessels, On the *small scale* it is generally made by beating the ingredients together in a marble mortar, but in *large quantities* by grinding in a mill. Great care must be taken to remove the seeds (*akenia* or *carpels*) with the hair surrounding them, before pulping the fruit; as they are apt, like the hairs of cowhage, when swallowed, to produce vomiting, itching about the anus, &c. This conserve is slightly laxative, and is principally used for forming pills. It is very apt to candy by keeping.

CONFECTION (Ipecacuanha). Syn. *Confectio Ipecacuanhæ*,—Lat. *Prep.* (Bories.) *Ipecacuanha*, 12 gr.; *sulphur*, 20 gr.; *orris root*, 1 dr.; *syrup of mallows* and *manna*, of each, 2 oz. *Dose.* A teaspoonful 2 or 3 times daily; in hooping-cough, dyspepsia, &c.

CONFECTION (Jalap). Syn. *Confectio Jalapæ, C. J. Composita.*—Lat. *Prep.* (St. B. Hosp.) *Jalap*, 4 dr.; *ginger*, 1 dr.; *bitartrate of potassa*, 3 oz.; *treacle*, 5 oz. *Dose.* 1 to 3 dr., as a purgative.

CONFECTION (Mercury). Syn. *Confectio Hydrargyri, C. Mercurialis*,—Lat. *Prep.* 1. *Stronger mercurial ointment* (Ph. L.), 1 part; *conserve of roses*, 3 part

2. (Dr. D. Davis.) *Mercury* and *manna*, equal parts; *treacle*, q. s.; triturate until the globules of mercury disappear.

Dose, &c. The same as those of mercurial pill.

CONFECTION (Nitre). Syn. *Confectio Potassæ Nitratis*,—Lat. *Prep.* 1. *Nitre*, 1 part; *confection of roses*, 6 parts; *oil of juniper*, a few drops.

2. (St. B. Hosp.) As the last without the *juniper*. Both are used in gonorrhœa.

CONFECTION (Opium). Syn. *Confectio Opii*,—Ph. L. & D. *C. Opiata*,—Ph. L. 1788. *Electuarium Opii*,—Ph. E. *Philonium Londinensis, P. Romanum*,—Obs. *Prep.* 1. (Ph. L.) *Powdered opium*, 6 dr.; *long pepper*, 1 oz.; *ginger*, 2 oz.; *caraways*, 3 oz.; *tragacanth*, 2 dr.; reduce to fine powder, and keep it in a closed vessel; for *use*, add to it by degrees, *hot syrup*, 16 fl. oz., (i. e., 3½ dr. of the powder to each fl. oz. of syrup.) It contains 1 gr. of opium in every 36 gr.

2. (Ph. E.) *Aromatic powder*, 6 oz.; *senega*, 3 oz.; *opium*, diffused in a little sherry, ½ oz.; *syrup of ginger*, 1 ℔. Contains 1 gr. of opium in every 43 gr.

3. (Ph. D. 1826.) Resembles the London formula, except in containing 1 gr. of opium in every 25 gr.

Uses, &c. This confection is intended as a substitute for the once celebrated *Mithridate, philonium*, and *theriaca* of the old Pharmacopœias. It is stimulant, anodyne, and narcotic. *Dose.* 5 to 30 gr.; in flatulent colic and diarrhœa unaccompanied by fever.

CONFECTION (Orange Flowers). Syn. *Confectio Florum Aurantii*,—Lat. *Prep.* 1. *Orange flowers*, 1 part; *white sugar*, 2 parts; beat together to a confection.

2. (Tadei.) *Orange flowers*, 1 part; *simple syrup*, 3 parts; evaporate to a proper consistence. Both are used as agreeable adjuncts or vehicles for other medicines. The first is the best article.

CONFECTION (Orange Peel). Syn. *Conf. of Orange, Conserve of Orange Peel; Confectio Aurantii*,—Ph. L. *Conserva Aurantii*, Ph. E. *Conserva Aurantiorum*, Ph. L. 1824. *Prep.* (Ph. L.) *External rind of the fresh orange*, separated by rasping, 1 ℔; beat it in a stone mortar with a wooden pestle to a pulp, then add, *white sugar*, 3 ℔; and beat them together until incorporated.

2. (Ph. E.) As the last.

Uses, &c. This confection is an agreeable tonic and stomachic; it is much used as an adjunct to bitter and purgative powders, and as a vehicle for the sesquioxide of iron.

CONFECTION (Pepper). Syn. *Confection of Black Pepper, Conserve of do., Ward's Paste; Confectio Piperis*,—Ph. L. *C. P. Nigri*,—Ph. D. & Ph. L. 1836. *Electuarium Piperis*,—Ph. E. *Prep.* 1. (Ph. L.) *Black pepper* and *elecampane*, of each, 1 ℔; *fennel*, 3 ℔; *white sugar*, 2 ℔; reduce to a very fine powder, and keep it in a covered vessel; for *use*, add it, gradually, to *honey*, 2 ℔; and beat the whole to a paste, (*i. e.*, 2 oz. of *honey*, to each 7 oz. of powder.)

2. (Ph. E.) As the last, but using *liquorice powder* instead of *elecampane*, and at once making a confection.

3. (Ph. D.) *Black pepper* and *liquorice root*, of each, *½ oz.; refined sugar*, 1 *oz.; oil of fennel, ½ fl. oz.; honey*, 2 *oz.;* mix. *Dose*, of each of the above, 1 to 3 dr., two or three times daily for 3 or 4 months; in piles, fistula, &c., unaccompanied with inflammatory symptoms. Or, it may be used as a suppository. It is intended as a substitute for the once celebrated nostrum, *Ward's Paste for the Piles.*

CONFECTION (Peppermint). Syn. *Confectio Menthæ Piperitæ*,—Lat. *Green peppermint*, 4 oz.; *white sugar*, 12 oz. Anti-emetic and anti-flatulent; in colic, diarrhœa, &c.; in the form of a bolus, or made into a mixture.

CONFECTION (Resin). Syn. *Confectio Resinæ*,—Lat. *Prep.* (Dr. Watson.) *Powdered resin*, 1 oz.; *balsam of copaiba*, ½ oz.; *honey*, 5 oz. *Dose.* 1 to 3 dr.; in piles and gleet. It is best combined with a little *confection of orange peel*, which effectually covers the taste of the copaiba.

CONFECTION (Roses). Syn. *Confection of Red Roses; Confectio Rosæ*,—Ph. L. & D. *Conserva Rosæ*,—Ph. E. *Confectio Rosæ Gallicæ*,—Ph. L. 1835. *Conserva R. G.*,—Ph. L. 1824. *Prep.* 1. (Ph. L.) *Fresh petals* (unopened flowers) *of red roses*, 1 ℔; *white sugar*, 3 ℔; as confection of hips.

2. (Ph. E.) *Fresh petals*, 1 part; *sugar*, 2 parts.

3. (Ph. D.)—*a. Fresh petals*, 3 *oz.*; *sugar*, 8 *oz.* Or—

b. Dried petals, 1 *oz.; water*, 2 fl. oz.; macerate for 2 hours; then add *refined sugar*, 8 *oz.*, and beat to a mass, as before.

Obs. It is astringent and tonic, but is principally used as an elegant vehicle for more active medicines. It keeps well, and does not "candy" like confection of hips. *Dose.* 1 to 2 dr., eaten off a spoon, either alone or combined with chalk; in slight cases of diarrhœa, vomiting in pregnancy, &c.

CONFECTION (Rue). Syn. *Confectio Rutæ*, Ph. L. *Electuarium è Baccis Lauri*, —Ph. L. 1745, &c. *Prep.* (Ph. L.) *Fresh rue*, (bruised,) *caraways*, and *laurel berries*, of each, 1½ oz.; *prepared sagapenum*, ½ oz.; *black pepper*, 2 dr.; *honey*, 16 oz.; *water*, q. s.; rub the dry ingredients to a fine powder, then add, gradually, the *sagapenum*, previously dissolved in the water and honey over a slow fire, and mix well. In the Ph. L. 1836, dried rue was ordered. Carminative and antispasmodic. In flatulent colic, and in the convulsions of children, when there is no inflammation. *Dose.* 15 to 60 gr.; either by the mouth, or made into an enema with gruel.

CONFECTION (Scammony). Syn. *Confectio Scammonii*,—Ph. L. *Electuarium Scammonii*,—Ph. D. *E. Caryocostimum*, Ph. L. 1720. *Prep.* 1. (Ph. L.) *Scammony*, 1½ oz.; *cloves* and *ginger*, of each, 6 dr.; reduce to a fine powder, and when wanted for use, add *oil of caraway*, ½ fl. dr.; *syrup of roses*, q. s. to make a confection.

2. (Ph. D.) As the last. *Dose.* 10 gr. to 60 gr.; as a warm carthartic, and in worms, &c.

CONFECTION (Senna). Syn. *Lenitive Electuary*, *Electuary of Senna; Confectio Sennæ*, — Ph. L. and D. *Electuarium Sennæ.*—Ph. E. *E. Lenitivum*,—Ph. L. 1746. *Prep.* 1. *Senna*, 8 oz.; *corianders*, 4 oz.; rub them together, and by a sieve separate 10 oz. of the mixed powder; also boil *figs*, 1 ℔, and *fresh liquorice*, bruised, 3 oz., in *water*, 3 pints, until reduced to one-half; press, strain, and evaporate the strained liquor in a water bath to 24 fl. oz.; then add *sugar*, 2½ ℔; dissolve, and further add, *prepared tamarinds*, *cassia*, and *prunes*, of each, ½ ℔; remove from the heat, and when the whole has considerably cooled, add the sifted powder, by degrees, and stir until the whole is thoroughly incorporated.

2. (Ph. E.) *Senna*, 8 oz.; *corianders*, 4 oz.; *liquorice root*, 3 oz.; *figs* and *pulp of prunes*, of each, 1 ℔; *white sugar*, 2½ ℔; *water*, 3¼ pints.

3. (Ph. D.) *Senna leaves*, in fine powder, 2 *oz.; corianders* (in fine powder), 1 *oz.; oil of caraway*, ½ *dr.*; mix, and add them to *pulp of prunes*, 5 *oz.; pulp of tamarinds*, 2 *oz.; brown sugar*, 8 *oz.; water*, 2 *fl. oz.;* previously brought to a smooth paste by the heat of a water bath.

Uses, &c. Confection of senna is a gentle and pleasant purgative, and well adapted for persons suffering from piles, and as a laxative during pregnancy. The dose is 1 dr. to ½ *oz.*, taken at bedtime or early in the morning.

Obs. There is no one pharmacopœial preparation which it is more difficult to obtain of good quality than confection of senna. The absolute cost of an article prepared according to the directions of the Colleges, is greater than the price at which many wholesale houses are vending the drug. Dr. Paris very truly remarks, that "the directions of the Pharmacopœia are very rarely followed." Considerable quantities are manufactured, into which unsound and spoilt apples enter as a principal ingredient; whilst the substitution of *jalap* for the whole, or a portion of the *senna*, is a very common practice. We have seen the following forms employed in the trade.

4. *Powdered senna, pulp of tamarinds, cassia*, and *prunes*, of each, 1½ *lb.; powdered corianders*, ¾ *lb.; Spanish juice*, ½ *lb.; simple syrup*, 12 *lb.*

5. As the above, but omitting the *cassia pulp*, and adding 2 *lb.* more *tamarind pulp.* Both these articles are labelled "P. L." and sent out as *genuine*, and that when *no competition* as to price exists. The cheaper article is made as follows:—

6. *Common prunes* and *tamarinds*, of each, 16 *lb.; treacle*, ¾ *cwt.; species*, (a compound of *senna dust* and *small senna*, mixed with 3 *lb.* of *coriander seeds*, and strengthened with *jalap;* all ground to a fine powder), 18¼ *lb.* To this is frequently added of *rotten* or *inferior apples*, ¼ *cwt.*, which are pulped with the prunes and tamarinds. This article is commonly labelled "CONF. SENNÆ VER." by the conscientious druggist.

CONFECTION (Sponge). Syn. *Electuary of burnt Sponge; Confectio Spongii, C. S. Ustæ*,—Lat. *Prep.* 1. *Burnt Sponge*, 3 parts; *confection of orange peel* and *hips*, of each, 1 part; *simple syrup*, q. s.

2. (St. B. Hosp.) *Burnt sponge*, made into a confection with *syrup of orange peel.* The first form produces the most agreeable confection. *Dose*, of either, ½ dr. to 2 dr., twice or thrice daily; in scrofula, &c.

CONFECTION (Steel). *Prep.* 1. (*Confectio Ferri Sesquioxidi, C. F. Subcarbonatis*).—*a.* From *confection of orange* and *sesquioxide of iron* (Ph. L.), of each, 2 oz.; *white sugar*, 3 oz.; *syrup*, 1½ oz.; mix. *Dose.* 1 dr. to 3 dr.

b. (St. B. Hosp.) *Sesquioxide of iron*, 1 oz.; *treacle*, q. s. *Dose.* ½ dr. to 1 dr. Both are given in the usual cases wherein iron is indicated; especially in anæmia, chlorosis, and amenorrhœa.

2. (*Confectio Ferri Tartarizati*,—St. B. Hosp.) *Cream of tartar*, 1½ oz.; *tartrate of iron*, 2 dr.; *ginger*, 1 dr.; *treacle*, 2½ oz., or q. s. *Dose.* 1 dr. to 2 dr.; 2 or 3 times daily.

CONFECTION (Sulphur). Syn. *Confectio Sulphuris*,—Lat. *Prep.* 1. *Sublimed sulphur*, 2 *oz.; treacle*, 4 *oz.* This is the "*brimstone* and *treacle*" of the lower classes. *Dose.* A spoonful night and morning for a week or longer, as an alterative or purifier of the blood; in skin diseases, &c.

2. (St. B. Hosp.) *Precipitated sulphur*, 1 oz., *cream of tartar*, 2 dr.; *honey* or *treacle*, 2 oz. As the last.

3. (Ph. D.) *Flowers of sulphur*, 2 *oz.; cream of tartar* and *honey*, of each 1 *oz.; syrups of ginger* and *saffron*, of each, ½ *fl. oz.* *Dose.* 1 to 2 dr.; as a laxative, in piles, gonorrhœa, &c.

CONFECTION (Tin). Syn. *Confectio Stanni*,—Lat. *Prep.* (Hosp. Form.) *Powdered tin*, 1 oz.; *confection of roses*, 2 oz.; mix. *Dose.* 2 to 4 dr., every morning; in worms.

CONFECTION (Turpentine). Syn. *Confectio Terebinthinæ*,—Lat. *Prep.* (Ph. D.) *Oil of turpentine*, 1 *fl. oz.*; *liquorice powder*, 1 *oz.;* triturate together, then add *clarified honey*, 2 *oz.* *Dose* and *use*, as the last.

CONFECTION (Worm Seed). Syn. *Confectio Cinæ, C. S. Cinæ*,—Lat. *Prep.* 1. (Ph. Slesvico-Holsat. 1831, and Ph. Suec. 1845.) *Wormseed*, 2 oz.; heat it in a pan over a gentle fire, add *white sugar*, boiled to a low candy height, 4 oz.; and stir together until they become dry; then pick out those seeds which are covered with sugar, and repeat the process with the others.

2. *Powdered worm-seed* and *syrup of orange peel*, equal parts. *Dose.* 1 to 2 dr. night and morning, followed by a brisk purge; in worms.

CONFECTIONERY. See *Candies, Drops, Stains, &c.*

CONGELATION. The conversion of a substance from the fluid to the solid state, by the abstraction of heat. See *Ice* and *Refrigeration.*

CONGLUTINUM (Bracy Clark's). *Sulphate of zinc* (white vitriol), 4 oz.; dissolved in *water*, 1 pint. *Used* as an astringent lotion in veterinary practice, and, much diluted with water, (a dessert spoonful to ¼ pint or more of water,) as a collyrium in chronic inflammation of the eyes.

CONIA. Syn. *Coneine, Conicine, Conicina, Cicutine.* An alkaloid, discovered by Gieseke in hemlock. It exists in every part of the plant, but is present in the largest quantity in the seed.

Prep. (Gieger.) The *seeds of hemlock*, or their *alcoholic extract*, is distilled with *water* and *potassa.* The *conia* passes over into the receiver, and floats on the top of the water, which also contains a little conia in solution. It is purified in the way directed for the volatile bases. (See *Alkaloid.*) When the alcoholic extract is employed, about half its weight of *potassa* should be used.

Prop., &c. Pure conia is an oily-looking liquid, smelling intensely of hemlock, or rather of a combination of the odours of tobacco and mice; volatile at common temperatures; reddens turmeric; boils at about 340° Fahr., but readily distils over with water at 212°; sp. gr. 0·89; with the acids it forms salts, some of which are crystallizable. 6 ℔ of *fresh* and 9 ℔ of dried seeds yielded 1 oz. of conia. (Gieger.) 40 ℔ of the ripe but green seeds yielded 2½ oz. of hydrated conia. (Christison.)

Conia is remarkably poisonous. 1 drop, placed in the eye of a rabbit, killed it in 9 minutes. 5 drops, poured into the throat of a dog, killed it in less than a minute. It has been employed in some convulsive and spasmodic diseases, but is now seldom used medicinally. "The plaintive cries, the contortions, and the rigidity of the limbs, which have always preceded death, (caused by conia,) leave no doubt as to the cruel pains which this kind of poisoning brings on." (Boutron-Chalard and Henry.) The *treatment* may be that recommended under *Aconite* and *Hemlock.*

CONSERVE. Syn. *Conserva*, — Lat. Recent vegetable matter, as *flowers, herbs, roots, fruit*, and *seed*, beaten with *powdered sugar* to the consistence of a stiff paste, so as to preserve them, as nearly as possible, in their natural freshness.—Conserves are made both by the *confectioner* and the *druggist;* by the *first*, as SWEETMEATS; by the *other*, chiefly as vehicles for more active medicines. The London College of Physicians now includes both *conserves* and *electuaries*, under the general head of *confections.* The term appears, however, in some cases, scarcely appropriate. The word confection has a more general application, and implies *any* sweatmeat or composition in which sugar is the principal ingredient. See *Confections* and *Electuaries.*

CONSERVE (Acetate of Potassa). Syn. *Conserva Potassæ Acetatis*,—Lat. *Prep.* (Bories.) *Acetate of potassa*, ½ oz.; *sulphate of soda*, 1 dr.; *juices of scurvy grass, fumitory*, and *dandelion*, of each, 2 oz. (reduced to one-half by gentle evaporation?); *sugar*, q. s. to make a conserve. A teaspoonful 2 or 3 times daily, as a diuretic aperient; in obstruction of the bowels, &c.

CONSERVE (Almonds). See *Confections.*

CONSERVE (Angelica). Syn. *Conservæ Angelicæ*,—Lat. *Prep.* (Giordano.) *Fresh angelica root*, 2 parts; *water*, 16 parts; macerate for a few hours, clarify the liquor, add *sugar*, 3 parts; cook the root in the *syrup*, and preserve it in this state (*confection*), or dry it (to a candy.) *Used* as an agreeable tonic, stomachic, and carminative.

CONSERVE (Antiscorbutic). Syn. *Conserva Antiscorbutica*,—Lat. *Prep.* (Selle.) *Horse-radish*, *water-cress*, and *water-trefoil*, *orange-juice*, and *radish juice*, equal parts; *powdered white sugar*, q. s. to make a conserve. In scurvy, &c.

CONSERVE (Arum). Syn. *Conserva Ari, C. A. Maculati*,—Lat. *Prep.* From *fresh arum tubers* (cuckow-pint or wake-robin), ½ ℔; *sugar*, 2½ ℔. As a diuretic and attenuant, in dropsy, or as an expectorant in chronic coughs. *Dose.* ½ teaspoonful, gradually increased.

CONSERVE (Broom). Syn. *Conserva Scoparii*,—Lat. *Prep.* (Van Mons.) *Broom flowers*, 1 part; *sugar*, 2 parts. *Dose.* ½ to 2 teaspoonfuls, 2 or 3 times a day; in dropsy, gout, rheumatism, &c.

CONSERVE (Hips). See. *Confections.*

CONSERVE (Lavender). Syn. *Conserva Lavendulæ*,—Lat. *Flowers*, 1 part; *powdered lump sugar*, 3 parts; beaten together to a smooth paste. *Used* to sweeten the breath. In a similar way conserves are made from various other *leaves* and *flowers;* but mostly with only twice their weight of sugar, when they are not very odorous or active.

CONSERVE (Lemon Peel). Syn. *Conserva Limonis, C. L. Corticis*,—Lat. As *conserve of orange peel.*

CONSERVE (Mallows). Syn. *Conserva Malvæ*,—Lat. From the *flowers*, as *conserve of lavender.*

CONSERVE (Orange Peel). See *Confections.*

CONSERVE (Peppermint). See *Confections.*

CONSERVE (Rosemary). Syn. *Conserva Rosmarini*,—Lat. As *Conserve of Lavender.*

CONSERVE (Roses). See *Confections.*

CONSERVE (Roses,—Acidulated.) Syn. *Conserva Rosæ Acida*,—Lat. *Prep.* (Hosp. F.) *Confection of roses* and *powdered gum*, of each, 1oz.; *sulphuric acid*, 1 dr. to 1½ dr.; (diluted with) *water*, 2 dr. An excellent substitute for tamarinds.

CONSERVE (Savine). Syn. *Conserva Sabinæ*,—Lat. *Prep.* (Ph. Han.) *Fresh savine*, 1 part; *sugar*, 2 parts. As an emmenagogue, in amenorrhœa, &c. Three parts of sugar make a better conserve.

CONSERVE (Scurvy Grass). Syn. *Conserva Cochleariæ, C. C. Hortensis*,—Lat. *Prep.* (Ph. Aust. 1836.) *Fresh scurvy grass*, 1℔; *sugar*, 3℔. Stimulant and antiscorbutic.

CONSERVE (Sea Wormwood). Syn. *Conserva Absinthii Maritimi*,—Lat. *Prep.* (Ph. L. 1788.) From *sea wormwood*, as the last. As a stomachic bitter and vermifuge; in dyspepsia, &c.

CONSERVE (Sloes). Syn. *Conserva Pruni Sylvestri*,—Lat. *Prep.* (Ph. L. 1788.) From the *pulp of the fruit*, 1 part; *sugar*, 3 parts. Astringent. Useful in simple diarrhœa, &c.; either alone or combined with chalk.

CONSERVE (Squills). Syn. *Conserva Scillæ*,—Lat. *Prep.* (Ph. L. 1788.) *Fresh squills*, 1 oz.; *sugar*, 5 oz. Diuretic, attenuant, and expectorant; in dropsy, chronic coughs, &c. *Dose.* 10 to 20 gr.

CONSERVE (Tamarinds). Syn. *Conserva Tamarindorum*,—Lat. *Prep.* (P. Cod.) *Tamarind pulp*, 2 oz.; *white sugar*, 3 oz.; evaporate by the heat of a water bath to the consistence of honey.

CONSERVE (Violets). Syn. *Conserva Violæ, C. V. Odoratæ*,—Lat. *Prep.* (Soubeiran.) *Flowers*, 1 part; *sugar*, 3 parts; beat to a paste. Demulcent and laxative; used as a purge for infants, and by ladies to perfume the breath.

CONSERVE (Water-cress). Syn. *Conserva Nasturtii*,—Lat. *Prep.* (Ph. Græca, 1837.) From *fresh water-cresses*, as the last. In scurvy; taken ad libitum.

CONSERVE (Wormwood). See *Conserve of Sea Wormwood.*

CONSTIPATION. Syn. *Constipatio, Obstipatio*,—Lat. Surgeons distinguish between *costiveness* and *constipation.* The *first* applies to that condition of the body in which the bowels act tardily, and in which the fæces are abnormally and inconveniently indurated; the *last*, implies the absence of the proper alvine evacuations. The *one* rapidly undermines the health; the *other* destroys life in a period varying from a few days to 3 or 4 weeks. In popular language, however, the words are frequently used synonymously. When the affection is merely *accidental* or *occasional*, a dose of some aperient or cathartic is the only treatment necessary; but when it is *habitual,* it calls for further attention. The *common causes* of constipation are:—The use of bread containing alum, and water containing lime (very hard water); and the want of sufficient exercise. The treatment may consist in adopting a diet free from *astringents,* and consisting of a large portion of *green vegetables* and *ripe fruit;* particularly avoiding the use of *over-cooked,* salted, or dried animal food. *Brown bread* should alone be eaten, as it acts as a gentle laxative from the bran it contains. The *occasional* use of aperient and emollient enemata may be had recourse to; but their habitual administration, as well as that of purgative medicines generally, by the mouth, is not to be recommended. The bowels, accustomed to the continual use of stimulants, act but languidly or scarcely at all, without their application. In *females,* especially of the higher classes, the want of proper exercise is commonly the chief cause of this affection. With such persons, a short walk, two or three times daily, will often do wonders, particularly if a little *ripe fruit,* a few *raisins* or *tamarinds,* or, still better, 2 or 3 *drum figs,* be occasionally eaten. In some cases of obstinate constipation a *cold water dressing,* placed over the pit of the stomach or the abdomen, will cause the bowels to act in the course of an hour or two. When the inactivity of the bowels arises from a deficiency of bile, (one of the most common causes,) no remedy is more natural, or more effective, than *inspissated ox-gall.* In cases complicated with nervous, hypochondriacal, or hysterical affections, in chlorosis, dyspepsia, depraved appetite, and numerous other ailments, accompanied by the accumulation of hard fæcal matter in the intestines, especially with clay-coloured stools, this substance frequently succeeds, after the most active articles of the materia medica have been tried in vain. See *Ox-gall, Purgatives, &c.*

In the treatment of the *constipation of infants, castor-oil* ($\frac{1}{2}$ tea-spoonful occasionally), or *manna* ($\frac{1}{4}$ to $\frac{1}{2}$ oz., sucked at will), may be given. The introduction (very gently) of a little slip of writing paper, parsley stalk, or suet, is a method sometimes adopted successfully by nurses. Friction on the stomach and bowels with the warm hand, or a piece of soft flannel, should also be employed.

CONSUMPTION. See *Phthisis.*

CONTAGION. See *Disinfectants.*

CONTUSIONS. See *Bruises* and *Abrasions.*

COOKERY. See *Baking, Boiling, Roasting, &c.*

COPAIBA. Syn. *Copaiva, Capivi, Balsam of Capivi, &c.; Copaiba,*—Ph. L. E. & D. "An oleo-resin, flowing from the incised stem" of "*copaifera multijuga* (Hayne) and other allied species." (Ph. L.) The *best copaiba* is that imported from *Maracaibo* and *St. Martha,* and is packed in casks containing from 1 to 1½ cwt. each, or in large bottles, or in cylindrical tin boxes. Considerable variation exists in the colour, odour, consistence, and transparency, as well as in the proportion of oil and resin yielded by different samples, scarcely any two of which exactly agree. The sp. gr. varies from 0·950 to 0·996. *Brazilian capivi* is thin, clear, and pale; whilst the *West Indian* variety is thick, golden yellow, less transparent, and has a less agreeable and somewhat terebinthinate smell. Some varieties are opaque and continue so unless filtered. This is often a most troublesome operation. The opacity generally arises from the presence of water, which it retains with great tenacity. The following is the plan we have found to answer on the large scale:—Place the casks upon their ends in a warm situation, and leave them so for 10 days or a fortnight, or longer, if convenient. They may then be tapped *a little above the bottom,* when some of them will generally be found quite transparent, and may be drawn off and vatted, care being taken to avoid shaking up the bottom. Those that are foul must be filtered through one or more long Canton flannel bags, sunk in the bottom of a tin cistern, placed over a suitable receiver, in a similar way to that adopted for oils; a few pounds of coarsely powdered charcoal being mixed up with the first 5 or 6 gallons thrown in. This will rapidly fill up the pores of the bag and make the balsam soon flow clear and pale. The "bottoms" of the casks, containing the water and impurities, may be poured into a large can or jar, and allowed to settle for a few days, when the copaiba may be poured off the top and filtered. A sudden change of temperature will frequently turn a *transparent* sample of this article *opaque* or *milky;* it is not, therefore, deemed fit to "send out" by the wholesale trade, unless it "*stands*" this test. To ascertain this point, a common practice is to fill a small bottle with the copaiba, and to leave it out of doors all night in an exposed situation.

Pur. This substance is frequently adulterated; indeed, fully one half that sold for capivi does not contain 10% of the genuine balsam. This is particularly the case with that sold in capsules, at low prices, in the shops. Pure *balsam of copaiba* should stand the following tests:—

1. (Ph. E.) It is "transparent; free of turpentine odour when heated; soluble in 2 parts of alcohol; and dissolves one fourth of its weight of carbonate of magnesia with the aid of a gentle heat, and continues translucent."

2. (Chevallier.) A drop of the balsam, placed on a piece of unsized paper, and heated until all the essential oil is expelled, forms a semi-transparent *well-defined spot;* but if the balsam has been adulterated with a fatty oil, it is surrounded by an oily areola.

3. (Planche.) 2½ parts of *balsam* shaken with 1 part of *liquor of ammonia*, sp. gr. 0·965, forms a mixture which becomes clear and transparent in a few moments, and may be heated to 212° Fahr. without becoming opaque.

4. (Vigne.) Boiled with 50 times its weight of water for 1 hour, it should lose at least half its weight.

5. (Adder.) By agitating the suspected sample with a lye of caustic soda, and setting the mixture aside to repose, the balsam after a time rises to the surface, and the fatty oil present (if any) forms a soapy thick mass below.

6. (Journ. de Pharm. 1842.) Pure copaiba may be adulterated with 50 per cent. of a fat oil (nut, almond, or castor oil,) without it ceasing to give a clear solution with 2 parts of alcohol; but it combines badly with magnesia and ammonia. Excess of alcohol, however, separates the oil in all cases. The best test for detecting the fat oils is the use of pure alcohol, to which some caustic potash has been added.

Uses, &c. Balsam of copaiba is considered detersive, vulnerary, diuretic, and astringent; and appears to possess a sort of specific power over diseases of the mucous membranes of the urino-genital organs. It is hence a favorite remedy in gonorrhœa, as soon as the first inflammatory symptoms have subsided, antiphlogistic and soothing measures being previously adopted. *Dose.* 20 to 60 drops on sugar, or floating on water, to which 30 or 40 drops of elixir of vitriol have been added, 3 or 4 times daily, if the stomach will bear it. The addition of a few drops of *sweet spirits of nitre* and *laudanum* have also been recommended, to allay the nausea. We have proved by extensive experience, that by adding 1 dr. of oil of orange (ol. aurantii) to each oz. of the balsam, its flavour becomes far from disagreeable, and it sits well upon the stomach. Capivi is also given in the form of *syrup, mixtures, pills, clysters, &c.*, (which see.)

Obs. Numerous preparations of this article are continually being "puffed off" by certain advertising druggists; as "*soluble copaiba,*" "*specific solution,*" "*salt of copaiba,*" &c.; of which *none* appear to possess equal activity and certainty of operation to the natural balsam. As the whole virtue of copaiba as a medicine depends on the essential oil it contains, the value of any of these preparations may be estimated by the quantity of that article which is found in them. In the case of the first two articles above mentioned, the quantity is *very small indeed*, and in the last it is *wholly deficient.* Hence the large doses of these articles that may be taken with impunity, as far as their balsamic properties go, always excepting, of course, the danger of burning a hole through the coats of the stomach with the large quantity of caustic potassa which they contain.

The following forms are current in the trade for the "reduction" (adulteration) of balsam of capivi:—

1. *Balsam of copaiba,* 4 *lb.; castor oil,* 3 *lb.;* mix well.

2. *Balsam,* 7 *lb.; castor oil,* 4 *lb.; yellow rosin,* 2 *lb.*

3. Equal parts of *balsam of copaiba* and *balsam of Canada.*

4. To the last add, *Venice turpentine,* 1 *lb.*

5. *Balsams of Canada* and *copaiba*, and *nut* or *castor oil,* equal parts.

6. *Copaiba,* 7 *lb.; nut oil,* 3 *lb.; yellow rosin,* 2 *lb.; balsam of Canada,* 1 *lb.* Used to fill the cheap capsules; and to sell in the lower parts of London and in the manufacturing districts. (See below.)

COPAIBA (Factitious). Syn. *Copaiba Factitia, Balsamum Copaibæ Factitium. Prep.* 1. *Castor oil* (warm), 7 quarts; *capivi bottoms,* 1 quart; mix, and filter through flannel.

2. *Castor oil,* 1 gall.; *yellow rosin,* 3 *lb.; balsam of Canada,* 2 *lb.; oil of juniper,* 2 *oz.; oil of savine,* 1 *oz.; essences of orange* and *lemon,* of each, ½ *oz.; powdered benzoin,* 1 *oz.;* melt the resin with the castor oil and benzoin, and when nearly cold add the essences.

3. *Balsam of Canada,* 9 *lb.; castor oil,* 7 *lb.; yellow resin,* 1 *lb.; Venice turpentine,* 2 *lb.; oils of rosemary, juniper,* and *savine,* of each, 1 dr.; *essential oil of almonds,* 20 drops.

4. *Balsam of Canada,* 3 *lb.; Venice turpentine,* 1 *lb.; oils of fennel, juniper,* and *savine,* of each, q. s. Used chiefly to fill

capsules. It is readily distinguished from balsam of copaiba by the proper tests. (See *above.*) *Train oil* or *nut oil* is frequently substituted for the castor oil.

COPAIBA (Miscible). *Prep.* From *balsam of copaiba*, (pure and transparent,) mixed with half its volume of *liquor of potassa* made of double the strength ordered in the Ph. L.

Obs. As different samples of copaiba often require *slightly* different quantities of the solution of potassa, it is best to mix the two gradually and cautiously together. Should the mixture be opaque, a *little* more of one or other of the ingredients, as the case may be, will render it clear. *No heat* must be used. This article is miscible with water, with which it forms a kind of milk; and from containing *all* the volatile oil of the copaiba, is a very valuable preparation. Its activity is considered equal to that of the balsam itself, and it is given in similar doses.

COPAIBA (Soluble). Syn. *Copaiba Solubilis*,—Lat. *Prep.* 1. Heat *miscible copaiba* in an earthen, glass, or bright-tinned copper-vessel, to nearly the boiling-point, pour it while still hot into a "separator," cover it up, and allow it to cool very slowly. After a few days, draw off the clear portion from a cock or hole placed at or near the bottom of the vessel, observing to reject the few first drops which pass through, and to stop the stream before any of the floating oil (*oleum copaibæ*) reaches the orifice. A *very little* concentrated liquor of potassa, added before applying the heat, renders it more soluble. Thick, transparent, soluble in *pure* water, and resembles the natural balsam in appearance.

2. *Balsam of copaiba* and *liquor of potassa* (Ph. L.,) equal parts, by volume; mix, boil for a few minutes, and then proceed as before. Thinner than the last. Less powerful than *miscible copaiba*, but it sits better on the stomach, and is about four times as strong as *specific solution of copaiba.*

COPAIBA (Resin of). Syn. *Copaibæ Resina*,—Lat. The *residuum* of the process of *distilling the oil of copaiba* from the balsam. It consists principally of copaibic acid. It has been recommended for gonorrhœa, but is nearly inert, even in ½ oz. or ¾ oz. doses.

COPAIBA (Salt of). Syn. *Sal Copaibæ*,—Lat. There are two preparations sold under this name; the one, *crude copaibic acid;* the other, *copaibate of an alkali.* Neither of them possesses the valuable properties of copaiba, which reside almost entirely in its essential oil. We have taken the "*sal copaibæ*," and have watched its action on others, but have not been able to perceive any good effects to result from its administration.

COPAIBA AND KALI. Syn. *Copaiba cum Potassâ*,—Lat. *Prep. Carbonate of potassa* and *water*, of each, equal parts; dissolve, and add, gradually, *transparent balsam of copaiba*, until the fluid, at first milky, turns quite clear. Resembles miscible copaiba.

COPAIBA CAPSULES. See *Capsules.*

COPAIBIC ACID. Syn. *Capivic Acid, Yellow Resin of Copaiba.* Prepared by digesting *resin of copaiba* in *alcohol*, and evaporating the solution. It may be purified by redissolving it in *alcohol.* It forms about 50% of the balsam.

Prop., *&c.* An amber-coloured, brittle, semi-crystalline, resinous substance, soluble in alcohol, rectified spirit, ether, and oils, reddens litmus paper, and forms salts with the bases, called *copaibates.* The *insoluble copaibates*, as those of *silver*, *iron*, *lead*, *lime*, *&c.*, may be made by dropping into a *solution of the acid in alcohol*, an *alcoholic solution of a salt of the base*, followed by the addition of a little *liquor of ammonia*, when the salts subside as a semi-crystalline powder. *Copaibate of potassa* (sal copaibæ), of *soda*, and of *ammonia*, are easily prepared, by neutralizing an *alcoholic solution of the acid* with the *pure alkali*, and carefully evaporating the solution. The first two are soluble in water, and alcohol; the last is insoluble in water, but soluble in both alcohol and ether. *Copaibate of magnesia* is made by adding *copaibate of potassa* to a solution of *epsom salts.* All these salts are easily decomposed by acids.

COPAL. Syn. *Gum Copal.* A resinous substance, which exudes spontaneously from the *rhus copallinum* and the *elæocarpus copalifer.* When of good quality it is too hard to be scratched by the nail, has a conchoidal fracture, and a sp. gr. ranging from 1·059 to 1·072. It dissolves with difficulty, and this combined with its extreme hardness, renders it very valuable for making varnishes. Among its best SOLVENTS, are—

1. *Absolute alcohol;* (alcohol, 1½ parts; copal, 1 part; by digestion for 24 hours, then adding more alcohol.)

2. *Absolute alcohol;* (added gradually, the gum having been previously rendered gelatinous with liquor of ammonia, or softened with ether.)

3. *Alcohol;* (the gum having been previously fused, or triturated with a little powdered camphor.)

4. *Camphorated alcohol;* ($\frac{1}{2}$ to 1 oz. to the quart.)

5. *Camphorated oil of turpentine;* (as the last, with heat.)

6. *Caoutchoucine;* (sparingly.)

7. *Caoutchoucine and alcohol* (sp. gr. 0·825), equal volumes; (freely in the cold.)

8. *Drying oil;* (nearly boiling; solution is afterwards thinned with oil of turpentine.)

9. *Ether;* (freely in the cold; the solution may be thinned with alcohol.)

10. *Oil of turpentine;* (only when very recent, or when previously digested for some time on sulphur.)

11. *Oils of rosemary, spike lavender, &c.;* (too expensive for general use.)

12. Copal, *heated until it fuses,* (MELTED COPAL,) then cooled and powdered, becomes soluble in alcohol and oil of turpentine, but the hardness of the varnish suffers a little.

13. Copal, *in powder, exposed* for *some time* (2 or 3 months) *to the air,* acquires the same properties as the last.

In all the above cases the copal should be reduced to a *coarse powder.* A *fine powder* is apt to stick together and run into hard lumps. The solution of copal, even in its most ready solvents, is attended with some difficulty, and frequently miscarries in the hands of the inexperienced. No 7 is an exception. See *Varnishes.*

COPPER. Syn. *Cuprum,*—Lat. This metal is found in the metallic state, and in combination with oxygen, sulphur, acids, and other minerals, and in the organic kingdom, in the ashes of plants, and in the blood of animals. (Sarzeau.) The *copper of commerce* is principally prepared from *copper pyrites,* a mixed sulphuret of iron and copper, found in Cornwall, and other parts of the world.

Prep. Copper is only prepared from its ores on the large scale. The *copper pyrites* is first roasted, and then smelted, by which process "*coarse metal*" is produced; this is again submitted to calcination and smelting, when "*fine metal*" is obtained, which is run into "pigs." It afterwards undergoes the process of refining and toughening. It is employed in the laboratory under the following forms:—

1. (*Bean-shot copper.*) Commercial *refined copper,* melted and poured in a small stream into *boiling water.* In small lumps like peas and beans; hence its name. Used to make alloys, solutions, &c.

2. (*Blanched copper.*) From *refined copper,* fused with $\frac{1}{16}$th of its weight of *neutral arsenical salt,* under a flux of *calcined borax, charcoal,* and *powdered glass.* Superior to the last.

3. (*Feather-shot copper.*) From *refined copper,* melted and poured in a small stream into *cold water.* In small pieces, with a feathered edge. Used to make solution of copper, &c.

4. (*Copper in plates or foil.*) Those of commerce (best, annealed,) is generally employed.

5. (*Copper in powder.*)—*a.* A solution of *sulphate of copper* is heated to the boiling-point, and precipitated with *distilled zinc;* the precipitated copper is then separated from the adherent zinc by *dilute sulphuric acid,* washed with *water,* and dried by exposure to a moderate temperature.

b. As the last, but using a plate of *polished iron.* Both are in very fine powder.

c. Copper filings separated from foreign matter.

6. (*Copper wire.*) That of *commerce* (best, annealed) is usually employed.

7. (*Perfectly pure copper.*) See *Estim.* (below.)

Prop., &c. Copper has a brilliant yellowish-red colour, a nauseous styptic taste, and emits a disagreeable odour when rubbed; is very malleable and ductile; unchanged in dry air; in damp air it soon becomes covered with a greenish rust (*carbonate of copper*); slightly soluble in dilute sulphuric and hydrochloric acid; freely soluble in boiling oil of vitriol (sulphurous acid being evolved); nitric acid, even dilute, dissolves it readily (with copious evolution of binoxide of nitrogen; heated to redness in the air, it rapidly becomes covered with a black scale (*oxide*); fuses at a full red heat, (2000° Fahr.; 1996°,—Daniell); and is volatile and combustible at a higher temperature; its crystals are either octahedra or cubes; sp. gr. 8·8 to 8·96; it forms numerous compounds (*alloys* and *salts*) with other bodies, all of which are more or less poisonous; those with the acids are either blue or green, and most of them (when neutral) are soluble in water.

Tests.—1. The solutions of copper possess a blue or green colour, which they retain even when considerably diluted with water.—2. With caustic potassa they give a light blue bulky precipitate, turning blackish-brown or black on boiling the liquid.—3. Ammonia and carbonate of ammonia produce a bluish-white precipitate, soluble in excess, yielding a rich deep blue solution. — 4. The carbonates of potassa give a like precipitate, insoluble in excess.

—5. Ferrocyanide of potassium gives a reddish-brown precipitate.—6. Sulphuretted hydrogen and hydrosulphuret of ammonia, give blackish-brown or black ones.—7. A polished rod of iron, on immersion in an acidulated solution, quickly becomes coated with metallic copper.

Estim.—1. By throwing it down from its solution by *pure potassa*, after which it must be carefully collected, washed, dried, ignited in a platinum crucible, and weighed therein as soon as it is cold. Every 5 parts of the ignited precipitate (*oxide*) represents 4 parts of copper (nearly); or, more accurately, every 39·7 parts are equal to 31·7 of pure metallic copper.—2. By immersing a piece of polished steel in the solution, and weighing the resulting precipitate of the copper. (See above.) Less delicate than the preceding. — 3. *Copper* may be separated from LEAD, by adding sulphuric acid to the nitric solution, and evaporating to dryness, when water digested on the residuum will dissolve out the sulphate of copper, but leave the sulphate of lead behind. From this solution the oxide of copper may be thrown down as before.—4. *Copper* may be separated from TIN by digestion in nitric acid, which will dissolve the *first*, but leave the *last* behind as an insoluble peroxide. — 5. *Copper* may be separated from ZINC by sulphuretted hydrogen, which will throw down a sulphuret of copper, which may then be dissolved in nitric acid.—6. *Copper* may be separated from SILVER by digesting it in the state of filings or powder in a solution of chloride of zinc, which dissolves the first, but leaves the last unchanged.—7. *Copper* may be separated, in a state of *absolute purity*, from ANTIMONY, ARSENIC, BISMUTH, LEAD, IRON, TIN, ZINC, &c., as it exists in *bell-metal, brass, bronze, gun-metal, mosaic gold,* and other commercial alloys, by fusing it in a crucible for about half an hour, along with *copper scales* (black oxide), and *ground bottle-glass*, or other like flux. The pure metal is found at the bottom of the crucible, whilst the impurities are either volatilized or dissolved in the flux. The proportions for refining commercial copper are, *metal*, 10 parts; *copper scales* and *bottle-glass*, of each, 1 part. The Society of Arts conceived this process to be so valuable, that they presented one of their gold medals to its inventor, Mr. Lewis Thompson.

Uses, &c. The ordinary uses of copper are well known. In *medicine*, 3 or 4 gr. of the filings or powder were formerly given in rheumatism, and to prevent hydrophobia. Some of its salts are still used as astringents, emetics, and caustics. Its alloys are of great value. With *zinc* it forms BRASS; with *tin*, BRONZE, BELL METAL and CANNON METAL. An alloy made with 2 parts of copper and 1 of tin, forms SPECULUM METAL. *White copper* is formed by the addition of *metallic arsenic*, and GERMAN SILVER is a mixture of *nickel, zinc,* and *copper*.

Ant. Copper in the metallic state is almost inert, but all its compounds are poisonous. The *antidotes* are—the *white of egg, milk,* or *flour*, mixed with *water*. The *hydrated sulphurets of iron, iron filings,* and *ferrocyanide of potassium* have also been strongly recommended, and are exhibited in the same way. *Sugar* is likewise highly spoken of as an antidote. In all cases a strong emetic should be first given.

Obs. Culinary and pharmaceutical vessels are very commonly made of copper, but too much caution cannot be exercised in their employment. Acid syrups, vegetable juices, aqueous extracts, soups, stews, &c., prepared in copper saucepans, or boilers, receive a metallic contamination proportional to the length of time they are exposed to the action of the metal. Such vessels are frequently tinned, for the purpose of protecting the copper from contact with their contents, but this film of tin is necessarily very thin, and soon becomes imperfect by constant use. When copper vessels are allowed to remain wet or dirty, or more especially, greasy, a poisonous green rust forms upon the surface, somewhat similar to verdigris. If articles are prepared in them in this state, serious consequences may ensue. Cases of poisoning from this cause are frequently met with, and instances of vomiting following the use of such articles are almost of daily occurrence, without the reason being suspected. We have occasionally seen confections and extracts, prepared in copper pans, deposit a coating of that metal upon the knives used to stir them. The ashes of the inspissated juices of fresh vegetables, and especially the pulps of fruit, prepared in vessels of this metal, have exhibited the presence of copper on the application of chemical tests. Ketchup is frequently rendered poisonous in this way. The most wholesome material for culinary utensils is thin sheet iron, or tinned iron-plate (*tin*), which is very durable if kept clean and dry when not in use. Copper vessels of every kind should be cleaned out, *immediately before use*, even though they may not appear to require it, and on no account should they be employed for any fluids that are the *least* acidulous, or that may have to remain long in them.

COPPER (Acetates of). Of these, two are employed in the *arts* and *medicine*:—

COPPER (Subacetate of). Syn. *Diacetate of Copper, Verdigris; Ærugo*, — Ph. L. & E. *Cupri Subacetas*,—Ph. D. *C. Diacetas*,—Ph. L. 1836. A green or bluish-green powder, consisting of a mixture of *hydrated diacetate* or *sesquibasic acetate of copper* (blue verdigris), and *triacetate of copper* (green verdigris), in variable portions. See *Verdigris.*

Pur. "Partly soluble in water, almost entirely so, with the aid of heat, in dilute sulphuric acid. Nothing is thrown down from this solution by ammonia added in excess." (Ph. L.) "Digested in hydrochloric acid, not above 5% of impurity is left undissolved." (Ph. E.) It should be almost entirely soluble in ammonia.

COPPER (Binacetate of). Syn. *Neutral Acetate of Copper, Distilled Verdigris, Crystallized do.; Cupri Acetas, Ærugo Crystallisata, Flos Ærugo*,—Lat. From *verdigris*, dissolved in *vinegar*, with the aid of heat, and crystallized. It forms dark green or blue crystals. See *Verdigris.*

COPPER (Ammonio-sulphate of). Syn. *Ammoniated Copper, Ammoniuretted do., Cupro-sulphate of Ammonia; Cupri Ammonio-sulphas*,—Ph. L. & D. *Cuprum Ammoniatum*,—Ph. E. *Prep.* (Ph. L.) *Sulphate of copper*, 1 oz.; *sesquicarbonate of ammonia*, 1½ oz.; rub together until carbonic acid ceases to be evolved, then wrap it in bibulous paper, and dry it in the air. The Ph. E. & D. order the same proportions.

Pur. "Pulverulent; dark blue; at an intense heat it is changed into oxide of copper, at first sesquicarbonate of ammonia, and, afterwards, sulphate of ammonia, being thrown off. It is soluble in water. This solution changes the colour of turmeric to brown; and arsenious acid being added, it turns green." (Ph. L.)

Uses, &c. It is employed in pyrotechny, and has been given in chorea, epilepsy, hysteria, &c., but it is now principally used as an injection, as a wash for foul ulcers, and as a collyrium, in opacity of the cornea. *Dose.* ½ gr., gradually increase to 5 gr., twice a day. Great care must be taken in drying this article, as it is apt not only to lose a large portion of its weight, but to become of an inferior colour. Both the ingredients should be separately reduced to powder before mixing them.

COPPER (Arsenite of). Syn. *Cupri Arsenis*,—Lat. See *Scheele's Green.*

COPPER (Carbonate of). Syn. *Dicarbonate of Copper; Cupri Carbonas*,—Lat. The beautiful mineral called *malachite*, is a *hydrated dicarbonate of copper.* See *Bice* and *Mineral Green.*

COPPER (Chlorides of). Of these there are two:—

COPPER (Subchloride of). Syn. *Dichloride of Copper, Resin of do., White Muriate of do.; Protochloride of do.* (?); *Cupri Subchloridum, &c.*,—Lat. *Prep.* 1. From *copper filings*, 1 part; *corrosive sublimate*, 2 parts; distilled together.

2. By putting *copper filings* or *copper foil* into *chlorine gas.* White; fusible; slightly soluble in water; and decomposed by exposure to the air.

COPPER (Chloride of). Syn. *Neutral Chloride of Copper, Protochloride of do., Hydrochlorate of do., Muriate of do.; Cupri Chloridum, &c.*,—Lat. *Prep.* From *copper scales* or *black oxide of copper* dissolved in *hydrochloric acid*, and the solution evaporated and crystallized.

Prop., &c. Green acicular crystals; deliquescent; soluble in alcohol, the flame of which it colours green; exposed to heat (under 400°), it loses water, and assumes the form of a yellow powder, (*anhydrous chloride of copper.*)

COPPER (Chromate of). Syn. *Cupri Chromas*,—Lat. See *Chrome Green.*

COPPER (Iodides of). When *iodide of potassium* is added to a *solution of a salt of copper, diniodide of copper* falls down, and *iodide of copper* remains in solution. It is little known.

COPPER (Diniodide of). Syn. *Subiodide of Copper; Cupri Diniodidum*,—Lat. *Prep.* To a solution of *protosulphate of copper*, 1 part; and *protosulphate of iron*, 3 parts; add a solution of *iodide of potassium*, and wash and dry the precipitate. This is the preparation commonly known in trade by the name of *iodide of copper.*

COPPER (Nitrate of). Syn. *Cupri Nitras*, — Lat. *Prep.* By dissolving the *copper* in *dilute nitric acid.* Deep blue crystals; very soluble and deliquescent.

COPPER (Oxides of). Three oxides of copper have been noticed by chemists:—

COPPER (Suboxide of). Syn. *Red Oxide of Copper, Dinoxide of Copper; Protoxide of do.* (?); *Cupri Suboxydum, &c.*,—Lat. *Prep.* 1. From *prepared copper filings*, 4 parts; *black oxide of copper*, 5 parts; heated together in a *covered* crucible.

2. Add *grape sugar* to a solution of

sulphate or *acetate of copper*, then further add *caustic potassa*, in excess; the blue solution heated to ebullition deposits the suboxide, which must be then collected, washed, and dried.

3. From *dichloride of copper* fused at a low red heat with an equal weight of *carbonate of soda*, and the residuum of the calcination treated as last.

4. *Sulphate of copper*, 100 parts; *carbonate of soda*, 57 parts; (both in crystals;) fuse them together at a gentle heat; cool, pulverize the mass, and add of *fine copper filings*, 25 parts; ram the mixture into a crucible, cover it over, and expose it for 20 minutes to a white heat.

5. A *saturated solution of sugar of milk*, containing some *carbonate of soda*, is poured over recently prepared *moist hydrated oxide of copper*, and heated to boiling; and the precipitate washed and dried as before.

6. A solution of *cane sugar*, 27 parts, in *water*, 60 parts, is poured over *hydrated oxide of copper*, (weighed in the compressed and still moist state,) 9 parts; a solution of *caustic potassa*, 18 parts, in *water*, 60 parts, is then added, and the whole mass well agitated together at the ordinary temperature, and strained through linen. If the dark-blue filtrate is next heated, (continually stirring,) over a water-bath, anhydrous protoxide of copper is disengaged, and the liquid becomes colourless. (Boettger's 'Beitrage.')

Uses, &c. A superb red powder, with a metallic lustre. It is used as a pigment and a bronze, and as a stain for glass and enamels, to which it gives a rich red colour. By heat it is converted into the black oxide. With ammonia it forms a colourless solution, which rapidly becomes blue from the action of the air.

COPPER (Protoxide of). Syn. *Oxide of Copper, Black Oxide of do.; Deutoxide of do.* (?); *Peroxide of do.* (?); *Cupri Protoxydum; C. Oxydum Nigrum*,—Lat. *Prep.* 1. By calcining at a red heat, with free exposure to the air, *copper filings*, or *nitrate of copper*, the *hydrate* thrown down from solutions of or the salts of copper by means of *pure potassa*. A heavy black powder.

2. By adding *caustic potassa*, in excess, to a *solution of a salt of protoxide of copper*, and heating the whole to the boiling point; the precipitate is then collected, washed, and dried. A heavy dark-brown powder, turning black when heated.

Uses, &c. Protoxide of copper is unchanged by heat, unless combustible matter is present, when it readily parts with its oxygen; hence its general use in organic analysis as a source of that element. It communicates a beautiful green colour to glass and enamels. With the acids it produces the ordinary salts of copper.

COPPER (Peroxide of). Syn. *Cupri Peroxydum*,—Lat. Formed by the action of *peroxide of hydrogen water* on the *hydrated black oxide*. (Thènard.) It is very liable to spontaneous decomposition, and its precise character is undetermined.

COPPER (Oxychloride of). See *Brunswick Green.*

COPPER (Saffron of). Syn. *Copper Stain; Æs Ustum, Cupri Crocus, C. Calcinatum, C. Oxydum Rubrum*,—Lat. *Prep.* (Pomet.) *Sheet copper* (cut into small pieces), and a mixture of *sulphur* and *common salt*, are arranged "stratum super stratum" in a crucible, and calcined in a strong fire until all the sulphur is burnt away, when the residuum is powdered, washed, and dried. Brownish coloured, yielding a fine red-coloured powder. See *Brass Stain* and *Suboxide of Copper.*

COPPER (Sulphate of). *Blue Copperas, B. Vitriol, Roman do.; Cupri Sulphas, Cuprum Vitriolatum*,—Lat. The sulphate of copper of commerce (*Cupri sulphas venalis*, —Ph. L.) is obtained by the oxidation of native sulphuret of copper (*copper pyrites*), by the joint action of air, heat, and moisture, by which its *copper* is converted into *an oxide*, and its *sulphur* into *sulphuric acid.* The resulting salt is washed out, and the solution evaporated and crystallized. The *water found in*, and *issuing from copper mines*, often furnishes such a solution ready to the hands of the manufacturers. A large quantity of sulphate of copper is also obtained as a *secondary product* in the *refining of silver*, and is "occasionally prepared by dissolving in *sulphuric acid* an *oxichloride of copper*, made for the purpose, by exposing sheets of copper to the joint action of air and hydrochloric acid." (Brande.) Pure *sulphate of copper* can only be made by the direct solution of the *metal*, or preferably, of its *oxide* or *carbonate*, in *sulphuric acid.*

For *medical use* the Ph. L. orders *commercial sulphate of copper*, 4 ℔; to be dissolved in *boiling water*, 2 quarts; (heat and stirring being had recourse to;) the solution is to be filtered whilst hot, and set aside that crystals may form, which are to be collected and dried. By evaporating the mother liquor, a second crop of crystals may be obtained.

Pur. The commercial sulphate is often largely contaminated with iron. When pure, "it is totally soluble in water; whatever ammonia throws down from this solution, excess of ammonia again dissolves." (Ph. L.)

Prop., &c. Fine blue crystals; tastes intensely styptic and metallic; slightly effloresces in the air; by heat it loses its water of crystallization, and becomes a white powder; (*sympathetic powder; pulvis sympatheticus;*) dissolves in 4 parts of water, at 60° Fahr., and in 2 parts at 212°; insoluble in alcohol and ether; decomposed at an intense heat into proto-oxide of copper, sulphurous acid, and oxygen. It has been used to prevent the dry rot in timber, (*Margary's patent,*) and in dyeing. Grain is steeped in a weak solution of it by the farmer, to prevent the "smut." As a medicine, it is employed chiefly as a styptic (in solution) and caustic (in substance) to destroy "proud flesh;" and, less frequently, as an astringent or tonic, (from $\frac{1}{4}$ gr. to 2 gr.,) and an emetic, (3 or 4 gr. to 10 or 12 gr.) It is exceedingly poisonous. For *antidotes,* see *Copper.*

COPPERAS. Commercial sulphate of iron. *Blue Copperas* is crude sulphate of copper.

COPPERAS (Calcined). From *copperas* heated in an unglazed earthen pot, until it becomes white and dry. *Used* as an astringent and "drier," and in making ink and dyeing. See *Sulphate of Iron.*

COPPERING. Iron may be covered with a thin film of copper by merely immersing it (previously scoured clean) in an *acidulated solution of sulphate of copper,* after which it must be rinsed in clean *water.* A coating of any desired thickness may be given by means of voltaic electricity. See *Electrotype.*

COPROLITE. Syn. *Fossil Manure.* This mineral is the petrified dung of carnivorous reptiles. (Buckland.) The coprolites of Suffolk contain from 50§ to 60§ of *phosphate of lime,* a quantity nearly double that in ordinary guano. They form the bases of Lawes' *superphosphate* or *coprolite manure.* The nodules, after being washed, are ground to powder in a mill, and mixed with an equal weight of *oil of vitriol.*

CORAL. Syn. *Corallium,*—Lat. *Prepared red coral* (*corallium rubrum preparatum*) was formerly used in medicine as an antacid or absorbent, and is still occasionally employed as a dentifrice. It consists almost entirely of carbonate of lime, coloured with red oxide of iron, and possesses no advantage over good chalk. It is *prepared* in a similar manner.

CORAL (Factitious). Syn. *Corallium Rubrum Factitium,*—Lat. *Prepared chalk,* coloured with a little *sesquioxide of iron* or *rose pink,* and passed through a sieve. Sold by the druggists for *powdered coral.*

CORDIALS. Syn. *Cardiaca,* — Lat. Warm, stimulating, restorative medicines, that tend to raise the spirits and promote the circulation. The principal cordial medicines are the *aromatized tinctures* and *syrups.*

CORDIALS. Aromatized and sweetened spirits used as beverages. See *Liqueurs* and *Rectifying.*

CORDIAL (Bilious, — Chamber's). A popular American medicine prepared from the inner bark of the *juglans cinerea* (Linn.) or Pennsylvania walnut, mixed with spices.

CORDIAL (Nervous,—Brodum's.) *Prep.* 1. "Originally it consisted simply of an *infusion of gentian root in English gin,* coloured and flavoured with a little *red lavender,* (compound spirit of lavender.) After a time the doctor added a little *bark* to this nostrum, and subsequently made other additions." (*Anat. of Quackery.*)

2. (Paris.) *Tinctures of gentian, calumba, cardamoms,* and *cinchona, compound spirits of lavender,* and *steel wine,* of each, equal parts. "It is tonic, stomachic, and stimulant; but, beyond these, possesses no curative properties." (*Anat. of Quackery.*)

CORDIAL (Sir Walter Raleigh's). Syn. *Sir W. R.'s Confection.* Now superseded by the *aromatic confection* of the pharmacopœias. Sir Walter's own receipt was very complicated.

CORDIAL (Warner's). *Prep. Rhubarb,* 1 oz.; *senna,* 1½ oz.; *saffron,* 1 dr.; *liquorice root,* 4 dr.; *raisins,* 1 ℔; *British brandy,* 1 quart; digest for a fortnight, press, and filter. Laxative.

CORIANDER. Syn. *Corianders, C. Seed; Coriandrum,*—Ph. L. "The fruit" (*seed*) of the "*coriandrum sativum.*" (Ph. L.) "Coriander" is chiefly used by confectioners and distillers as a flavouring ingredient. It is aromatic, carminative, and stimulant; and more effectually covers the taste of senna than any other substance. *Dose.* 20 to 60 gr.; chiefly as a corrective or adjuvant in compound medicines.

CORK. Syn. *Corker.* The *lichen omphalodes* made into balls. *Used* to dye wool.

CORK. The prepared bark of the *quercus liber* or *cork oak,* a tree common in southern France, Italy, and Spain.

CORKS. The common practice of employing inferior corks for the purpose of stopping the mouths of bottles, is often productive of considerable loss, from the air being only partially excluded, and the contents suffering in consequence. Many a large "*bin*" of valuable wine has become, from this cause, in less than a year, little better than sour "Cape." Chemical preparations often suffer from a similar cause. The best corks are those called "*velvet corks*," and of these the finest qualities are imported from France.

Several attempts have been made to introduce cork-cutting by machinery, but they have hitherto failed to supersede hand labour.

CORN. Syn. *Clavus*,—Lat. A horny induration of the skin, with a central nucleus, very sensitive at the base. The *common cause* of *corns* is continued pressure over the projection of the bones, from *tight* or *stiff* boots or shoes. They are of two kinds, *hard* and *soft*. The *first* grow on the exposed portions of the joints; the *last*, between the toes.

Prevention. This consists in keeping the feet clean, by frequent ablution with warm water, and in the use of *easy, soft boots and shoes*. Without the latter precaution, corns will generally return, even after they appear to have been perfectly removed.

Treatment. After soaking the feet in warm water for a few minutes, pare the corns as close as possible with a sharp knife, taking care not to make them bleed. They may now be touched over with a little *lunar caustic*, or *nitric acid*, or a little *concentrated acetic acid* or *aromatic vinegar*. The last two do not stain the skin. The first is used by merely rubbing it on the corns, previously *slightly moistened* with water; the others, by moistening the corns with them, by means of a small strip of wood, or, preferably, a rod of glass; due care being taken not to allow the liquid to touch the neighbouring parts. This treatment adopted every 3 or 4 days for 10 days or a fortnight, accompanied by the use of *soft, loose shoes*, will generally effect a cure. It has been recommended to remove large corns by *ligatures of silk*, applied as close to their base as possible, and tightened daily until they drop off; but this plan is tedious, and often inconvenient, and is not always successful. *Another mode of extirpation* is, the application of a *small blister*, which will frequently raise them with the skin out of their beds. In this case the exposed surface must be dressed with a little *simple ointment*. SOFT CORNS may be removed by applying *ivy leaf, previously soaked in strong vinegar*, changing the piece every morning; or by placing a *dressing* of *soap cerate*, spread on a bit of lint or old rag, between the toes. One of the *simplest* and *best remedies* for *hard corns*, and which has lately received the sanction of high medical authority, is to wear upon the toe or part affected a *small circular piece of soft leather*, or, still better, a piece of *amadou*, spread with *diachylon*, or some other *emollient plaster*, and having a hole cut in the centre, corresponding to the size of the corn. (Sir B. Brodie.) By this means the pressure of the boot or shoe is equalised, and the apex of the corn protected from injury.

CORNS (Popular Remedies for). The following are among the most useful of this class:—

1. (*Caustic for Corns.*) From *tincture of iodine* and *butter of antimony*, of each, 1 dr.; *iodide of iron*, 3 gr.; mix. It is applied as explained above. 2 to 4 applications are said to effect a cure.

2. (*Lotions for Corns.*)—*a.* A solution of *sal ammoniac*, 1 part; in *proof spirit*, 4 parts.

b. A concentrated *aqueous solution of sulphate of copper*. To be applied night and morning.

3. (*Corn Plasters.*) — *a.* From *white diachylon*, 3 parts; *yellow rosin*, 2 parts; *verdigris*, 1 part; melted together, and spread on leather.

b. From *galbanum plaster*, 1 oz.; *verdigris*, 1 dr.; as the last.

c. From *resin plaster*, 2 oz.; *black pitch*, 1 oz.; *verdigris* and *sal ammoniac*, of each, $\frac{1}{2}$ dr.

d. To the last add *powdered opium*, 1 dr. Recommended to allay pain, &c.

e. (W. Cooley.) A piece of *spread adhesive plaster* is placed upon a table, and a piece of card paper having a round hole cut in it the size of the central portion of the corn is laid upon it; the exposed part is then softened by holding a piece of heated iron for a second or two near it; the card paper is then instantly removed, and *nitrate of silver*, in fine powder, is sprinkled over the part which has been warmed. As soon as the whole is cold, the loose powder is shaken off, and the plaster is ready for use. Very cleanly and convenient. Two or three applications seldom fail to effect a cure.

f. (*Mechanical Corn Plasters.*) From common *adhesive plaster* spread on *buckskin, amadou*, or *vulcanized Indian rubber*, cut into pieces, and a circular hole corresponding to the size of the corn punched in each.

4. (*Pommade for Corns.*)—*a. Powdered verdigris*, 1 dr.; *savine ointment*, 7 dr.

b. Dried *carbonate of soda*, 3 dr.; *lard*, 5 dr.; *verdigris* or *smalts*, q. s. to give a slight tinge of green or blue. Applied on a piece of rag.

5. (*Corn Solvents.*)—*a. Salt of tartar* or *pearlash*, contained in an open jar or bottle, set in a damp place, until it forms an oil-like liquid (*oil of tartar*). Applied by means of a feather, or a small piece of rag dipped in it is bound on the corn.

b. Salt of tartar, 1 oz.; *smalts*, q. s. to give a faint blue. It must be kept dry in a corked bottle.

c. Hydrate of potassa, 1 dr.; *rectified spirit*, 1 oz.; dissolve. As No. 1.

d. (Sir H. Davy's.) *Potash*, 2 parts; *salt of sorrel*, 1 part; each in fine powder; mix and place a small quantity on the corn for four or five successive nights, binding it on with a rag.

Obs. Care must be taken, in all cases, to pare the corn moderately close before applying the remedy; but in *no case should they be applied to a raw surface.*

CORROSION. One of the best means of *preventing* the *corrosion of metals* is, *first* to dip the articles into *very dilute nitric acid*, and *afterwards*, to immerse them in *linseed oil*, allowing the *superfluous oil* to drain off. They are by this means effectually preserved from rust or oxidation. The *ironmongers* generally preserve small knife-blades, awls, &c., from rust, by keeping them in *powdered fresh-slaked quicklime.*

CORTICINE. A resinous extractive matter obtained by Braconnot from the bark of *salix alba* (Linn.) or *common white willow.*

COSMETICS. Syn. *Cosmetica*,—Lat. External applications employed for the purpose of preserving or restoring personal beauty. The term is generally understood to refer to substances applied to the cuticle, to improve the colour and clearness of the complexion; but some writers have included under this head, every topical application used with the like intention. Hence cosmetics may be divided into — *cutaneous cosmetics*, or those applied to the skin; *hair cosmetics*, or such as are employed to promote the growth and beauty of the hair; and *teeth cosmetics*, or such as are used to cleanse and beautify the teeth. See *Baldness, Hair Dyes, Pomatums, Pommades, Depilatories, Dentifrices, Tooth Powders, &c.*

COSMETIQUES. These are formed of hard pomatum, coloured to the desired tint; the pigments being added in the state of an impalpable powder.

1. (*Cosmetique Noir.*) From *good lard*, 5 parts; *wax*, 2 parts; (or, *hard pomatum*, 7 parts;) melt, stir in *levigated ivory black*, 2 parts; and pour it into moulds of tinfoil; which are afterwards to be placed in paper "sheaths."

2. (*Cosmetique Brun.*) As the last, but using *levigated umber* for "plain brown," and *levigated terra di Sienna* for "auburn" and "chestnut."

3. (*Cosmetique Blanc.*) The same, without colouring matter. *Used* to colour the eyebrows, whiskers, &c., as well as to keep the hair in its place. The labels on the packets before us have—"pour fixer et lisser les cheveux." The application must be renewed daily, as the cosmetique is gradually removed by friction, and perfectly so by soap-and-water. They are generally scented with *musk, ambergris*, or *cassia.*

COSMETIQUE (Simple). *Prep.* From *soft soap*, ½ *lb.*, melted over a slow fire with *sweet oil*, 3 *oz.*; and *fine sand*, a small teacupful; stir well together, and mould or press the mixture into cakes. The shelly sea-sand, sifted from the shells, is better than that which has no shells. *Used* by ladies who are remarkable for the delicate softness and whiteness of their hands. It may be scented at pleasure.

COTARNINE. A crystallizable substance obtained from the *mother-waters of opianic acid.* It is basic, very soluble, and bitter. *Hydrochlorate of cotarnine* is soluble and crystalline.

COTTON. Syn. *Gossypium*,—Lat. The cotton of which textile fabrics are made, is obtained from the *gossypium herbaceum*, (Linn.,) of which there are many varieties.

Identif. See *Linen.*

Dyeing. The fibres of cotton have nearly the same affinity for mordants and the colouring matter of dyed stuffs as linen, and may be treated in the same manner. See *Dyeing, Linen, &c.*

COUGH. Syn. *Tussis*, — Lat. The sudden and violent expulsion of air from the lungs. It is generally symptomatic of other affections, but is sometimes idiopathic, or a primary disease. Many cases of cough depend upon the extension of catarrh to the trachea and bronchiæ, which thus become loaded with mucus or phlegm, which they endeavour to throw off by the convulsive effort called coughing. In some cases it is caused by a vitiation and inspissation of the secretions, arising from the imperfect action of the absorbents; this is the common cause of the *dry cough* of old people. *Idiopathic cough* is not considered dangerous in itself, or while running its regular course, but it is often productive of most serious consequences, by superinducing the inflammation of some organ, or laying the foundation of phthisis.

Cough is sometimes attended by copious expectoration, and at other times exists without any; it has hence been distinguished into *moist* or *mucous cough*, and *dry cough.*

The *treatment* of common catarrhal cough consists in allaying the irritation as much as possible, by demulcents and expectorants, as *mucilaginous drinks* and *lozenges*, which act upon the glottis, and sympathetically upon the trachea and bronchiæ. Among the first may be mentioned, *almond milk, barley water, refined Spanish juice, gum arabic*, and a *mixture of the last two* made into lozenges; among the *second*, the most innocent and convenient is *ipecacuanha*, in the shape of lozenges, 2 or 3 of which may be sucked whenever the cough is troublesome. A *light diet* should be adopted, the bowels kept *slightly relaxed* by the use of gentle aperients, and a *mild* and *equable temperature* sought as much as possible. When this plan does not succeed, recourse may be had to an *emetic*, followed by small doses of *Dover's powders*, and *extract* or *tincture of henbane*, or *squill pill.* When a cough is troublesome at night, and *unattended with fever*, a small dose of *laudanum*, or *tincture of henbane*, taken on going to rest, will generally procure sleep. In the treatment of *dry cough*, the more stimulating expectorants are useful, as *garlic, ammoniacum, styrax*, and *benzoin*, combined with *narcotics* and *sedatives*, as *henbane, hemlock*, and *opium*. A *diaphoretic opiate* is also very useful, especially in the *cough of old people.* See *Draughts, Emulsions, Mixtures, Pills, &c.*

COUMARINE. Syn. *Cumarine.* The odorous principle of the fruit or bean of *dipterix odorata* (tonquin bean) of Willdenow. It is dissolved out by *ether*, and purified by solution in *alcohol.* It crystallizes in small prisms.

COUNTER-IRRITANTS. Substances applied to the surface of the body to establish a secondary morbid action, with the view of relieving one already existing. In painful and spasmodic affections, as neuralgia, spasms, and cramp; in rheumatism, lumbago, swelled and painful joints; in headache, sore throat, sprains, languid glandular tumours, and many other cases, this class of medicines often proves extremely valuable. The counter-irritants which are best known, are *blisters, mustard poultices, hartshorn-and-oil*, and *liniment of ammonia.* In Dr. Granville's work, entitled '*Counter-Irritation*,' he gives upwards of 100 cases of the most painful and important diseases effectually cured by external applications of the kind referred to.

COURT PLASTER. See *Plasters.*

COURY. The native name of a superior species of catechu obtained from the areka catechu.

COW DUNG. This substance is employed in large quantities by the calico printers. Recently, a mixture of *sulphate, carbonate*, and *phosphate of lime* and *soda*, with *British gum* or *bran*, has been successfully tested as a substitute for it, and has the advantage of cleanliness and economy.

COWHAGE. Syn. *Cow-itch; Dolichos, D. Pubes; Mucuna*,—Ph. L. "The hairs of the fruit" (pods) of "*mucuna pruriens*" (Ph. L.) or *dolichos pruriens.* (Linn.) It occasions violent itching, when it comes in contact with the skin, which can only be allayed by a *solution of green vitriol*, or by *oil.* It is frequently administered as a vermifuge, made into a confection, by scraping the hair off a pod into treacle, syrup, or honey, for a morning dose, which is repeated for 3 or 4 successive days, followed by a brisk purge. It acts more effectually, if its administration has been preceded by a gentle emetic.

COWS. See *Dairy.*

CRABS. See *Shell-fish.*

CRACKNELS. *Prep.* To *flour*, 1 pint, add a little *grated nutmeg*, the *yelks of* 2 *eggs*, 2 or 3 spoonfuls of *rose-water*, and cold water, q. s. to make a paste; then roll in *butter*, ½ *lb.*, and make it into shapes. In 1 hour put them into a kettle of boiling water, and boil them until they swim, then throw them into cold water; take them out, and when dry, bake them on tins. Those of the shops contain less butter, and the rose-water is omitted. They are noticed in 1 Kings, xiv, 3.

CRACKNUTS. *Prep.* 1. *Flour*, 1 *lb.; sugar*, ¾ *lb.; melted butter*, ½ *lb.;* 6 or 7 *eggs*, well beaten; make a paste with a *glassful of raisin wine* and a *little water;* add *caraways*, roll it out as thin as paper, cut it into shapes with a tumbler, wash the pieces with the *white of egg*, and dust them over with *powdered sugar.*

2. As the last, but using ½ *lb.* more *flour.*

CRAMP. See *Spasms.*

CRAPE is *cleaned* by rinsing it in *ox-gall and water*, to remove the dirt; afterwards in *pure water* to remove the gall; and lastly, *in a little gum water*, to stiffen and crisp it. It is then "clapped" between the hands until dry.

CRAY-FISH. See *Lobsters* and *Shell-fish.*

CRAYONS. Colouring substances made up into small cylinders or any other convenient form for use in writing or drawing.

Prep. 1. *Spermaceti,* 3 *oz.; boiling water,* 1 pint; agitate together till they form a species of emulsion; add *bone ash,* 1 *lb.* (or more, previously reduced to an impalpable powder); and *colouring matter,* q. s., to give the proper tint; reduce the whole to a perfectly homogeneous paste, and form it into crayons.

2. *Pipeclay* and the *finest prepared chalk,* equal parts; or *pipeclay* alone, q. s.; *colouring,* a sufficient quantity; make them into a paste with *pale mild ale.*

3. *White curd* or *Castile soap,* cut into thin shavings, 1 *oz.; boiling water,* 1 pint; dissolve, and when cold, add gradually, as much *rectified spirit of wine* as will render the liquid barely transparent. With this fluid make equal parts of the *finest elutriated clay* and *chalk* into a stiff paste, adding *colouring matter,* q. s., as before. For common qualities, the spirit of wine may be omitted, but the mass will then dry more slowly.

4. *Curd soap,* 1½ oz.; *gum arabic,* ½ oz.; *boiling water,* 1¼ pint; dissolve, and use it as the last. General Lomet uses a similar mixture to work up the softest varieties of hematite, with which he thus forms superior *red crayon.*

5. (Process of the Brothers Joel, of Paris.) *Shellac,* 3 parts; *spirit of wine,* 4 parts; *oil of turpentine,* 2 parts; dissolve; add *pure clay,* 6 parts; *colouring matter,* q. s.; form the mass into crayons, and dry them by a stove heat.

6. *Pale shell-lac,* 5 parts; *wood naphtha,* 12 parts; dissolve, and with this fluid mix up the *colouring powder,* previously stirred up with an equal weight of *fine pale blue clay;* dry by a stove heat, as before. When this process is well managed, it produces crayons equal to those of the best Parisian houses.

Obs. The composition may be formed into crayons by simply rolling it on a slab; but to ensure their solidity the manufacturers generally employ a *metallic cylinder* of 2 or 3 inches in diameter, with one end open and the other firmly secured to a perforated plate, having holes of the same size as the intended crayons. The crayon-composition, in the state of a stiff paste or dough, is introduced into the open end, and is forced down and through the holes, by means of a small plug or piston, that exactly fits the inside of the cylinder, and which is driven by the equable motion of a small screw. The pieces that pass through the holes are then cut into lengths and dried.

The *substances* employed as *colouring matters* for crayons are very numerous, and their choice offers a wide field for the skill and fancy of the artist. The pigment having been selected, it may be reduced to any shade or tint by admixture with other pigments, and by "dilution" with a proper quantity of *elutriated* or *prepared chalk.* As, however, crayon colours do not admit of being mixed together at the time of using them, like liquid colours, it is usual to make 3 to 6 different shades of each colour, so as to enable the artist at once to produce any effect he chooses.

Black crayons. From *prepared black-lead, ivory-black, lamp-black, &c. Black chalk* and *charcoal* are frequently made into crayons by simply sawing them into suitably sized pieces. They may then be put into a pipkin of *melted wax,* and allowed to macerate for an hour; after which they should be taken out, drained, and laid on a piece of blotting paper to dry. Drawings made with these crayons are very permanent, and if warmed slightly on the wrong side, the lines will adhere and become almost as durable as ink.

Blue crayons. From *indigo, smalts, Prussian blue, verditer, &c.*

Brown crayons. From *umber,* (raw and burnt,) *terra di sienna,* (raw and burnt,) *Cullen's earth, brown ochre, &c.;* and some peculiar shades, from a mixture of *black, carmine,* and *either of the above colours.*

Green crayons. From a *mixture of king's yellow,* or *yellow ochre,* with *blues.*

Purple crayons. From any of the *more brilliant blues,* mixed with *carmine, lake,* or *vermilion.*

Red crayons. From *carmine, carminated lakes, vermilion, hematite,* and any of the *earthy* or *mineral colours* commonly used as pigments. *Crayons of red chalk* may be prepared in the manner pointed out for crayons of black chalk.

White crayons. From *pure clay* and *chalk.*

Yellow crayons. From *king's yellow, Naples do., orpiment, yellow ochre, &c.*

CRAYONS (for Writing on Glass). *Prep.* From *French chalk* cut into suitable pieces. Marks made with these crayons, when obscured or rubbed out, may be several times revived by simply breathing on the glass.

2. (Brunquelle.) *Spermaceti,* 4 parts; *tallow,* 3 parts; *wax,* 2 parts; are melted together in a cup; and *red lead,* 6 parts,

and *carbonate of potassa,* (in fine powder,) 1 part, stirred in; the mass is kept melted and stirred for about half an hour longer, then poured into glass moulds (tubes) of the thickness of a common pencil, and cooled as rapidly as possible. The mass may be screwed up and down in the tube, and cut to a fine point with a knife. A crayon is thus obtained which will readily write upon clean dry glass.

CRAYONS (Lithographic). *Prep.* 1. *Tallow soap,* 7 parts; *white wax,* 6 parts; melt by a gentle heat, and add *lamp-black,* 1 part; keep it melted, with constant stirring, for 20 or 30 minutes, then let it cool a little, and cast it into moulds.

2. *White wax,* 4 parts; *shell-lac* and hard *tallow soap,* of each, 2 parts; *lamp-black,* 1 part; as last.

3. *Spermaceti, white wax,* and *hard tallow soap,* of each, equal parts; *lamp-black,* q. s. to colour.

Obs. Some makers melt the soap, wax, and lamp-black, in an iron ladle, over a brisk fire, and allow the mixture to blaze for a *few seconds* before adding the shell-lac, which is no sooner thoroughly incorporated than the heat is increased until the mass again kindles, when it is at once removed from the fire and stirred until it is cool enough to be poured into the moulds. This method leads to trouble and loss without any corresponding advantage. These crayons are used to draw designs on lithographic stones.

CREAM. Syn. *Cremor, C. Lactis, Flos Lactis,*—Lat. The oleaginous portion of milk, which collects in a thin stratum upon the surface, when that fluid is left undisturbed for some time. By violent agitation, as in the process of *churning,* the fatty globules unite together, forming *butter;* whilst the liquid portion, consisting of caseum, serum, and a little butter, constituting the residuum, is called *butter-milk.* This separation is effected the most readily, when the cream has become partially sour and coagulated by being kept a few days; a change which occurs in consequence of the conversion of some of the *sugar of the serum* into *lactic acid,* which precipitates the caseous matter contained in the small portion of the milk with which the cream is mixed. On these simple facts chiefly depend the *successful manufacture of butter.* The cream intended for churning should therefore be kept until it turns *slightly* sour, and assumes the condition above referred to, as then the butter will readily "*come.*" If churned while quite sweet, the operation will be tedious and will frequently fail. When this happens, the dairy maids declare the milk is "*charmed*" or "*bewitched,*" and reluctantly proceed with the operation. The addition of a little *rennet,* or *vinegar,* is the proper remedy in this case, and will cause the almost immediate separation of the butter.

When *cream* is *suspended in a linen bag,* and allowed to drain, it gradually becomes drier, and harder, by the separation of the liquid portion, and then forms what is known by the name of *cream cheese.* By the application of *slight* pressure, the separation of the whey is more completely effected, and the product is not only better, but will keep longer.

Qual. Cream, in a dietetic point of view, may be regarded in the same light as butter, as it is converted into butter in the process of digestion. On this account much cream should never be taken at once by persons of delicate stomachs. In eating cream with fruit, persons are hardly aware of the large quantity they consume, until they find it disagree with the stomach, when the condiment is blamed for the indiscretion of those who take it. See *Milk, Butter, Liquors, Crème, &c.*

CREAM (Almond). *Prep.* From *sweet almonds,* 2 *oz.; bitter almonds,* 4 in no.; blanched and beaten in a mortar to a *smooth paste,* adding a *teaspoonful of water* to prevent oiling; and, afterwards, *a pint of cream,* and enough *powdered lump sugar* to sweeten; the whole is then whisked to a froth, the glasses filled with the liquor, and some of the froth placed on the top of each. Some persons add the *juice of a lemon.*

CREAM (Brandy). To the last, add the *yelks of* 6 *eggs;* heat it gently over the fire until it thickens, keeping it well stirred, then further add 2 or 3 glassfuls of *brandy,* and pour it into small cups or shallow glasses.

CREAM (Burnt). *Cream,* 1 quart; *cassia,* a small stick; *peel of half a lemon;* boil for 5 minutes, cool a little, take out the spice, and add the *yelks of* 9 *eggs,* and *sugar,* q. s. to sweeten; stir until cold, put it into a dish, strew *pounded sugar over it,* and bake it until brown.

CREAM (Chocolate). *Chocolate,* scraped fine, 1 *oz.; thick cream,* 1 quart; *sugar,* (best) 6 *oz.;* heat it nearly to boiling, then remove it from the fire, and mill it well; when cold, add the *whites of* 8 *or* 10 *eggs;* whisk rapidly, and take up the froth on a sieve; serve the cream in glasses, and pile up the froth on the top of them.

CREAM (Coffee). *Prep.* 1. As the last,

omitting the *chocolate*, and using a *pint of the strongest made coffee.*

2. Add a teacupful of very clear *concentrated made coffee* to 1 pint each of *clarified calf's feet jelly* and *good cream;* sweeten with *lump sugar*, give it one boil up, and pour it into shapes or glasses, when nearly cold.

CREAM (Cold). *Prep.* 1. See *Cosmetic Cerate.*

2. (Hudson's.) *Oil of almonds*, 4 *oz.; white wax* and *spermaceti*, of each, ¼ *oz.; rose water*, 4 *oz.; orange flower water*, 1 *oz.*

3. See *Granulated Cream.*

CREAM (Costorphin). After a village near Edinburgh, where it is commonly made. The *milk of* 3 *or* 4 *consecutive days*, together with the cream, are allowed to remain until sour and coagulated; the *whey* is then drawn off, and *fresh cream* added. It is eaten with sugar and fruit, especially with strawberries and raspberries.

CREAM (Devonshire). 1. (*Devonshire Raw Cream.*) From *sour cream* mixed with an equal quantity of *fresh cream*, and *sweetened with sugar.* Eaten with fruit.

2. (*Devonshire Scalded Cream, D. Clouted do.*) The *milk of yesterday* is set in a polished shallow brass pan, over a clear fire free from smoke, and gradually heated until very hot, care being taken not to let it boil; when the undulations on the surface look thick, and form a ring round the top of the fluid, the size of the bottom of the pan, it is removed from the fire and allowed to cool; the next day it is skimmed off for sale. *Used* with either tea or coffee, and excellent with both; it is also eaten with sugar and fruit, and is made into butter. See *Cream*, (above.)

CREAM (D'Illotte's). Syn. *Crystallized Cream, Vegetable do.* The ingenious little gentleman, the manufacturer of this article, whose anagrammatic powers have converted his patronym of Elliott into one less familiar to vulgar English ears, prepares this really elegant hair cosmetic as follows:—*Oil of almonds*, 3 *oz.*, and *spermaceti*, ½ *oz.*, are melted together; and *bergamotte*, *neroli*, and *verbena*, of each, 5 drops, and *huile au jasmin*, 10 drops, are then stirred in, and the mixture is at once poured into small wide-mouthed bottles to crystallize. If preferred harder, ½ dr. more spermaceti may be used, but the precise quantity to produce the best crystalline appearance depends greatly on the season of the year; more being required in winter than in summer.

CREAM (Factitious). Syn. *Mock Cream. Prep.* 1. Beat 3 *eggs*, with 2 *oz.* of *sugar*, and a *small piece of butter*, until the combination is complete; then add, *warm milk*, 1 pint; put the vessel into another containing *hot water*, and stir it *one way* until it acquires the consistence of cream.

2. *Arrow-root*, 1 spoonful; wet it with a little *cold* milk, then add, gradually, *boiling milk*, ¼ pint; mix well, and further add, of *fresh butter*, 1 *oz.; sugar*, 1½ *oz.; cold milk*, ¾ pint; and continue stirring until the whole is quite cold.

CREAM (for Icing). See *Ice Creams.*

CREAM (Fruit). *Prep.* From *pulped* or *preserved fruit*, 1 *lb.; cream*, or *good raw milk*, 1 quart; *sugar*, q. s.; boil for 1 minute; cool, and add a *glassful of brandy.* A froth is raised on these creams with a chocolate mill. It is taken off, and placed on a hair sieve, and some of it, after the glasses are filled with the cream, placed on the top of each. The *expressed juice* of *raspberries*, of *currants*, and several other kinds of fruit, also make delicious creams. In *winter*, *raspberry jelly*, *jam*, or *syrup*, may be used. A glass of *good brandy* improves these creams.

CREAM (Furniture). See *Polishes.*

CREAM (Granulated). Syn. *Granulated Cold Cream. Prep.* (Owen.) *Almond oil*, 6 *oz.*, *white wax* and *spermaceti*, of each, 2 *oz.*, are melted together, and a little *otto of roses* added; the liquor is then poured into a large Wedgewood-ware or marble mortar, previously warmed, and containing 1½ to 2 pints of *warm water;* brisk agitation with the pestle is then had recourse to, until the oleaginous portion is well divided, when the whole is suddenly thrown into a vessel containing a gallon or two of clean *cold water;* lastly, the *granulated cream* is thrown on a muslin filter, and as much water as possible is shaken (gently) out of it; after which it is put up for use.

CREAM (Lemon). *Prep.* From *cream*, 1 pint; *yelks of* 3 *eggs; powdered sugar*, 6 *oz.;* the *yellow rind of* 1 *lemon* (grated), with the juice; mix, apply a gentle heat, and stir until cold. If desired *white*, the *whites of the eggs* should be used instead of the *yelks.*

CREAM (Orange). Similar to *lemon cream*, but using *oranges.*

CREAM (Pistachio). From the *kernels* of *pistachio nuts*, as almond cream.

CREAM (Raspberry). See *Fruit Creams.*

CREAM (Saturnine). Syn. *Cremor Plumbi Acetatis*,—Lat. *Prep.* (Dr. Kirkland.) *Cream*, 1 oz.; *solution of diacetate of lead*, 1 dr.; mix. Cooling, sedative, and astringent; a useful application in certain cases to irritable ulcers, sore nipples, &c. It is *poisonous.*

CREAM (Scotch Sour). *Prep.* (Gray.)

Skimmed milk is put over night into a wooden tub, with a spigot at the bottom, and this tub is put into another filled with *hot water;* in the morning the small tub is taken out and the thin part of the milk (*wigg*) drawn off until the thick sour cream begins to come. This process requires practice as to the heat of the water; when it succeeds, skimmed milk yields nearly one half of this cream, which is eaten with sugar as a delicacy; it is only distinguishable from cream by its taste, and sells for double the price of fresh milk.

CREAM (Stone). Syn. *Cream Blancmange.* From *isinglass, ½ oz.*, dissolved in *boiling water*, a teacupful, adding *cream*, 1 pint, and *sugar*, 4 *oz.;* stirred until nearly cold, and then poured over *fruit* or *preserves*, placed on the bottom of glass dishes.

CREAM (Taraxacum). Syn. *Cremor Taraxaci,*—Lat. *Prep.* (Dr. Collier.) From *washed dandelion roots*, (sliced,) sprinkled with *spirit of juniper*, and then pressed for their juice. *Dose.* A tablespoonful twice or thrice daily, as a stomachic and tonic, in dyspepsia, &c.

CREAM (Vanilla). *Prep.* 1. Boil a stick of *vanilla* (grated), and *isinglass*, ½ oz., in *milk*, 1 pint, until the latter is dissolved; strain, add *sugar*, 6 *oz.*, and *cream*, 1 pint; stir till nearly cold, then pour it into moulds like blancmange.

2. *Cream* and *strong isinglass jelly*, of each, 1 pint; *sugar*, 6 *oz.; essence of vanilla*, ¼ *oz.;* mix as before.

CREAM (Velvet). As the last, but, instead of vanilla, flavour with the rind and juice of a *lemon*, and about a *teacupful of white wine.*

CREAM (Whipt). *Prep.* From the *whites of* 12 *eggs; cream*, 1 quart; *pale sherry*, ½ pint; *essence of musk* and *ambergris*, of each, 10 drops; *essences of lemon* and *orange peel*, of each, 3 or 4 drops; whisk to a froth, remove the latter on to a sieve, fill the glasses with the cream, and then pile the froth on the top of them.

CREAMING (of Liquors). See *Wines, Malt Liquors, &c.*

CREASOTE. See *Kreasote.*

CREATINE. See *Kreatine.*

CREME. (*Fr.*) Syn. *Cream.* This name is applied to several compound spirits and cordial liquors, especially by the French liqueuristes, who pride themselves on the superior quality and cream-like smoothness of their manufactures. Like the cordials of the English, they are mostly dilute spirit, aromatized, and sweetened. See *Liqueurs.*

CRENIC ACID. See *Krenic Acid.*

CRICKETS. These insects may be destroyed by putting *Scotch snuff* into their holes, or by placing some pieces of *beetle wafers* for them to eat.

CROCONIC ACID. One of the products of the action of *potassium* on *carbonic oxide.* When a solution of *rhodizonate of potassa* is boiled, it suffers decomposition, and the liquid is found to contain oxalate of potassa, free potassa, and *croconate of potassa;* from the last of which *croconic acid* is obtained. It is yellow, crystallizable, and soluble in both water and alcohol.

CROTON OIL. Syn. *Oleum Crotonis,*—Ph. E. *O. C. Tiglii; O. Tiglii,*—Ph. L. The "oil expressed from the seeds" of "*croton tiglium*" (Ph. L.) or *purging croton.* This oil is a drastic purgative, and a powerful local irritant and rubefacient. Rubbed on the skin it produces a pustular eruption, and frequently purges. In this way (diluted with thrice its weight of olive oil) it is occasionally used as a counter-irritant. *Dose*, (as a purge,) 1 to 2 drops; in obstinate constipation, lead colic, &c.

CROTONIC ACID. See *Jatrophic Acid.*

CROTONINE. Syn. *Tigline.* A crystallizable substance discovered by Brandes and D'Jussieu in croton oil. According to Soubeiran and Weppen, it is an alkaline magnesian soap.

CROUP. Syn. *Cynanche Laryngea, C. Suffocativa, C. Trachealis, &c.,*—Lat. An inflammatory disease affecting the larynx and trachea.

Symp. A permanently laborious and suffocative breathing, accompanied by wheezing, cough, a peculiar shrillness of the voice, and more or less expectoration of purulent matter, which continually threatens suffocation. There are two varieties, *acute croup* and *chronic croup.* The latter is very rare.

Treat. Bleeding by leeches, or cupping, over the region of the trachea, should be immediately had recourse to, when the symptoms are urgent; or violent local irritants, as pieces of lint dipped in strong acetic acid, or blisters, may be applied to the same part. In weakly subjects of irritable constitution, bleeding should be avoided. Dr. Larroque recommends repeated vomiting, in the croup of children; and M. Marotte and M. Boudet have adopted this plan with great success. The treatment consists in making the patient attacked with croup vomit a great number of times within the day, so as to detach the pseudo-membrane from the larynx nearly as fast as it is formed. For this purpose,

M. Marotte employs one or other of the following formulæ:—

1. *Tartar emetic*, 1½ gr.; *syrup of ipecacuanha*, 1 oz.; *water*, 2 oz.

2. *Impure emetine*, 3 gr.; *syrup of ipecacuanha* and *water*, of *each*, 1½ oz.

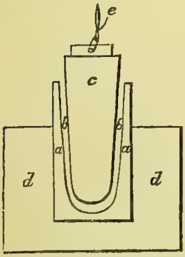
These draughts are administered by *spoonfuls* every ten minutes, until there has been a sufficient number of vomitings. In this manner he says he has been always able to make the patient expectorate a certain quantity of false membrane. This treatment is accompanied by the use of small doses of *calomel, leeches* to the throat, and *blisters* to the nape of the neck; but it is the opinion of M. Marotte that the vomitings alone effect the cure. Out of 25 cases that occurred at the Hôpital des Enfans, the only authenticated case of cure among all these, was effected by emetics. (M. Boudet.)

The croup is a very dangerous disease, and medical aid should be *immediately* sought wherever it can be procured. It is principally confined to infancy, or to children under 9 years of age; but occasionally attacks adults. One of our early friends, a young medical practitioner of great promise, died of it, prematurely, after only about 20 hours' illness.

CRUCIBLE. Syn. *Crucibulum*,—Lat. A conical-shaped vessel made of clay, employed to hold substances whilst they are submitted to a strong heat.

Manuf. There are two ways of making crucibles:—

1. By forcibly shaping the ingredients in a double mould (*See* engr.)



a a, External steel mould.

b b, Clay or composition for forming the crucible.

c, Internal steel mould.

d d, Wooden stand.

e, Cord or chain to withdraw the internal mould or plug.

2. By pouring the "*slip*" of the consistence of cream, into *porous moulds*, made of a species of stucco. A series of these moulds are placed upon a table and *filled* with the semifluid composition. By the time the whole (say 50 or 60) are filled, the "*slip*" may be poured out of the one first filled, leaving only a very small quantity behind to give the requisite thickness to the bottom. The *second* and *third* may then be treated in the same way, until the whole number have been attended to. In each mould a perfect crucible is formed, by the abstraction of the water of that portion of the "*slip*" in immediate contact with the stucco, and the crucible is either thicker or thinner, in proportion to the time this absorbent action has been allowed to go on. 70 or 80 crucibles may thus be easily made in less than 15 minutes. The moulds and their contents are next placed in a stove or slow oven. In a short time from the contraction of the clay in drying, the crucibles may be removed, and the moulds, as soon as they have become dry, may be again filled; by care they will last for years. As soon as the crucibles, formed by either of the above methods, have become *perfectly* dry they are ready for baking in a potter's kiln. In this way *earthen tubes* and vessels of other shapes may be made.

The compositions of which crucibles are formed differ according to the uses for which they are intended. The following may be taken as examples:—

1. (*Anstey's patent.*) From *raw Stourbridge clay*, 2 parts; *hard gas coak* (previously ground and sifted through a sieve of ⅛th-inch mesh), 1 part. The crucibles formed with this composition are only *dried*, and *not baked*. For use they are warmed, placed on the furnace, bottom upwards, the burning coak gradually heaped round them, and the firing continued until they acquire a full red heat. They are now turned and charged with cold iron. These pots will stand 15 or 16 meltings, but are liable to crack on cooling.

2. (*Berlin.*) From *Stourbridge clay*, 8 parts; *cement* (old crucibles ground to a fine powder), 3 parts; *coak*, 5 parts; *graphite* or *black-lead*, 4 parts. They resist the greatest heat, and may be repeatedly heated and cooled without cracking.

3. (*Black-lead.*) From *clay*, 1 part; *graphite*, 2 parts. These bear a great heat and sudden changes of temperature, and have the advantage of smoothness of surface. The compound is excellent for forming *portable furnaces, &c.*

4. (*Hessian.*) From *clay* (containing 10% of silica and a *little* of the oxides of iron and manganese); sand (containing 2% of alumina, and 1·5% of the above metallic oxides, and nearly 1% of lime). (Wurzer.)

5. (*Stourbridge.*) From *Stourbridge clay*, 4 parts; *cement*, 2 parts; *coak powder* and *pipeclay*, of each, 1 part. Used by brass-founders.

Obs. For the manufacture of crucibles a clay should be chosen which is free or nearly free from lime. Those containing graphite lose this substance by combustion when exposed to a full current of air at a high temperature.

CRUMPETS. *Prep.* From *flour*, 2 *lb.*, made into a dough with warm *milk-and-water*, adding *a little salt*, 3 *eggs*, (well beaten,) and 3 teaspoonfuls of *yeast*, mixed to the consistence of *thick* batter; after standing before the fire for a short time, to rise, it is poured into *buttered tins*, and baked slowly to a fine yellow.

CRUST. The paste with which *pies*, *tarts*, *&c.*, are made, or covered.

1. (*Fine.*) From *flour*, 1 *lb.; sugar*, ¼ *lb.; melted butter*, ½ *lb.;* 3 eggs; milk, q. s. Requires little baking.

2. (*Raised crust, for meat pies, &c.*) As the last, but using 6 *oz.* of *lard* for the *butter*, and only 2 instead of 3 *eggs*.

3. (*Short.*) From *flour*, 1 *lb.; butter* and *sugar*, of each, 2 *oz.; eggs*, 2 in no.; made into a *stiff* paste.

Obs. The quality is improved if the whole, or a portion of the butter is employed in the way directed under "*puff paste.*" For further information hereon, consult Soyer or Rundell.

CRYOPHORUS. See *Refrigeration.*

CRYSTALLIZATION. The act or process by which crystals are formed. The frequent reference to this subject in the pages of this work, and the constant employment of the process of crystallization in the manufacture of salts, &c., in the laboratory, seem to point out the necessity of a few explanatory remarks thereon under this head. When *fluid substances* are suffered to pass with adequate slowness to the *solid state*, or when *solutions of solids* are slowly *concentrated by evaporation*, or the *solvent powers of the menstruum, gradually lessened by cooling*, the ultimate particles of matter frequently so arrange themselves as to form regular geometrical bodies, familiarly known by the name of *crystals.* This wonderful property, which is possessed by a great variety of substances in the mineral kingdom, and by nearly all saline bodies, is resorted to for many useful and important purposes in the chemical arts. It is by means of crystallization that the majority of salts are obtained in a state of purity; for in the act of passing into the crystalline state, the foreign substances with which they are united, are left behind in the "*mother-water.*"

Salts are crystallized, either by allowing their *hot* and *saturated solutions* to *cool slowly*, or by simply *evaporating the menstrua as long as crystals form.* In the *first* case, the liquid is commonly evaporated until a pellicle appears on the surface, when the vessel is set aside in some sheltered situation until cold, at which time the crystals are collected, and the process repeated for fresh crystals. In the *second* case, the crystals are usually removed from the liquid as soon as they are deposited. The *first* method is adopted for those salts that are considerably more soluble in *hot* than in *cold water*, as carbonate of soda, Epsom salts, &c.; the *last method*, for those that possess nearly equal solubility in both cases, and also for many salts which are not required in handsome crystals; thus common salt and chromate of potash are crystallized in this way. Many of the *alkaloids*, and *their salts*, are obtained in crystals, by *allowing their solutions* (generally alcoholic or ethereal) to *evaporate spontaneously.* By repeating the processes of solution and crystallization two or three times with the same body, the crystals obtained by the last operation will usually be found to be quite pure.

Solids are obtained in a crystalline state by melting them, and allowing them to cool *very slowly.* Thus, *iodide of sulphur* is crystallized by melting it in a flask placed in a salt water bath, and allowing it to remain in the water until the whole becomes cold. *Sulphur* and many *metals* are crystallized by pouring them, in a state of fusion, into a hot vessel, having a plug in the bottom, which is withdrawn as soon as the surface becomes cool, when the liquid portion runs out and leaves the under surface in the form of a mass of agglomerated crystals. *Perfectly pure wax, stearine*, and *spermaceti*, have a very pleasing appearance when treated in this way.

CUBEBINE. A peculiar substance obtained from cubebs.

Prep. From *cubebs*, (from which the oil has been expelled by distillation,) by digestion in *alcohol*, evaporating the resulting tincture to one fourth, filtering, and then evaporating the remaining fluid almost to dryness. The residuum is left in a cold place until it assumes a semi-crystalline appearance, when it is thrown on a filter, and the fluid portion (*cubebine of M. Cassola;*) allowed to drain off. In 24 hours, the substance left on the filter is dissolved in 4 times its weight of *boiling alcohol*, (sp. gr. 0·90,) the solution allowed to deposit its undissolved resin, (still maintaining it near the boiling temperature,) after which the clear portion is decanted. The crystals deposited as the liquid cools are *cubebine.* It is purified by redissolving it in *boiling concentrated alcohol*, and the addition of a little *boiling water* and *animal charcoal*, when long white needles will be deposited, if the solution is allowed to cool *very slowly.*

Prop., &c. It is insoluble in water, and nearly so in cold alcohol, but very soluble in boiling alcohol. It strikes a fine crimson colour with sulphuric acid, which remains unaltered for some hours; a property which distinguishes it from *piperine.* Its physiological action has been but little studied. According to Dr. Görres this for the most part resembles that of cubebs.

CUBEBS. Syn. *Cubeb Pepper; Cubeba,*—Ph. L. D. & U. S. *Cubebæ,*—Ph. E. *Piper Cubeba,*—Ph. L. 1836. "The immature" and "stalked fruit" of "*piper cubeba.*" (Ph. L.) Cubebs are stimulant, stomachic, and aromatic like the other peppers; they are also diuretic and appear to possess a specific influence over the urino-genital apparatus. *Dose.* 10 to 20 gr., in affections of the bladder and prostate gland, and in gleet and leucorrhœa; 1 to 3 dr., in the *early* and inflammatory stages of gonorrhœa, in piles, &c. They may be taken in water, milk, or bitter ale.

CUCUMBER. The fruit of the *cucumis sativus* (Linn.), the most indigestible and dangerous of all our salad vegetables; and, without doubt, a great provocative of dyspepsia and bowelly affections. See *Elaterium.*

CUDBEAR. Syn. *Persio.* From white Swedish or tartareous lichen (*lecanora tartarea*) chiefly, by a process nearly similar to that used in making archil. The lichen is watered with *stale urine* or other *ammoniacal liquor*, and suffered to ferment for 3 or 4 weeks, after which the whole is poured into a flat vessel, and exposed to the air until the urinous smell has disappeared, and it has assumed a violet colour. It is then ground to powder. Like archil, there are two varieties of this dye-stuff—*blue cudbear* and *red cudbear.* The properties of both resemble those of archil and litmus, (which see.)

CUMARIC ACID. Syn. *Coumaric Acid.* Obtained by the action of a hot *concentrated solution of potassa* on *cumarine.*

CUMARINE. See *Coumarine.*

CUMIC ACID. Syn. *Cuminic Acid.* Formed by the oxidation of *cuminol*, one of the constituents of *oil of cumin.* By distillation it is converted into another hydrocarbon, called *cumol.*

CUMIDINE. Obtained by acting on *nitrocumol* with *sulphuretted hydrogen*, in a similar way to that followed for obtaining *aniline* from *nitrobenzol.* It is an oily liquid, boiling at 437° Fahr., and forming magnificent salts with the acids.

CUMIN. Syn. *Cymini Semina; Cyminum,*—Ph. L. "The fruit" (seed) of "*cuminum cyminum.*" (Ph. L.) It is carminative and aromatic. See *Plasters.*

CUMINOL. See *Cumic Acid.*

CUMOL. See *Cumic Acid.*

CUMYL. The radical of the *cumyl-series.*

CUPELLATION. See *Assaying.*

CUPPING. This method of *topical bleeding* is performed as follows:—

The skin being softened by means of a sponge and warm water, and the hair, and other extraneous substances being previously removed, one of the small bell-like glasses, (*cupping-glasses; cucurbitulæ,*) having the air contained in it rarified by being passed over the flame of a *spirit-lamp*, is *immediately* applied to the part. From the formation of a partial vacuum beneath the cup, the pressure of the air on the surrounding surface causes that portion immediately under the cup to swell, and the vessels to become turgid. When this has taken place, the cup is removed, and several incisions are *instantly* made by means of a *scarificator*, an instrument containing *numerous lancets*, which, by means of a spring, make a number of incisions at the same moment; the depth of these incisions being regulated by means of a screw which protrudes or withdraws the lancets, according to the vascularity of the part, or the quantity of blood to be abstracted. The cupping-glass is now again applied. When a sufficient quantity of blood has been collected in the cup, it is removed by gently introducing the nail of one of the fingers under the *upper* edge, by which means, air being allowed to enter, the cup becomes detached. The part being washed with warm water to remove any clots of blood, another cup is applied as before, and the operation continued till a sufficient quantity of blood is withdrawn. Sometimes, especially when applied to the scalp, the cups fill so rapidly with blood, as to become detached almost immediately on being applied. This method of local bleeding is frequently called, *cupping with scarifications.*

When cupping-glasses are applied without the use of the lancet or scarificator, the operation is called "*dry cupping,*" and is much used to cause a speedy irritation of the skin and reaction, for the relief of oppressive breathing, local pains, &c. To obtain the full benefit from this operation, the cups should be suffered to remain upon the part until they cause an exudation of a small quantity of serum, or a considerable amount of irritation of the part. Dry cupping has been found extremely beneficial in poisoned wounds; as it acts not only by abstracting the poison, but also, by the pressure the glasses exercise on and around the part, in preventing the absorption of it.

Obs. For the operation of cupping, a basin of hot water, sponges, and clean soft towels should be provided. In clumsy hands, cupping is occasionally a severe and painful operation; but this is not the case with the skilful operator. A good cupper does not exhaust much of the air in the cup before applying it, but simply passes its mouth rapidly over the flame of the lamp. When it is held over the flame even for a few seconds, the compression of the edge of the cup upon the skin is so great, that it checks the flow of the blood to the scarified part. A good cupper also removes the cups without spilling the contents, and completes the whole operation quickly and neatly. There are, however, few persons, who are not professional cuppers, who are sufficiently expert to exhaust the air in the cup by means of the common lamp; although it is by far the best. A good plan is to rarify the air in the cup by means of a small *cone of paper*, dipped in *spirits of wine*, or *strong brandy*; this is ignited and thrown in the cup, which is *instantly* to be applied to the proper spot. Where *cupping-glasses* and the *scarificator* are not to be had, wine-glasses, or any very small tumblers may be substituted for the *first*; and small incisions by means of a *thumb lancet* will answer the purpose of the other.

The cicatrices of the scarifications leave permanent marks on the skin; on which account, when blood is to be drawn from the head or neck, the glasses should be applied behind the ears, and a portion of hair removed in such a manner that the part may be covered by what remains.

A most convenient cupping apparatus is manufactured by Mr. Bigg, the eminent surgical instrument maker of Leicester Square, consisting of cups and an exhausting syringe, so arranged that the use of the spirit-lamp is rendered unnecessary, and the operation of cupping may be performed nearly as expertly by an inexperienced nurse, as by the most accomplished professional operator. It is invaluable in places remote from town.

CURARINE. The vegeto-alkaline base of the arrow-poison of Central America.

CURCUMINE. The yellow colouring matter of turmeric, obtained by digesting the *alcoholic extract of the powder in ether*, and evaporating the clear ethereal solution to dryness. A brownish-yellow mass, yielding a bright-yellow powder. It is scarcely soluble in water, but very soluble in both alcohol and ether. Boracic and hydrochloric acids redden it; alkalies turn it reddish-brown.

CURD. Coagulated caseine. See *Cheese.*

CURRANTS. The currants of our gardens are varieties of the *ribes rubrum* and *ribes nigrum.* (Linn.) The first includes *red currants* (ribes hortense) and *white currants* (ribes album); the fruit of both of which are gently acidulous, cooling, and wholesome. The juice makes excellent wine. The *fruit* of the last, (*black-currants, quinsy-berries*,) is aperitive, and has been used in calculous affections; the *juice* is made into *wine, jellies, jams, lozenges, &c.* The *young leaves* are used as a substitute for tea; one or two buds, or half a small leaf, impart to *black tea* the flavour and fragrance of *green.* The *currants of the grocers* are a small variety of dried grapes.

CURRY. A noted dish in Indian cookery, prepared in great variety, and much esteemed in the East. They are simply *stews*, of which *rice* usually forms a characteristic ingredient, highly flavoured with *fried onions* and *curry powder*, to which *sliced apples* and *lemon juice* are sometimes added. They are made from every variety of fish, meat, poultry, game, &c., according to the fancy of the parties. See Mrs. Rundell's '*New System of Cookery*,' Soyer's '*Gastronomic Regenerator*,' *&c.*

CUSCONINE. See *Aricine.*

CUSPARIA. Syn. *Cusparia Bark, Angostura do.; Cortex Angosturæ, C. Cuspariæ; Cusparia*,—Ph. L. and E. "The bark" of "*galipea cusparia*" (?—Ph. L.), or *galipea officinalis* (Ph. E.) *Dose.* 10 gr. to 30 gr., as a tonic, stomachic, and febrifuge, in similar cases to those in which cascarilla, calumba, and cinchona, are commonly given.

Angostura or *cusparia bark* has fallen into comparative disuse, in consequence of *nux vomica* or *false angostura bark* having formerly, in several instances, been mistaken for it, and administered with fatal results. The leading characteristics of these two barks have been pointed out by M. Guibourt, and are as follows:—

Characters.	False Angustura.	True Angustura.
Form . .	Thick, rugous, rolled upon itself. Edges cut perpendicularly.	Flat, or rolled up, little wrinkled, edges bevilled.
Colour . .	Brown, or greenish-yellow, presenting protuberances or excrescences, produced by the great development of the corky layer, which has a still more yellow colour.	Grayish-yellow.
Taste . .	Very bitter	Bitter.
Reaction with Nitric Acid . .	*Red* colour when dropped upon the bark.	*Yellow* colour.

CUSPARINE. See *Angosturine.*

CUSTARDS. A composition of *milk* or *cream*, and *eggs*, sweetened with *sugar*, and variously flavoured. They are cooked either in the oven or stew-pan.

Prep. 1. (Soyer.) *Milk,* (boiling,) 1 pint; *sugar,* 2 *oz.; thin yellow peel of half a lemon;* mix, and set it aside for a short time; then take *eggs,* 4 in no., beat them well in a basin; add, gradually, the milk (not too hot), pass the mixture through a colander or sieve, and fill the custard cups with it; these are then to be placed over the fire in a stew-pan, containing about one inch of hot water, and left there for 12 minutes, or till sufficiently set. The above is for PLAIN CUSTARDS; but it forms a good basis to receive any of the usual flavouring ingredients, as *fresh* or *stewed fruit, peels, essences, orange-flower water, brandy* or *other spirits, &c.*

2. (Rundell.) As the last, but using *cream* instead of *milk,* or equal parts of the two, with *two additional eggs.* Very rich; like the last, any suitable flavouring matter may be added to it.

3. (*Almond custards,*—Rundell.) As either of the above, adding *blanched sweet almonds,* 4 *oz.*; *bitter do.*, 6 in no.; beaten to a smooth paste.

4. (*Baked custards,*—Rundell.) From *cream,* 1 pint, with 4 *eggs;* flavour with *mace, nutmeg,* and *cinnamon,* and add a little *white wine, rose water,* and *sugar;* bake in cups.

5. (*Coffee custards,*—Soyer.) *Hot milk* and *strong-made coffee,* of each, ½ pint; *sugar,* 2 *oz.;* dissolve, and add it, gradually, to 4 *eggs,* (well beaten,) and proceed as in No. 1. *Chocolate custards* and *cocoa custards* are made in the same way.

6. (*Lemon custards,*—Rundell.) As No. 1, (nearly,) using a little more *lemon peel.* In the same way *orange custards* are made, but using *orange peel.*

7. (*Orange custard.*)—*a.* As the last.

b. From *candied orange peel* and *lump sugar,* of each, 2 *oz.,* beaten in a mortar quite fine, and added to either No. 1 or No. 2. *Lemon* and *citron custards* may be made in the same manner. A little *orange-flower water,* or *marsala,* or *sherry,* may be also added at pleasure. They are best baked.

8. (*Rice custards,*—Rundell.) Boil ½ a cupful of the best *ground rice* in a *pint of milk* until dissolved, then mix it with *a quart of cream;* flavour with *nutmeg, mace,* and a little *brandy,* and put it into cups or a dish.

9. *Cold custard, for invalids,*—Dewees.) 1 *egg; sugar,* a tablespoonful; beat well together; and add, gradually, constantly stirring, *cold water,* ½ pint; *rose water,* 2 teaspoonfuls; and a little *grated nutmeg.* An agreeable and nutritious demulcent. A wine-glassful every 2 or 3 hours, or *ad libitum.*

CUTCH. The catechu of the *acacia catechu.*

CUTTLE-FISH. The bone of the *sepia officinalis* of Linnæus, or common cuttle-fish (*cuttle-fish bone; os sepiæ;*) is used by the law-stationers to erase ink-marks from paper and parchment, an application familiar to most school boys of the present generation. Reduced to powder (*pulvis sepiæ*) it forms a valuable *dentifrice* and *polishing powder,* and is used for forming the moulds for small silver castings.

CUTS. These are incised wounds of greater or less extent, and must be treated accordingly. The divided parts should be drawn close together, and held so with small pieces of *strapping* or *adhesive plaster* stretched across the wound. If the part is covered with blood, it should be first wiped with a damp sponge. When the wound is large, and it is much exposed, a good method is to sew the parts up. The application of a little *creasote* or a *spirituous solution of creasote,* will generally stop local bleeding, provided it is applied to the clean extremities of the wounded vessels. A good way is to place a piece of lint, moistened with creasote, on the wound, previously wiped clean, or to pour a drop or two of that liquid on it. An excellent method is to cover the part with a film of *collodion* or *traumaticine. Friar's balsam, quick-drying copal varnish, tincture of galls, copperas water, black ink, &c.*, are popular remedies applied in the same way. A bit of the fur plucked from a black *beaver* hat, is an excellent remedy to stop the bleeding from *a cut produced by the razor* in shaving. A cobweb is said to possess the same property.

CUTTING. See *Horticulture.*

CYAMELIDE. See *Cyanic Acid.*

CYANATE. Syn. *Cyanas,*—Lat. A compound formed by the union of cyanic acid with the bases. The *cyanates* are distinguished by evolving the odour of *cyanic acid,* accompanied by effervescence, when treated with the *dilute mineral acids,* and by this solution, mixed with *hydrate of lime,* evolving ammonia. The *alkaline cyanates* are soluble, the *others,* insoluble.

CYANETHINE. An organic alkali, formed along with *cyanide of potassium,* by the mutual action of *potassium* and *cyanide of ethyle.*

CYANHYDRIC ACID. See *Hydrocyanic Acid.*

CYANIC ACID. Syn. *Acidum Cyanicum,*—Lat. A compound of cyanogen and oxygen, discovered by Wöhler. It is only known in the hydrated state.

Prep. 1. *Dry cyanuric acid,* or *cyamelide,* is distilled in a retort, and the product collected in a *well-cooled* receiver.

2. (Liebig.) A *current of sulphuretted hydrogen gas* is passed through *water in which cyanate of silver is diffused,* the process being suspended before all the cyanate of silver is decomposed.

Prop., &c. Cyanic acid reddens litmus; is sour to the taste; possesses a modified sulphurous odour, similar to that which is always perceived when any of its salts are decomposed by an acid; it forms salts with the bases, called *cyanates;* when in contact with water it suffers decomposition in a few hours, and is converted into bicarbonate of ammonia; it cannot be preserved for any time, as shortly after its preparation it spontaneously passes into a white, opaque, solid mass, to which the name *cyamelide* has been given. By distillation, this new substance is reconverted into *cyanic acid.*

CYANIDE. Syn. *Cyanuret; Cyanidum, Cyanuretum,*—Lat. The compound formed by the union of cyanogen with a metal. See *Cyanogen* and *Hydrocyanic Acid.*

CYANIDE (Alkaline). *Prep.* (R. Wagner.) Dry *ferrocyanide of potassium,* 4 parts; dry *carbonate of soda,* 1 part; are melted together in an iron crucible at a red heat, and continually stirred until the iron rod comes out covered with a white crust, when the heat is withdrawn, and after a few moments' repose, the supernatant liquid portion is poured out on a clean iron slab. The crude mixed cyanide is quite as useful as the more expensive one of Liebig, and is equally fit for technical applications, as *electrotyping, gilding, silvering, &c.*

CYANIDE OF BENZOYLE. Obtained by heating *chloride of benzoyle* with *cyanide of mercury.* It is a colourless, oily, inflammable liquid, having an odour resembling that of oil of cinnamon.

CYANILINE. Syn. *Cyanide of Aniline.* A crystalline compound formed by the action of *cyanogen* on *aniline.*

CYANOGEN. Syn. *Prussine, Bicarburet of Nitrogen, Bicarbide of do.; Cyanogenium,*—Lat. A highly important quasi-elementary body, discovered by M. Gay-Lussac, in 1815.

Prep. From *bicyanide of mercury,* (carefully dried,) exposed in a small retort to the heat of a spirit-lamp, and the gas collected in the mercurial pneumatic trough.

Prop., &c. A colourless gas, possessing a pungent and peculiar odour, resembling that of peach-kernels or prussic acid; under a pressure of about 4 atmospheres, at a temperature of 45°, it assumes the liquid form, (Faraday,) and this fluid again becomes gaseous on withdrawal of the pressure; water absorbs nearly 5 times its bulk of cyanogen at 60° Fahr., and alcohol, about 23 times its volume; with hydrogen it forms *hydrocyanic acid,* and with the metals, a most interesting and important class of bodies called *cyanides* or *cyanurets;* when kindled, it burns with a beautiful purple flame, carbonic acid and nitrogen being evolved. Sp. gr. 1·806. See *Hydrocyanic Acid.*

CYANOGEN (Bromide of). By distilling *bromine* with *cyanide of mercury.* Colourless; volatile; solid; powerfully odorous.

CYANOGEN (Chlorides of). *Prep.* 1. (*Gaseous Chloride of Cyanogen.*) By passing *chlorine* over moist *cyanide of mercury,* in the dark. It possesses an insupportable pungency, and is soluble in alcohol, ether, and water.

2. (*Solid Chloride of Cyanogen.*) By placing *anhydrous hydrocyanic acid* in a vessel of *chlorine,* and exposing the whole in the sunshine. Colourless needles; volatile; odour powerful and offensive, somewhat resembling that of mice or conia; dissolves in alcohol and ether; melts at 284° Fahr.; and sublimes unchanged at a higher temperature.

CYANOGEN (Iodide of). Its preparation and properties resemble those of *bromide of cyanogen.*

CYANURIC ACID. Syn. *Pyro-uric Acid.* A peculiar acid, discovered by Scheele. It is a product of the decomposition of the soluble cyanates by dilute acids, of urea by heat, &c.

Prep. 1. Urea (pure and dry) is heated until it fuses and is converted into a white or grayish-white mass; this is dissolved in *strong oil of vitriol,* and *nitric acid* added drop by drop to the solution until it becomes nearly colourless; the liquid is then mixed with an equal volume of *water.* As the liquid cools *crystals* of *cyanuric acid* are deposited, which are washed with a *little cold water,* and then dissolved in 24 parts of *boiling water,* when crystals of *pure hydrated cyanuric acid* form on cooling.

Prop., &c. Cyanuric acid forms small colourless efflorescent crystals, scarcely soluble in cold water; soluble in hot oil of vitriol and in nitric acid without decomposition; from the last it crystallizes in the anhydrous state; by exposure to the atmosphere, or a gentle heat, they lose their water and fall into powder. It forms salts with the bases called *cyanurates.* The *alkaline cyanurates* may be formed by neutralizing a *boiling solution of the acid* with the *base. Cyanurate of silver* is prepared by adding a *solution of nitrate of silver* to another of *cyanurate of potassa.*

CYDER. See *Cider.*

CYDONINE. The peculiar gum of quince seed. It appears to be intermediate between *bassorine* and *mucus.*

CYMOL. A peculiar hydrocarbon found in *oil of cumin* and the presumed source of *toluylic acid.*

CYNAPINE. Syn. *Synapina.* An alkaoid obtained from *æthusa cynapium* or *fool's parsley.* It possesses no practical interest.

CYSTIC OXIDE. Syn. *Cystine.* Obtained from *cystic oxide calculi* (in powder) by digestion in *liquor of ammonia.* By spontaneous evaporation the ammoniacal solution deposits small colourless crystals of *cystic oxide.* It forms a saline compound with hydrochloric acid, and is decomposed by the strong alkalies.

CYTISINE. A purgative bitter principle, extracted from the *cytisus laburnum,* (Linn.) or *common laburnum,* and some other plants.

DAGUERREOTYPE. See *Photography.*

DAHLINE. A species of fecula obtained from the tubers of the dahlia. It is identical with *inuline.* It is not employed in the arts.

DAIRY. The best situation for a dairy is on the north side of the dwelling-house, in order that it may be sheltered from the sun during the heat of the day. Ample means should be provided to ensure ventilation, and at the same time, to exclude flies and other insects. The temperature should be preserved, as much as possible in an equable state, ranging from 45° to 55° Fahr. To lessen the influence of external variations of temperature, the walls should be double, or of considerable thickness, and the windows provided with shutters or doors. In summer, the heat may be lessened by sprinkling water on the floor, which will produce considerable cold by its evaporation. Dairies built of *mud* or "*cob,*" are preferred in the West of England; and this preference arises from the uniform temperature they maintain, on account of the great thickness of the walls, and their being very bad conductors of heat. In large dairy-farms, where butter and cheese are made, the dairy is generally a separate building, and divided into 3 or 4 apartments; one of which is called the *milk-room;* a second, the *churning-room;* a third, the *cheese-room,* containing the cheese-press, &c.; and a fourth, the *drying-room,* where the cheeses are placed to dry and harden. To these may be added a scullery, furnished with boiler, water, &c., for scalding and cleaning the dairy utensils.

Cleanliness is very essential in all the operations of the dairy, and in none more so than in the milking of the cows. The hands and arms of the milk-maid should be kept scrupulously clean, and should be well washed with soap and water, after touching the udder of a sick cow, as without this precaution, the sores may be conveyed to the healthy ones. The milk-cans should be scalded out daily, and, as well as all the other dairy utensils, should be kept *clean* and *dry.* Before placing the milk on the shelves of the dairy, it should be strained through a hair sieve or a searce covered with clean cheese-cloth, as by this precaution any stray hairs that may have fallen into the milk-pail will be taken out.

The average produce of a milch cow, supplied with good pasturage, is about 3 gallons daily, from Lady-day to Michaelmas, and from that time to February about 1 gallon daily. Cows of good breed will be profitable milkers, to 14 or 15 years of age, if well-fed. See *Butter, Cheese, Cream, &c.*

DAMASCUS BLADES. See *Steel.*

DAMP, under any form, should be avoided. A humid atmosphere or situation is one of the commonest causes of agues, asthmas, rheumatism, and numerous other diseases.

Damp linen is also very injurious, and should be especially avoided. In travelling, when it is expected that the bed has not been properly aired, a good plan is to sleep between the blankets. To ascertain this point, the bed may be warmed, and a cold, dry, glass tumbler, immediately afterwards introduced between the sheets, in an inverted position. After it has remained a few seconds, it should be examined, when, if it is found *dry*, and *untarnished with steam*, it may be fairly presumed that the bed is "well-aired;" but if the reverse should be the case, it should be avoided. When it is impossible to prevent the use of damp linen, as articles of dress, the best way to obviate any ill effects, is to keep constantly in motion, and avoid remaining near the fire, or in a warm apartment, or in a draught of cold air, until sufficient time has elapsed to allow of the escape of the moisture. The effect of evaporation is the reduction of the temperature of the body; hence the depressing action of damp linen.

Ivy planted against the sound wall of a house, is said to exclude dampness. If a wall is already damp, ivy planted against it, will, when grown up, cause it to become dry, provided the brickwork is sound, and the dampness does not arise from moisture attracted upwards from the foundation. Sometimes, when ivy is propagated from flowering branches, it will not adhere to a wall at all; the way to get over this difficulty is to cut it back to near the surface of the ground. The young wood which will then form, will take hold and cling immediately to almost anything.

DAMSONS. A species of small black plum, much used in the preparation of tarts, &c. They are rather apt to disagree with delicate stomachs, and also to affect the bowels. See *Plums.*

DANCING. The practice of dancing as an amusement or exercise must be almost as old as the human race itself. Yet, notwithstanding its antiquity and prevalence amongst all nations, both barbarous and refined, the propriety and advantages of its cultivation are of a very questionable character. In a hygienic point of view it can claim no preference, as an exercise, over the more simple ones of walking and running; whilst, from the associations it frequently induces, and the heated and confined atmosphere in which its votaries commonly assemble to indulge in it, it becomes the fertile parent of immorality and consumption. A celebrated cyclopædist has, perhaps, harshly, but truthfully, defined dancing to be "a silly amusement for the idle and thoughtless."

DANDELION. Syn. *Piss-a-bed; Taraxacum,*—Ph. L. "The recent root" of the "*taraxacum dens leonis* (leontodon taraxacum, *Linn.*),"—Ph. L. The *root* of this plant is diuretic and tonic. It is *roasted* and used as coffee, and when mixed with an equal weight of foreign coffee, constitutes the article once so much puffed under the name of "*dandelion coffee.*" A similar mixture prepared with chocolate, forms the *dandelion chocolate* of the shops. The *blanched leaves* are used in salads, and the *inspissated juice*, *extract*, and *decoction*, are employed in medicine, and are considered as detergent, aperitive, and deobstruent.

DAPHNINE. A peculiar bitter principle, discovered by Vauquelin in the *daphne mezereum* or *spurge olive.* It is procured by separating the resin from the *alcoholic tincture of the bark* by evaporation; afterwards, diluting the residue with *water*, filtering, and adding *acetate of lead.* A yellow substance (*daphnate of lead*) falls down, which when decomposed by *sulphuretted hydrogen*, may be obtained under the form of small, colourless, transparent, radiated needles. It is bitter; volatile; sparingly soluble in cold water; freely soluble in hot water, and in alcohol and ether. It possesses basic properties.

DATISCINE. A substance having the appearance of grape sugar, obtained by Braconnot from *datisca cannabina.*

DATURINE. Syn. *Daturia, Daturina, Daturium; Hyoscyamine.* An organic alkali, discovered by Geiger and Hesse in *datura stramonium* or *thorn apple.* It also occurs in *hyoscyamus niger* or *henbane.* It is best obtained from the *seeds.* Daturine dissolves in 280 parts of cold, and 72 parts of boiling water; it is very soluble in alcohol; less so in ether. It tastes bitter, dilates the pupil strongly, and is very poisonous. It may be sublimed unaltered, and may be obtained in prismatic crystals, by the addition of water to its alcoholic solution. With the acids it forms salts, which are mostly crystallizable. See *Alkaloid.*

DEAFNESS. Syn. *Dysecœa,*—Lat. An imperfection or absence of the sense of hearing. When deafness is present in infancy and childhood, it is accompanied with dumbness, or imperfect articulation, in consequence of the impossibility of conveying a knowledge of the sounds necessary for the exercise of the imitative faculty of speech. Deafness frequently arises from some imperfection or obstruction of the psssage leading to the membrane of the tympanum or drum of the ear. In some cases this passage is totally occluded by a membrane, or some malformation of the tube, which may frequently be removed by a surgical operation. Even instances of partial obliteration of this passage have occurred, which have been successfully treated. The researches of Mr. Yearsley, the eminent aurist of Savile Row, have established the fact, that enlarged tonsils are a very common cause of deafness; and when such is the case, their excision will generally effect a cure. The removal of the tonsils in the hands of this gentleman is an extremely harmless and almost painless operation, and not only improves the hearing, but also removes the tendency to sore throat. To this form of the affection Mr. Yearsley applies the term —*throat deafness.* Another cause of deafness, is the presence of foreign bodies in the aural passages, or the accumulation of hardened wax. In these cases the best treatment is to inject warm water into the ear by means of a proper syringe. When deafness arises from imperfection of the tympanum or drum of the ear, the effects of the application of the *artificial membrana tympani* invented by Mr. Yearsley (moistened cotton wool,) are generally immediate and truly wonderful. By its aid, persons previously so deaf as to be incapable of bearing their share in conversation, are enabled to hear an ordinary whisper. *Insects* may be destroyed by pouring a spoonful of *warm olive oil,* or *camphorated oil,* into the ear over night, retaining it there until the next morning by means of a piece of cotton wool, when it may be washed out with a little *mild soap* and *warm water.* When there is a deficiency of the natural secretion of wax, or a dryness of the aural passage, mild oleaginous stimulants may be employed. For this purpose a little *olive* or *almond oil,* to which a few drops of *oil of turpentine, oil of juniper,* or *camphor liniment* have been added, may be used with advantage. Mr. Thomas Wakley, jun., has for some time successfully employed *glycerine* in such cases. When deafness is accompanied with continued acute pain, or a discharge of purulent matter, inflammation of the tympanum, or some other portion of the internal ear, probably exists, and medical advice should be sought as soon as possible. The deafness that frequently accompanies a violent cold, is generally caused by obstructions in the Eustachian tubes, and goes off as soon as the secretions return to a healthy state. When imperfect hearing depends upon obtundity of the auditory nerve, or an extensive obliteration or malformation of the internal ear, it scarcely admits of cure.

DEAFNESS (Taylor's Remedy for). *Prep.* From *oil of almonds,* 1 ℔; *garlick,* bruised, 2 oz.; *alkanet root,* ½ oz.; digest for a week and strain. A little is poured into the ear in deafness.

DEATH. In cases of sudden death, interment should be deferred till signs of putrefaction begin to appear, especially when no gradation of disease has preceded, as in cases of apoplexy, hysterics, external injuries, drowning, suffocation, &c. No sooner has breathing apparently ceased, and the visage assumed a ghastly or a death-like hue, than the patient, after his eyes are closed, is too often hurried into a coffin, and the body, scarcely yet cold, is precipitated into the grave. So extremely fallacious are the signs of death, that the semblance has been frequently mistaken for the reality. By prompt means and judicious treatment, many persons, when in such a condition, have been happily restored to their families and friends. The effects of *sound* upon animal life is astonishing. The beat of a drum, for instance, has had a very beneficial effect upon persons in a state of suspended animation. At one time, a scream, extorted by grief, proved the means of resuscitating a person who was supposed to be dead, and who had exhibited the usual recent marks of the extinction of life. In cases of *catalepsy* or *trance,* having the semblance of death, the action of the lungs and heart continues, though in a nearly imperceptible degree. By placing a *cold mirror* or piece of *highly polished metal* immediately over the mouth of the patient, symptoms of moisture will appear upon the surface, if the most feeble respiration takes place.

DEBILITY. Syn. *Debilitas,* —Lat. Weakness; languor; feebleness. When this arises from a diseased action of the stomach, the occasional use of *mild aperients,* followed by *bitters* and *tonics,* may be had recourse to. When from a general laxity of the solids, and there are no symptoms of fever, nor a tendency of blood to the head, a course of chalybeates generally proves advantageous. See *Anæmia, Pills, Mixtures, &c.*

DECANTATION. The operation of pouring or drawing off the clear portion of a liquid from the impurities or grosser matter that has subsided. It is commonly performed, either by gently inclining the vessel, or by the use of a syphon or pump. In the laboratory it is much resorted to, in the purification of precipitates, or other similar operations, where repeated edulcoration or washing is required, for which purpose it is preferable to filtration, from being less troublesome and more economical. In these cases, after a sufficient time having been allowed for the subsidence of the precipitate or powder, or for the clearing of the supernatant fluid, the latter is decanted and its place supplied by a fresh portion of water, which, after sufficient agitation, is similarly treated, and the whole operation repeated as often as necessary.

DECANTERS. There is often much difficulty experienced in cleaning decanters, especially after port wine has stood in them for some time. The best way is to wash them out with a little *pearlash* and *warm water*, adding a spoonful or two of *fresh slaked lime*, if necessary. To facilitate the action of the fluid against the sides of the glass, a few small *cinders* may be used. A spoonful of *strong oil of vitriol* will also rapidly remove any kind of dirt from glass bottles. Decanters which have become "furred" by holding hard water, may be cleaned with a spoonful of *spirits of salt*, diluted with 3 or 4 times its weight of *water*. See *Stoppers*.

DECARBONIZATION. This operation is performed on *cast iron*, to convert it into *steel* or *soft iron*. The articles to be decarbonized are packed in finely powdered *hæmatite*, or native oxide of iron, to *which iron filings* are often added, and exposed for some time to a strong red heat, by which the excess of carbon is abstracted or burnt out. The process somewhat resembles annealing or cementation.

DECAY. See *Eremacausis*.

DECIMALS, or *Decimal fractions*, are fractions which have for their denominator 10, or some power of 10; as, 100, 1000, &c.; the number of ciphers in the denominator being always equal to the number of figures in the numerator. Thus, ·2, ·25, ·125, respectively represent $\frac{2}{10}$, $\frac{25}{100}$, $\frac{125}{1000}$. The denominator of decimals is never written, the dot placed before the first figure of the numerator expressing its value. Ciphers placed on the right hand of a decimal fraction do not alter its value; for ·5, ·50, ·500, are each equal to $\frac{1}{2}$; but ciphers placed on the left hand of a decimal diminish its value in a tenfold proportion: thus, ·3, ·03, ·003, respectively answer to the common fractions, $\frac{3}{10}$, $\frac{3}{100}$, and $\frac{3}{1000}$. Every figure on the left-hand side of the dot or decimal sign is a whole number.

Addition and *subtraction of decimals* are performed in the same manner as with common numbers, care being taken to place the numbers under each other according to their several values; as, *tens* under tens, *hundreds* under hundreds, &c.

Multiplication of decimals is performed in precisely the same manner as with whole numbers, merely pointing off as many figures in the product as there are decimals in the multiplier and multiplicand put together.

Division of decimals. As the last, but pointing off as many figures in the quotient as the decimal places in the dividend exceed those of the divisor. If there are not figures enough in the quotient the deficiency must be supplied by prefixing left-hand ciphers. Ciphers are also added to the right hand of the dividend, or to a remainder, when there are more figures in the divisor than in the dividend, by which the quotient may be carried on to any extent.

A *vulgar fraction* is reduced to a *decimal*, by dividing the numerator by the denominator. Thus, $\frac{1}{2} = {\cdot}5$, $\frac{1}{8} = {\cdot}125$, &c.

The *value of a decimal*, of any denomination, is found by multiplying it by the number of parts in the next less denomination, and cutting off as many places to the right hand as there are decimals, and so on until the terms are exhausted. Thus, ·634 oz. is =

·634
8

5·072 drachms.
60

4·320 grains.

or, 5 dr., $4\frac{1}{3}$ gr. (nearly.)

The constant use of decimals in the laboratory, in the surveys of the Excise, and in numerous chemical calculations, induce us to press the subject on the attention of operatives and others of neglected education. An attentive perusal of the above, and a few hours' application, will make the matter familiar to them. See *Alcoholmetry, Mixtures, &c.*

DECOCTION. Syn. *Decoctum*,—Lat. An aqeuous solution of the active principles of any substance obtained by boiling.

The effect of *decoction* in water differs greatly from that of *infusion*. At the temperature of 212° Fahr., the essential oils and aromatic principles of vegetables are dissipated or decomposed; while by infusion in hot water, in covered vessels, they remain for the most part uninjured. The solvent powers of *boiling* water are, however, much greater than those of *hot* water; and many vegetable principles scarcely acted on by the one, are freely soluble in the other. This is the case with many of the alkaloids, on which the medicinal virtues of several vegetables depend. On the other hand, the solutions of many substances, though more readily made by boiling, are speedily weakened or rendered inert by ebullition, in consequence of the active principles being either volatilized along with the steam, or oxidized or decomposed by exposure to the atmosphere. This is particularly the case with substances abounding in extractive or astringent matter. When the medicinal properties of vegetables are volatile, or are injured by a *strong* heat, infusion should be had recourse to, in preference to boiling; but when a solution of the fixed constituents is alone sought, decoction is preferable.

The *substances employed* for *making decoctions* should be well bruised, or reduced to a *very coarse* powder, or, if fresh and soft, they should be sliced small. In the former case, any *very fine* powder or *adhering dust* should be removed with a sieve, as its presence tends to make the product thick and disagreeable, and also more troublesome to strain. The vessel in which the ebullition is conducted should be furnished with an accurately fitting cover, the better to exclude the air; and the application of the heat should be so conducted that the fluid may be kept "*simmering*," or only *gentle boiling*, as *violent* boiling is not only quite *unnecessary*, but absolutely *injurious* to the quality of the product. In every case the liquor should be strained whilst *hot*, but *not* boiling, and the best method of doing this is to employ a fine hair sieve, or a coarse flannel bag. In general it is found, that as decoctions cool, a sediment is formed, in consequence of the boiling water dissolving a larger portion of vegetable matter than it can retain in solution when cold. This deposit for the most part consists of the active principles of the solution, and, unless when otherwise ordered, should be mingled with the clear liquid by agitation, when the decoction enters into extemporaneous compositions, or when the dose is taken.

The length of time occupied by the ebullition, is another point demanding some attention. *Long boiling* is in no case necessary, and should be avoided, especially in decoctions prepared from aromatic vegetables, or those abounding in extractive. The colleges, in such cases, direct the ingredients "to be boiled for a *short time*," or "for 10 minutes;" or they limit the period of the ebullition by stating the quantity that must be volatilized, as—"boil to a *pint*, and strain." The last method is generally employed for those substances that do not suffer by lengthened boiling.

In *preparing compound decoctions*, those ingredients should be boiled first which least readily give up their active principles to the menstruum, and those which most readily part with them, should be added afterwards. In many cases it is proper simply to infuse the more aromatic substances in the hot decoction of the other ingredients, by which means their volatile principles will be the better preserved.

Distilled water, or perfectly clean *rain water*, should alone be used for decoctions, extracts, and infusions. Spring and river water, from containing lime, have much less solvent power.

The aqueous solutions of organic matter, from the nature of their constituents, rapidly ferment, or putrefy. At the ordinary temperature of the atmosphere, neither decoctions nor infusions are fit to be used in dispensing, unless made the *same day.* They should, consequently, be only prepared in *small quantities* at a time, and any unconsumed portion should be rejected, as it would be imprudent for the dispenser to risk his own reputation, and the welfare of the patient, by employing an article of dubious quality.

It has of late years become a general practice for the wholesale houses to vend preparations under the name of "*Concentrated Decoctions*," which, with the exception of the compound decoction of aloes, are stated to be of 8 times the pharmacopœial strength; so that *one drachm* of these liquids added to *seven* drachms of water, forms extemporaneous decoctions, professedly resembling those of the pharmacopœia. The decoction of aloes is made of only *four* times the usual strength, as the nature of its composition would not permit of further concentration. Such preparations are, however, very imperfect substitutes for the freshly made decoctions. The extreme difficulty of forming concentrated solutions of vegetable matter with bulky ingredients, too often leads to the omission of a portion of the materials, or to the practice of concentrating the liquid by long evaporation. In the first case, the strength is of course less than it should be; and in the second, the quality is injured, and perhaps the preparation is rendered nearly inert by the lengthened exposure to heat, and the consequent volatilization or decomposition of its active constituents. The common practice of adding a considerable portion of spirit to these preparations, which is absolutely necessary to preserve them, is also objectionable, as, in many of the cases in which decoctions are prescribed, this article, even in small quantities, exerts a prejudicial action. Some concentrated decoctions have been recently offered for sale which do not contain alcohol, being preserved by the addition of *sulphurous acid*, or *sulphite of lime*. A sample of one of these, which we lately examined, we found to be perfectly worthless. It possessed a strong odour of bark, but it contained barely a trace of alkaloid. See *Infusions*, *Essences*, *Liquors*, *&c.*

DECOCTION (Aloes). Syn. *Compound Decoction of Aloes*, *Balsam of Life; Baume de Vie; Decoctum Aloës*,—Ph. E. *Dec. Aloës Compositum*,—Ph. L. & D. *Prep.* 1. (Ph. L.) *Extract of liquorice*, 7 dr.; *extract of aloes*, *powdered myrrh*, and *saffron*, of each, 1½ dr.; *carbonate of potassa*, 1 dr; *water*, 1½ pint; boil to a pint, strain, and add, *compound tincture of cardamoms*, 7 fl. oz.

2. (Ph. E.) *Aloes*, *myrrh*, and *saffron*, of each, 1 dr.; *extract of liquorice*, ½ oz.; *carbonate of potassa*, 40 gr.; *water*, 16 fl. oz.; boil to 12 fl. oz.; strain, and add of *compound tincture of cardamoms*, 4 fl. oz.

3. (Ph. D.) As No. 1, (nearly,) but using *hepatic aloes*. A warm cathartic. *Dose.* 1 to 2 oz.; in habitual costiveness, dyspepsia, jaundice, &c.

4. (*Wholesale.*) *Solazzi juice*, 1½ *lb.; kali* (carbonate of potassa), 4 *oz.; aloes* (hepatic), 5½ *oz.; myrrh* (small), 5 *oz.; water*, 4½ gall.; boil to 3 gall., strain through flannel, cool, and add, of *compound tincture of cardamoms*, 10 pints; previously digested for 10 days on *saffron*, 2½ *oz.;* mix well, and add *essential oil of nutmeg*, 15 drops; *oils of cassia* and *caraway*, of each, 10 drops; and *oils of cloves* and *pimento*, of each, 5 drops; in a week decant the clear portion from the sediment, and preserve it in a cool place.

Obs. By boiling the saffron as ordered by the colleges, nearly the whole of its fragrance is dissipated. A better plan is to macerate it in the tincture for a few days, previously to adding the latter to the decoction of the other ingredients. After the tincture has been strained off from the saffron, the latter may be washed with a little water, to remove any adhering colour and odour, and this may be added to the decoction. The addition of the tincture produces a deposit of mucilaginous and feculent matter, which has been dissolved out of the liquorice, for which reason some houses omit the latter altogether, and supply its place with an equal quantity of *sugar* or *treacle*, and a little *colouring*. By this method the liquid, after being once obtained clear, will continue so for any length of time. The full quantity of saffron ordered by the College, is seldom used in making this preparation, and, not unfrequently, it is wholly omitted.

DECOCTION (Aloes,—Concentrated). Syn. *Decoctum Aloes Concentratum*, *D. A. Comp. C.*,—Lat. *Prep.* 1. *Lump sugar*, 8 *oz.; colouring*, ¼ pint; *carbonate of potash*, 2 *oz.; aloes*, 3½ *oz.; myrrh*, and *saffron*, of *each*, 2½ *oz.; compound tincture of cardamoms*, ½ a gall.; *water*, 3 pints; boil the first five in the water, until reduced to *nearly* one half; cool and add the tincture, previously digested for a week, on the saffron; and proceed as above. 14 *oz.* of *extract of liquorice* may be used instead of the sugar and colouring.

2. *Aloes*, *myrrh*, *liquorice*, and *potassa*, (all in powder,) and *saffron*, as last; *compound tincture of cardamoms*, 5¾ pints; digest a fortnight, and filter. In this way a very odorous and beautiful preparation is produced, which has been much admired. The above are said to possess 4 times the strength of the College preparation.

DECOCTION (Anticolic). See *Apozems.*

DECOCTION (Arnica). Syn. *Decoctum Arnicæ*,—Lat. *Prep.* 1. (Swediaur.) *Flowers of arnica montana*, 1 oz.; *water*, 3 pints; boil to a quart; filter, and add of *syrup of ginger*, 3 oz. *Dose.* 1 to 2 fl. oz., every two or three hours, in aphonia, paralysis of the voluntary muscles, rheumatism, &c.; and as a substitute for bark, in putrid fever, agues, &c.

2. (Ph. Cast. Austr., 1841.) *Arnica root*, 2 dr.; *water*, 9 oz.; boil to 6 oz., and strain. *Dose.* 1 oz.; as the last.

DECOCTION (Astringent). Syn. *Decoctum Astringens*,—Lat. *Prep.* (Swediaur.) *Oak-bark*, *pomegranate peel*, and *tormentil root*, of each, 2 dr.; *water* and *milk*, of each, 1 ℔; boil 12 minutes, add of *cinnamon*, 2 dr.; boil 2 or 3 minutes longer, and strain. *Dose.* A wine-glassful.

DECOCTION (Bark).—1. *Decoction of Yellow Bark; Decoctum Cinchonæ*,—Ph. L. & E. *D. C. Cordifoliæ*,—Ph. L. 1836. *Prep.*—*a.* (Ph. L.) *Yellow cinchona bark* (bruised), 10 dr.; *distilled water*, 1 pint; boil for 10 minutes in a lightly covered vessel, and strain the liquor whilst still hot.

b. (Ph. E.) *Brown*, *gray*, *yellow*, or *red cinchona* (bruised), 1 oz.; *water*, 24 fl. oz.; boil for 10 minutes; when cold, filter the liquor, and evaporate it to 16 fl. oz.

2. *Decoction of Pale Bark; Decoctum Cinchonæ Pallidæ*,—Ph. L. *D. Cinchonæ*,

—Ph. D. & Ph. L. 1788, 1809, & 1824. *D. C. Lancifoliæ*,—Ph. L. 1836. *Prep.* (Ph. L.) From *pale cinchona bark;* as *decoctum cinchonæ*,—Ph. L.

3. *Decoction of Red Bark; Decoction Cinchonæ Rubræ*,—Ph. L. *D. C. Oblongifoliæ*, — Ph. L. 1836. *Prep.* (Ph. L.) As *decoction of yellow bark*, (Ph. L.)

Dose, &c. 1 to 2 fl. oz., 3 or 4 times daily, as a tonic, stomachic, and febrifuge, when the stomach will not bear the administration of bark in powder; in fevers, dyspepsia, convalescence, &c. The plan recommended by the Edinburgh College, of filtering the decoction when *cold*, is absurd. According to Soubeiran, 146 gr. of the deposit thus removed, contained 86 gr. soluble in alcohol, and rich in the cinchona alkaloids. This liquid should, therefore, be well shaken before pouring it out for use, instead of being filtered. The addition of a few drops of either *sulphuric* or *hydrochloric acid* to the water, greatly increases its solvent power, and also, consequently, the medicinal value of this preparation. (See *below*.)

DECOCTION (Bark,—Acidulated). Syn. *Decoctum Cinchonæ Acidulatum*, — Lat. *Prep.* 1. To the *water* for any one of the above, add *dilute sulphuric acid*, 1½ fl. dr.; boil 10 minutes, and strain whilst hot.

2. (Sir J. Wylie.) *Cinchona bark*, 1 oz.; *water*, 16 fl. oz.; *diluted sulphuric acid*, 1 dr.; as last.

DECOCTION (Bark,—Factitious). Syn. *Decoctum Cinchonæ Factitium*,—Lat. *Prep.* (Ph. Bor.) *Willow bark* and *horse-chesnut bark*, of each, ½ oz.; *calamus root* and *cloves*, of each, ¼ oz.; *water*, 16 fl. oz.; boil to one half. *Used* as a substitute for decoction of cinchona bark, but is vastly inferior.

DECOCTION (Bark and Serpentary). Syn. *Decoctum Cinchonæ cum Serpentariâ*, — Lat. *Prep.* (Sir J. Pringle.) *Peruvian bark*, 3 dr.; *water*, 1 pint; boil to one half, and infuse in the hot decoction, *serpentaria root*, 3 dr. As a diaphoretic stimulant, and tonic, in fevers, and as a gargle in sore throat.

DECOCTION (Barley). Syn. *Barley Water; Aqua Hordeata; Decoctum Hordei*,—Ph. L. & D. *Prep.* (Ph. L.) *Pearl barley*, 2½ oz., (washed clean,) is boiled in *half a pint of water* for "a *little while*," and this water being thrown away, *hot water*, 4 pints, is added, and then boiled to one half, and strained.

DECOCTION (Barley, — Compound). Syn. *Pectoral Decoction, Fever Drink; Decoctum Pectorale; Ptisana Communis; Dec. Hordei Compositum*, —Ph. L. & D. *Mistura Hordei*, — Ph. E. *Prep.* 1. (Ph. L.) *Decoction of barley* (simple), 1 quart; *figs* (sliced) and *raisins* (stoned), of each, 2½ oz.; *fresh liquorice* (sliced), 5 dr.; *water*, 1 pint; boil to a quart, and strain.

2. (Ph. E.) *Pearl barley*, 2½ oz.; *water*, 4½ pints; boil to 3 pints; add, *figs* and *raisins*, of each, 2½ oz.; *liquorice root*, 5 dr.; *water*, 1 pint; and boil to 2 pints, as before.

3. (Ph. D.) As No. 1, (nearly.)

Obs. The above are used as demulcents in fevers, phthisis, strangury, &c., taken ad libitum. They are slightly laxative, and when this would be an objection to their use, a few drops of laudanum may be added. Mixed with an equal quantity of *decoction of bark*, barley water forms an excellent gargle in cynanche maligna (*ulcerated sore throat*), and, with a like quantity of *milk* and a *little sugar*, a good substitute for the breast in dry nursing infants. It is, also, often acidulated with *lemon juice* or *sulphuric acid*, and sweetened, (*Decoctum Hordei Acidulatum*.) *Gum arabic*, 4 dr., and *nitre*, 1 dr., to each pint, is a common addition in gonorrhœa. *Cream of tartar*, 1 dr., is occasionally added to render it more aperient.

DECOCTION (Bitter). Syn. *Decoctum Amarum*,—Lat. *Prep.* 1. *Dried tops of lesser centaury* and *wormwood*, and *leaves of germander*, of each, 3 dr.; *water*, 1¼ pint; boil to a pint.

2. *Gentian root*, ½ oz.; *water*, 1½ pint; boil 10 minutes, take out the root, slice it, and add it again to the decoction with *dried orange peel*, ¼ oz.; boil to 1 pint, and strain.

DECOCTION (Blue Cardinal Flowers). Syn. *Decoctum Lobeliæ, D. L. Syphiliticæ*, —Lat. *Prep.* 1. (P. Cod.) *Root of lobelia syphilitica*, 1 handful; *water*, 12 ℔; boil to 7 ℔, and strain.

2. (Swediaur.) *Dried root*, 5 oz.; *water*, 12 ℔; as last. Alterative, purgative, and diuretic.

Obs. This decoction was strongly recommended by Swediaur, in certain complaints. He gave half a pint, at *first*, twice daily, and *afterwards*, 4 times a day, unless it acted too strongly on the bowels, when the frequency of the dose was diminished, or it was discontinued for 3 or 4 days, and then had recourse to again, until the cure was effected.

DECOCTION (Bran). Syn. *Decoctum Furfuris*, — Lat. *Prep.* 1. From *bran*, ¼ *lb.; water*, 1¼ pint; boil to a pint. In diabetes; and sweetened with *sugar*, as a demulcent and laxative in cough and sore throat.

2. *Bran,* 1 quart; *water,* 1½ gall.; boil 5 minutes, and add *cold water,* q. s., to bring it to the proper temperature. As an emollient foot-bath.

DECOCTION (Broom). Syn. *Decoctum Spartii Cacuminium*; *D. Scoparii,*—Ph. D. *Prep.* (Ph. D.) *Broom tops,* (dried,) ½ *oz.; water,* ½ pint; boil 10 minutes, and strain. (See *below.*)

DECOCTION (Broom,—Compound). Syn. *Decoctum Spartii Cacuminium Co.; Dec. Scoparii,*—Ph. E. *Dec. Scop. Compositum,*—Ph. L. *Prep.* 1. (Ph. L.) *Tops of broom,* (recent and dried,) *juniper berries,* (bruised,) *dandelion root,* (bruised,) of each, ½ oz.; *distilled water,* 1½ pint; boil to a pint, and strain.

2. (Ph. E.) *Tops of broom* and *juniper,* of each, ½ oz.; *cream of tartar,* 2½ dr.; *water,* 1½ pint; boil to a pint, as last. The above are diuretic and laxative. *Dose.* ½ to 1 wine-glassful 3 or 4 times a day; in dropsy, especially of the belly (*ascites*).

DECOCTION (Burdock). Syn. *Decoction Arctii, D. Bardanæ,*—Lat. *Prep.* 1. *Bardana root,* 6 oz.; *water,* 5 pints; boil to 3 pints, and strain.

2. (Wood.) *Dried roots,* 2 oz.; *water,* 3 pints; boil to 2 pints, and strain. As an alterative; a pint, or more, daily, in all those cases in which sarsaparilla is recommended.

DECOCTION (Cabbage-tree Bark). *Decoctum Geoffroyæ,*—Ph. E. 1817. *D. Geoffroyæ Inermis,*—Ph. D. 1826. *Prep.* (Ph. D.) *Bark of the cabbage tree,* (bruised,) 1 oz.; *water,* 1 quart; boil to a pint and strain. Cathartic, narcotic, and anthelmintic. *Dose.* 2 to 4 tablespoonfuls, for an adult; 1 to 2 teaspoonfuls, for a child, followed by demulcents and castor oil; in worms, &c.

DECOCTION (Calumba,—Compound). Syn. *Decoctum Calumbæ Compositum,*—Lat. *Prep.* (Ph. U. S. 1831.) *Calumba* and *quassia,* of each, 2 dr.; *orange peel,* 1 dr.; *rhubarb,* 20 gr.; *carbonate of potassa,* 30 gr.; *water,* 20 fl. oz.; boil to 16 fl. oz., strain, and when cold, add of *compound tincture of lavender,* ½ fl. oz. Bitter, tonic, and stomachic. *Dose.* 1 to 2 tablespoonfuls 3 or 4 times daily.

DECOCTION (Ceylon Moss). Syn. *Decoctum Fuci Amylacei, D. Plocariæ Candidæ,*—Lat. *Prep.* From *Ceylon moss,* 2 dr.; *water, milk,* or *whey,* 1 pint; boil to 16 fl. oz., and strain. It may be sweetened and flavoured. In irritation of the mucous membranes and in phthisis.

DECOCTION (Chamomile). Syn. *Decoctum Anthemidis, D. Chamæmeli,*—Lat. From *chamomiles,* 1 oz.; *boiling water,* 1 pint; digest for 10 minutes, simmer gently for 2 or 3 minutes longer, and strain with pressure.

DECOCTION (Chamomile,—Compound). Syn. *Decoctum Chamæmeli Compositum,*—Lat. *Prep.* (Ph. D. 1826.) *Chamomile flowers,* (dried,) ½ oz.; *fennel seed,* 2 dr.; *water,* 16 oz.; boil a short time and strain. Both the above are bitter, stomachic, and tonic; the last is vermifuge. They are chiefly used as fomentations and clysters.

DECOCTION (Chiretta). Syn. *Decoctum Chiraytæ,*—Lat. *Prep.* From *chiretta* or *chyrata,* 5 dr.; *water,* 1 pint; boil 8 or 10 minutes and strain. *Dose.* ½ to 1 wine-glassful, 2 or 3 times daily, as a stomachic tonic; in flatulency and acidity, especially in the dyspepsia of gouty patients.

DECOCTION (Cinchona). See *Decoction of Bark.*

DECOCTION (Colocynth). Syn. *Decoctum Colocynthidis,*—Lat. *Prep.* (Ph. Bat.) *Colocynth pulp,* 1 dr.; *water,* 8 oz.; boil 10 minutes, and when *quite cold,* add of *syrup of orange peel,* 1 oz., *sulphuric ether,* 1 dr. *Dose.* 2 to 6 dr., 2 or 3 times a day; in dropsy, &c.

DECOCTION (Coltsfoot). Syn. *Decoctum Tussilaginis,*—Lat. *Prep.* (Pereira.) *Fresh leaves of coltsfoot,* 2 oz.; (or, *flowers,* 1 oz.;) *water,* 2 pints; boil to a pint and strain. A popular remedy in chronic coughs and chest diseases. It is emollient and demulcent. *Dose.* ½ a teacupful, ad libitum.

DECOCTION (Coltsfoot,—Compound). Syn. *Decoctum Tussilaginis Compositum,*—Lat. *Prep.* (Taddei.) *Coltsfoot flowers,* 6 oz.; *figs, raisins,* and *jujubes,* of each, 2 oz.; *water,* 12 pints; boil down to 4 pints, add *liquorice root,* 2 oz.; again boil, and strain. As the last.

DECOCTION (Common). See *Decoction of Mallows.*

DECOCTION (Corsican Moss). Syn. *Decoctum Helminthocorti,*—Lat. *Prep.* From the *moss,* 5 dr.; *water,* 1½ pint; boil to a pint. *Dose.* A wine-glassful, three times a day; as a vermifuge. In 1822, Mr. Farr brought it forward as a remedy for cancer.

DECOCTION (Cotton Root). Syn. *Decoctum Gossypii,*—Lat. *Prep.* (Dr. Bouchelle.) *Inner part of the root of the cotton plant,* 4 oz.; *water,* 1 quart; boil to a pint. *Dose.* A wine-glassful, occasionally, as an emmenagogue; or, every 30 or 40 minutes, to produce uterine contractions, for which purpose it is said to be as effectual as ergot of rye.

DECOCTION (Dandelion). Syn. *Decoctum Taraxaci,*—Ph. L. & E. *Prep.* 1. (Ph. L.) *Fresh dandelion root,* (bruised,) 4 oz.; *water,* 1½ pint; boil to a pint, and strain.

2. (Ph. E.) *Herb* and *root,* (fresh,) 7 oz.; *water,* 1 quart; boil to a pint. Aperient, stomachic, and tonic. *Dose.* 1 to 2 fl. oz., or more, 2 or 3 times daily.

DECOCTION (Diaphoretic). Syn. *Decoctum Diaphoreticum,*—Lat. *Decoction of bark,* 1 pint; *liquor of acetate of ammonia,* 4 oz.; *aromatic confection,* 1 oz. *Dose.* 2 or 3 table-spoonfuls every 3 hours.

DECOCTION (Dog-grass). Syn. *Decoctum Graminis,*—Lat. *Ptisane Chiendent,*—Fr. *Prep.* From *dog-grass root* (triticum repens), 1 oz.; *liquorice root,* ½ oz.; *water,* 1 quart; boil 20 minutes and strain. Aperient and pectoral; by cupfuls ad libitum.

DECOCTION (Dog-grass,—Ioduretted). Syn. *Decoctum Graminis Ioduretum,*—Lat. *Prep.* (Magendie.) *Decoction of dog-grass,* 32 fl. oz.; *syrup of peppermint,* 2 oz.; *iodide of potassium,* ½ dr.; mix. By cupfuls, ad libitum.

DECOCTION (Dog-wood). Syn. *Decoctum Cornus Floridæ,*—Lat. *Prep.* (Ph. U. S.) *Dog-wood bark* (bruised), 1 oz.; *water,* 1 pint; boil 10 minutes, and strain whilst hot. Tonic and astringent; recommended as a substitute for bark. *Dose.* A wine-glassful.

DECOCTION (Dulcamara). Syn. *Decoction of Bitter Sweet, D. of Woody Nightshade; Decoctum Dulcamaræ,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Woody nightshade* or *bitter sweet* (the new shoots), 10 dr.; *water,* 1½ pint; boil to a pint, and strain.

2. (Ph. E.) *Dulcamara* (chopped small), 1 oz.; *water,* 24 fl. oz.; boil to a pint and strain.

3. (Ph. D.) *Twigs of woody nightshade,* 1 *oz.; water,* 1 pint; boil 10 minutes in a covered vessel, and strain. It should measure about 16 *fl. oz.* Alterative, diaphoretic, and diuretic. *Dose.* A wine-glassful, or more, 2 or 3 times a day; in chronic coughs and chronic skin diseases, and in most of those cases wherein sarsaparilla proves useful.

DECOCTION (Dulcamara,—Compound). Syn. *Decoctum Dulcamaræ Compositum,*—Lat. *Prep.* 1. (Augustin.) *Dulcamara* (bitter sweet), 4 dr.; *burdock root, liquorice root, sassafras chips,* and *guaiacum wood,* of each, 2 dr.; *water,* 2 ℔; boil to 16 fl. oz., and strain. *Dose.* 1 to 2 wine-glassfuls, 2 or 3 times a day.

2. (Foy.) As the last, but using *dulcamara,* 2 oz. *Dose.* ½ to 1 wine-glassful; in similar cases to those in which the simple decoction is given; especially in chronic rheumatism and venereal affections.

DECOCTION (Elder Bark). Syn. *Decoctum Sambuci, D. S. Corticis,*—Lat. *Prep.* 1. (Sydenham.) *Inner bark of elder,* 1 oz.; *water* and *milk,* of each, 1 pint; boil to one half, and strain.

2. (Collier.) *Bark,* 1 oz.; *water,* 16 fl. oz.; boil to ½ pint, and strain.

3. (Pereira.) *Bark,* 1 oz.; *water,* 1 quart; boil to one half. *Dose.* One wine-glassful 2 or 3 times a day; as an aperient and resolvent in various chronic disorders, in dropsy, and in certain cutaneous affections; or, 2 wine-glassfuls, as before, as a hydragogue cathartic in dropsies.

DECOCTION (Elecampane). Syn. *Decoctum Helenii, D. Inulæ,*—Lat. *Prep.* (Ph. U. S.) *Elecampane root,* ½ oz.; *water,* 1 pint; boil a few minutes, and strain. Tonic and expectorant, and, in some cases diuretic and diaphoretic. *Dose.* A wine-glassful, every hour or two.

DECOCTION (Elecampane, — Compound). Syn. *Decoctum Helenii Compositum, D. Inulæ C.,*—Lat. *Prep.* (Rotier.) *Elecampane,* 1 oz.; *hyssop* and *ground ivy,* of each, 2 dr.; *water,* 1 pint; boil 15 minutes, strain, and add of *honey,* 2 oz. *Dose.* 1 to 3 table-spoonfuls; as the last.

DECOCTION (Elm Bark). Syn. *Decoctum Ulmi,*—Ph. L. & D. *Prep.* (Ph. L.) *Fresh inner elm-bark* (bruised), 2½ oz.; *distilled water,* 1 quart; boil to a pint, and strain. *Dose.* 1 to 3 wine-glassfuls, three or four times a day, as a cheap substitute for sarsaparilla in scaly skin diseases.

DECOCTION (Elm Bark,—Compound). Syn. *Decoctum Ulmi Compositum,*—Lat. *Prep.* (Jeffrey.) *Simple decoction of elm bark,* 8 pints; *liquorice root, sassafras,* and *guaiacum chips,* of each, 1 oz.; *mezereon root,* 3 dr.; boil for one hour, and strain. More active than the last.

DECOCTION (Ergot). Syn. *Decoctum Ergotæ, D. Secalis Cornuti,*—Lat. *Prep.* (Pereira.) *Ergot of rye* (bruised), 1 dr.; *water,* 6 fl. oz.; boil 10 minutes, and strain. *Dose.* One third at intervals of half an hour, until the whole is taken; as a parturifacient.

DECOCTION (Fern Root). Syn. *Decoctum Filicis, D. Radicis F.,*—Lat. *Prep.* (Dr. Wood.) *Dried fern-root,* 1 oz.; *water,* 1 pint; boil to 16 fl. oz., and strain. By wine-glassfuls, fasting, until it excites slight nausea; as a vermifuge, more particularly for tapeworm.

DECOCTION (Figs). Syn. *Decoctum Fici*,—Lat. *Prep.* (Cadet.) *Figs* (chopped), 1 oz.; *water*, 1 pint; boil, and strain. Demulcent and pectoral; taken ad libitum.

DECOCTION (Figs,—Compound). Syn. *Decoctum Fici Compositum*,—Lat. *Prep.* (Foy.) *Figs* and *raisins* (chopped), of each, 2 oz.; *liquorice root*, ½ oz.; *boiling water*, 1 quart; boil 15 minutes, and strain. As the last.

DECOCTION (for Enemas). Syn. *Decoctum pro Enemate*,—Lat. *Barley water* or *thin gruel*, is commonly used under this name. See *Decoction of Mallows, &c.*

DECOCTION (for Fomentations). Syn. *Decoctum pro Fomento*,—Lat. *Prep.* (Ph. L. 1788.) *Dried leaves of southernwood, tops of sea wormwood*, and *chamomile flowers*, of each, 1 oz.; *laurel* or *bay leaves* (dried), ½ oz.; *water*, boil a few minutes, and strain.

DECOCTION (Galls). Syn. *Decoctum* Gallæ,—Ph. L. *Prep.* From *galls* (bruised), 2½ oz.; *water*, 1 quart; boiled to one half, and strained. As an astringent, fomentation, enema, or injection, in prolapsus ani, piles, and leucorrhœa.

DECOCTION (Guaiacum). Syn. *Decoctum Guaiaci*,—Ph. E. *D. G. Compositum*,—Ph. D. 1826. *D. Lignorum, D. of the woods*,—Obs. *Prep.* (Ph. E.) *Guaiacum shavings*, 3 oz.; *raisins* (chopped), 2 oz.; *water*, 8 pints; simmer down to 5 pints; adding towards the end, *sassafras* (rasped or sliced), and *liquorice root* (bruised), of each, 1 oz.

2. (Ph. D.) *Guaiacum wood*, 3 oz.; *sassafras*, 10 dr.; *liquorice root*, 2½ oz.; *water*, 10 pints; as the last; to strain 5 pints.

Obs. The above form the once celebrated "*Decoction of the Woods.*" *Dose.* A teacupful, 3 or 4 times daily, or oftener, in chronic rheumatism, cutaneous diseases, after a course of mercury, &c. Although its virtues are of a very dubious kind, there is no doubt that it frequently does good, especially when persevered in with a sudorific regimen.

DECOCTION (Hartshorn). See *Mixtures.*

DECOCTION (Hellebore).—1. *Decoction of Black Hellebore; Decoctum Hellebori Nigri*,—Lat. *Prep.* (A. T. Thomson.) *Black hellebore root*, 2 dr.; *water*, 1 pint; boil 15 minutes. *Dose.* 1 fl. oz., every 4 hours; in dropsy, worms, chronic skin diseases, &c., occurring in non-irritable habits.

2. *Decoction of White Hellebore; Decoctum Veratri*,—Ph. L. & D. *Prep.* (Ph. L. 1836.) *White hellebore* (bruised), 10 dr.; *water*, 1 quart; boil to a pint, and when cold, add of *rectified spirit*, 3 fl. oz. *Used* as a lotion in itch, lepra, psoriasis, scald-head, &c.; and to destroy pediculi. In most cases it should be diluted with water, and should never be applied to the unsound skin.

DECOCTION (Horehound). Syn. *Compound Decoction of Horehound; Decoctum Marubii Compositum*,—Lat. *Prep.* (Dr. R. E. Griffith.) *Dried horehound* (marrubium vulgare), 1 oz.; *liquorice root* and *flax seed* (bruised), of each, ½ oz.; *boiling water*, 1½ pint; macerate for 3 or 4 hours, (boil a minute,) and strain. An excellent demulcent and pectoral. *Dose.* 1 to 2 fl. oz., as required, in coughs, &c.

DECOCTION (Hairy Horehound). Syn. *Decoctum Ballotæ Lanatæ*,—Lat. *Prep.* (Rehmann.) *Siberian or woolly horehound* (ballota), 1½ oz.; *water*, 1 quart; boil to one-half. *Dose.* A tumblerful, or more, twice a day; in rheumatic, gouty, and dropsical affections, especially the latter.

DECOCTION (Horse-chestnut Bark). Syn. *Decoctum Hippocastanei*, — Lat. *Prep.* (Dr. Wood.) *Horse-chestnut bark* (coarsely powdered), 10 dr.; *water*, 1 pint; boil 10 minutes and strain. *Used* for decoction of cinchona bark. A little liquorice root is frequently added.

DECOCTION (Horse-Chestnut Bark,—Compound). Syn. *Decoctum Hippocastanei Compositum*,—Lat. *Prep.* 1. (Phœbus.) *Horse-chestnut bark*, 1½ oz.; *water*, 18 fl. oz,; boil to one half, strain, and when *quite cold*, add of *sulphuric ether*, 1 to 2 dr.; *syrup of orange peel*, 1 oz. To be used during the intermission of an ague, in wine-glassfuls at a time.

2. (Spielman.) *Horse-chestnut bark* and *willow bark*, of each, ½ oz.; *calamus aromaticus* and *root of water avens*, of each, 2 dr.; *water*, 16 fl. oz.; boil to one half. As the last.

DECOCTION (Iceland Moss). Syn. *Decoction of Liverwort; Decoctum Cetrariæ*,—Ph. L. *D. Lichenis Islandici*,—Ph. D. *D. Lichenis*,—Ph. L. 1824. *Prep.* 1. (Ph. L.) *Liverwort* (Iceland moss), 5 dr.; *water*, 1½ pint; boil to a pint, and strain.

2. (Ph. D.) *Iceland moss*, 1 *oz.; water*, 1½ pint; boil for 10 minutes in a covered vessel, and strain. Nutritious, demulcent, pectoral, and tonic. *Dose.* 1 to 4 fl. oz., every 3 or 4 hours; in chronic affections

of the chest and stomach, especially pulmonary consumption, old coughs, dyspepsia, chronic diarrhœa, and dysentery. It may be flavoured and sweetened; milk is frequently added to it. The bitter matter may be removed by steeping the moss for some time in pretty warm water, or in cold water to which a *very little* carbonate of potash has been added. Without this is done, it is intensely bitter and nauseous.

DECOCTION (Indian Bael). Syn. *Decoction of Ægle Marmelos; Decoctum Bael.* From the *dried unripe fruit of ægle marmelos* (Indian bael), 2 oz.; *water,* 1 pint; boil to one third, and strain. *Dose.* 2 fl. oz. two or three times a day; in dysentery, diarrhœa, and English cholera.

DECOCTION (Indian Pink). Syn. *Decoctum Spigeliæ,*—Lat. *Prep. Indian pink root,* 5 dr.; *water,* 1 pint; boil 5 minutes, add *senna,* 4 dr.; digest 15 minutes, strain, and add of *manna,* 1 oz. *Dose.* A small teacupful, 3 times a day, for an adult; ½ oz. to 1 oz., or less, for children; as an anthelmintic purge.

DECOCTION (Indian Sarsaparilla). Syn. *Decoctum Hemedesmi,*—Lat. *Prep.* (Pereira.) *Root of Indian sarsaparilla* (hemedesmus Indicus), 2 oz.; *water,* 1½ pint; boil to a pint. Diuretic, alterative, and tonic. *Dose.* By wine-glassfuls, as decoction of sarsaparilla.

DECOCTION (Irish Moss). Syn. *Decoctum Chondri. Prep.* (Pereira.) *Carrageen* or *Irish moss,* 1 oz.; macerate in lukewarm water for 10 minutes, take it out and drain it, and then boil it in *water,* (or *milk,*) 3 pints, for 15 minutes, and strain through linen.

Obs. If twice the above weight of moss is employed, a mucilage (*mucilago chondri*) is produced, which may be flavoured with lemon juice, spices, &c., and forms a most nutritious article of spoon diet. It is taken in the same cases as *decoction of Iceland moss;* and is frequently employed in cookery, as a substitute for animal jelly, in the preparation of blancmanges, soups, &c.

DECOCTION (Isinglass). See *Lisbon Diet Drink.*

DECOCTION (Juniper Berries,—Compound). Syn. *Decoctum Juniperi Compositum,*—Lat. *Prep.* (St. B. Hosp.) *Juniper berries,* 2 oz.; *cream of tartar,* 3 dr.; *water,* 4 pints; boil to a quart, strain, and add *compound spirit of juniper,* 2 fl. oz. Diuretic. *Dose.* 2 or 3 wine-glassfuls, 3 times a day, warm.

DECOCTION (Linseed,—Compound). Syn. *Decoctum Lini Compositum,*—Ph. D *Prep.* (Ph. D.) *Linseed,* 1 oz.; *liquorice root,* (bruised,) ½ oz.; *water,* 1½ pint; boil for 10 minutes in a covered vessel, and strain whilst hot. Emollient and demulcent. *Dose.* A wine-glassful ad libitum; in gonorrhœa, dysentery, pulmonary affections, &c. It may be flavoured with lemon peel, and sweetened. See *Infusions.*

DECOCTION (Liquorice). Syn. *Decoctum Glycyrrhizæ,*—Lat. *Prep.* (Ph. D. 1826.) *Liquorice root,* (sliced,) 1½ oz.; *water,* 16 fl. oz.; boil 10 minutes and strain. A mild demulcent; it is taken either alone, by wine-glassfuls, or is used as a vehicle for more active remedies.

DECOCTION (Lisbon). See *Lisbon Diet Drink.*

DECOCTION (Liverwort). See *Decoction of Iceland Moss.*

DECOCTION (Logwood). Syn. *Decoctum Hæmatoxyli,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Logwood chips,* 10 dr.; *water,* 1½ pint; boil to a pint, and strain.

2. (Ph. E.) *Logwood,* 1 oz.; *water,* 1 pint; boil to 10 fl. oz., adding towards the last, *cinnamon,* (in powder,) 1 dr.

3. (Ph. D.) *Logwood,* 1 *oz.; water,* ½ pint. Astringent and tonic. *Dose.* 1 table-spoonful to a wine-glassful; in diarrhœa, as required.

DECOCTION (Madder). Syn. *Decoctum Rubiæ, D. R. Tinctoriæ,*—Lat. *Prep.* 1. (Dewees.) *Powdered madder,* 1 oz.; *boiling water,* 1 pint; simmer for 15 minutes, and add of *cloves,* (bruised,) 1 dr.; when cold, strain. *Dose.* A wine-glassful, 2 or 3 times daily; in amenorrhœa, chlorosis, &c.; or every 3 hours, a short time previous to the expected menstrual discharge.

2. (W. Cooley.) To the last add *ammonio-citrate of iron,* 3 dr.

3. (St. Marie.) *Powdered madder,* ½ oz.; *hops,* 1 dr.; *English walnut leaves,* 3 dr.; *water,* 1 quart; boil to 1½ pint, strain, and when cold, add of *tincture of tartrate of iron,* 1 dr. *Dose.* 2 fl. oz., night and morning; in scrofula, &c.

DECOCTION (Mallows). Syn. *Common Decoction; Decoctum Commune; D. pro Enemate,*—Ph. L. 1787. *D. Malvæ Compositum,* Ph. L. 1836. *Prep.* (Ph. L. 1836.) *Common mallows,* (dried,) 1 oz.; *chamomile flowers,* (dried,) ½ oz.; *water,* 1 pint; boil 15 minutes, and strain. *Used* chiefly for fomentations and enemas.

DECOCTION (Malt). Syn. *Decoctum Binæ, D. Bynes, D. Malti,*—Lat. *Prep.* (Swediaur.) *Ground malt,* 3 oz.; *water,* 1 quart; boil to a pint, and strain. An oz. of *syrup of lemons,* or of *saffron,* may be added to the cold decoction; or, a little *liquorice root*, with the malt. Demulcent and laxative. A cupful ad libitum. *Infusion of malt* (*sweet wort*) is a more convenient and elegant preparation.

DECOCTION (Marshmallow). Syn. *Decoctum Althææ,*—Ph. D. 1826 & Ph. E. 1813.) *Prep.* (Ph. D. 1826.) *Dried root* and *herb of marshmallow,* 4 oz.; *raisins,* (stoned,) 2 oz.; *water,* 7 pints, (wine measure); boil down to 5 pints, strain, allow it to deposit the sediment, and decant the clear liquid. Demulcent. *Dose.* A cupful ad libitum, in coughs, colds, calculous affections, and other diseases of the urinary organs. See *Mixtures.*

DECOCTION (Matico). Syn. *Decoctum Maticonis,*—Lat. *Prep.* (Dr. Jeffreys.) *Matico leaves,* 1 oz.; *water,* 1 pint; boil 12 minutes and strain. Astringent. *Dose.* 1 fl. oz., 2 or 3 times a day; in hemorrhagic and other discharges.

DECOCTION (Mercurial). Syn. *Decoctum Hydrargyri, D. Mercuriale,*—Lat. *Prep.* 1. *Quicksilver,* 4 oz.; *water,* 1 pint; boil in a glass or earthen vessel for an hour, adding water to replace that lost by evaporation. *Dose.* A teacupful.

2. *Mercurial pill,* 1 oz.; *water,* 1 quart; boil to a pint. *Dose.* A wine-glassful. Both were formerly taken for worms and the itch.

3. *Corrosive sublimate,* 1 gr.; (dissolved in) *spirit of wine,* 30 drops; *extract of sarsaparilla,* 3 dr.; *decoction of sarsaparilla,* 8 fl. oz.: mix. *Dose.* One large tablespoonful, 3 times a day; in syphilis, and obstinate skin diseases.

DECOCTION (Mezereon). Syn. *Decoction Mezerei,*—Ph. E. & Ph. D. 1826. *Prep.* (Ph. E.) *Root-bark of mezereon,* 2 dr.; *liquorice root,* 4 dr.; *water,* 1 quart; simmer to 1½ pint, and strain. Stimulant and sudorific. *Dose.* A wine-glassful, or more, three or four times a day; in chronic rheumatism, scrofula, secondary syphilis, lepra, and some other cutaneous affections. Much boiling injures the virtues of mezereon.

DECOCTION (Mezereon,—Compound). Syn. *Decoctum Mezerei Compositum,*—Lat. *Prep.* (Van Mons.) *Mezereon,* 2 dr.; *bitter sweet,* 4 dr.; *burdock,* 2 oz.; *water,* 2 quarts; boil to 3 pints, add of *liquorice root,* 2 dr., and strain. As the last, and in obstinate diseases of the skin.

DECOCTION (Narcotic). Syn. *Decoctum Anodynum, D. Narcoticum,* — Lat. *Prep.* (Hosp. Form.) *Common nightshade* (solanum nigrum), dried, 1 oz.; *poppy heads,* 3 in no.; *water,* 1 pint; boil 10 minutes, and strain. As an anodyne fomentation, used warm.

DECOCTION (Nitre). Syn. *Decoctum Nitrosum, D. Nitratum, D. Potassæ Nitratis,*—Lat. *Prep.* 1. *Nitre,* ½ oz.; *white sugar,* 2 oz.; *cochineal,* 20 gr.; *water,* 1½ pint; boil a few minutes and strain.

2. (Hosp. Form.) *Barley water,* 1 pint; *nitre,* 5 dr.; dissolve. Diuretic, diaphoretic, and refrigerant. A wine-glassful, frequently; in gonorrhœa, sore throat, acute rheumatism, scurvy, &c.

DECOCTION (Oak Bark). Syn. *Decoctum Quercûs,*—Ph. L. E. and D. *Prep.* 1. (Ph. L. & E.) *Oak bark* (bruised), 10 dr.; *water,* 1 quart; boil down to a pint, and strain.

2. (Ph. D.) *Oak bark,* 1½ *oz.; water,* 1½ pint; boil 10 minutes, and strain. Astringent. *Used* as a gargle in ulcerated sore throat, relaxation of the uvula, &c.; and as a wash, and an injection in piles, leucorrhœa, hemorrhages, prolapsus ani, &c.

DECOCTION (Oats). Syn. *Water Gruel; Decoctum Avenæ,*—Lat. *Prep.* 1. (Cullen.) *Oatmeal,* 1 oz.; *water,* 3 quarts; boil to a quart, strain, and when cold, decant the clear liquid from the sediment.

2. (A. T. Thomson.) *Washed groats,* 4 oz.; *water,* 4 pints; boil to a quart. Nutritious and demulcent. Taken ad libitum, to promote the action of purgatives, and as an enema, either alone, or as a vehicle for more active substances. It is too thin for food. See *Gruel.*

DECOCTION (Pareira). Syn. *Decoctum Pareiræ,*—Ph. L. *Prep.* 1. (Ph. L.) *Pareira brava root* (sliced), 10 dr.; *water,* 1½ pint; boil to a pint, and strain.

2. (Sir B. Brodie.) *Pareira,* 4 dr.; *water,* 3 pints; boil to a pint, as last. The above are given in gonorrhœa, leucorrhœa, and chronic inflammation of the bladder. *Dose.* Of the *first,* ½ to 1 wine-glassful, 3 or 4 times a day; of the *second,* about twice that quantity, or more. It is commonly combined with some tincture of hyoscyamus; and when the triple phosphates are present in the urine, dilute hydrochloric or nitric acid may be added. See *Pareira.*

DECOCTION (Pectoral). See *Decoction of Barley.*

DECOCTION (Pellitory). *Decoctum Pyrethri,* — Lat. *Prep.* (Guy's Hosp.) *Pellitory root,* 1 oz.; *water,* 1½ pint; boil to a pint, and strain. *Used* as a gastric stimulant, and as a gargle in relaxation of the uvula.

DECOCTION (Pomegranate). Syn. *Decoctum Granati,*—Ph. L. *Prep.* (Ph. L.)

Pomegranate rind (fruit-bark), 2 oz.; *distilled water*, 1½ pint; boil to a pint, and strain. Astringent. *Used* as a gargle and injection, in sore throat, leucorrhœa, &c.; and *internally*, in diarrhœa, dysentery, &c. *Dose.* 1 fl. oz., or more.

DECOCTION (Pomegranate Root). Syn. *Decoctum Granati Radicis,*—Ph. L. *Prep.* 1. (Ph. L.) *Root-bark of pomegranate* (sliced), 2 oz.; *water*, 1 quart; boil to a pint, and strain.

2. (Collier.) *Bark of the root*, 2 oz.; *water*, 1 pint; boil to one half. This is the common form used in India.

Dose, &c. A wine-glassful, half-hourly, until the whole is taken, a light diet and a dose of castor oil having been taken the day previously. In tape-worm, Dr. Collier recommends the whole of the *last* preparation to be given at 2 doses, at the interval of 2 hours. It purges, and in 5 or 6 hours frequently expels the worm; if this does not take place, it should be persevered in. "Look for the head of the tænia (tape-worm); for if that is not expelled, you have done nothing." (Collier.) *Oil of turpentine* and *kousso* are now more frequently given in tænia in this country.

DECOCTION (Poppies). Syn. *Decoction of Poppy-heads, Fomentation of do.; Decoctum Papaveris,* — Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Poppy-heads* (bruised), 4 oz.; *water*, 2 quarts; boil for 15 minutes, and strain.

2. (Ph. E. & D.) As the last, but using only 3 *pints of water*. *Used* as an emollient fomentation, in painful swellings, excoriations, &c. The addition of a ¼ pint of vinegar, is said to promote its efficacy.

DECOCTION (Quassia). Syn. *Decoctum Quassiæ,*—Lat. *Prep.* From *quassia chips* (small), 1 dr.; *water*, 1¼ pint; boil to a pint, and add *syrup of orange peel*, 2 oz. *Dose.* A wine-glassful, occasionally, as a stomachic tonic. See *Infusions.*

DECOCTION (Quince). Syn. *Decoction of Quince Seed, Mucilage of do.; Decoctum Cydonii,*—Ph. L. *Prep.* From *quince seeds*, 2 dr.; *water*, 1 pint; boil 10 minutes, and strain. *Used* as an emollient and sheathing application to abraded or wounded surfaces, as cracked lips, nipples, &c.; and to the skin in erysipelas, to painful hemorrhoidal tumours, and the like. Prepared with a little less water, it is used by the hairdresser as "*bandoline*" or "*fixateur.*"

DECOCTION (Rice). Syn. *Rice Water, Rice Drink; Decoctum Oryzæ. Prep. Rice*, 2 oz.; *water*, 1 quart; boil to one half, and strain. Demulcent. A good drink in fevers, coughs, &c., either alone, or sweetened and flavoured with a little lemon peel.

DECOCTION (Sarsaparilla). Syn. *Decoctum Sarzæ,*—Ph. L. & E. *D. Sarsaparillæ,*—Ph. D. *Prep.* 1. (Ph. L.) *Sarsaparilla* (sliced), 5 oz.; *water*, 2 quarts; boil to a quart, and strain.

2. (Ph. E.) *Sarsaparilla*, 5 oz.; *boiling distilled water*, 4 pints; macerate for 2 hours, in a vessel lightly covered, and placed in a warm situation; then take out the root, bruise it, return it again to the liquor, boil down to a quart, and strain.

3. (Ph. D.) *Sarsaparilla*, 2 oz.; *boiling water*, 1½ pint; digest an hour, boil 10 minutes, cool, and strain.

Obs. The medicinal virtues of sarsaparilla root reside wholly in the bark, or cortical portion, it is therefore quite unnecessary to bruise it, as directed in the Ph. E. By those houses which do largely in decoction of sarsaparilla, the root is seldom split or cut; the bundles in which it is made up being simply untied and spread open, to allow of the free exposure of every part to the solvent action of the water. By this plan, the whole of the soluble portion of the bark is extracted, whilst the feculent matter that pervades the wood is only partially dissolved out. According to Soubeiran, a mere infusion is preferable. The *Dose* is a teacupful to half a pint, 3 or 4 times a day.

An *extemporaneous decoction of sarsaparilla* is made by dissolving ¾ oz. of the *simple extract* in 1 pint of *hot water.* See *Sarsaparilla.*

DECOCTION (Sarsaparilla, — Concentrated). Syn. *Decoctum Sarzæ Concentratum,*—Lat. *Prep.* 1. (Wholesale.) *Sarsaparilla* (Jamaica), 10½ *lb.*, are placed in a large and well-cleaned copper boiler, and enough *boiling water* added to cover it; it is then left to macerate, *without boiling*, for 3 or 4 hours, after which it is boiled for about an hour, and the clear liquor drawn off into *another clean copper pan;* the root (after it has well drained) is then washed or "sparged" with boiling water, until the latter runs off scarcely coloured, (see *Scotch Ale;*) the washings are added to the decoction, and the whole evaporated as quickly as possible to 6½ pints; it is then set to cool, and *rectified spirit of wine*, 1½ pint, further added; after agitation, the whole is set aside in a well-corked bottle, in a cool place for a week. In a few days it is usually found as clear and brilliant as brandy, with very little sediment, and will keep for any length of time uninjured. Some manufacturers, instead of washing the root, give it a second and third water, boiling it each time, and evaporating the mixed liquors.

2. (Extemporaneous.) *Extract of sarsaparilla*, 6½ *oz.; water*, 12 fl. oz.; dissolve, add *rectified spirit*, 2½ fl. oz., and *water*, q. s. to make the whole exactly measure a pint.

Obs. 1 drachm of this decoction, mixed with 7 drachms of water, forms a similar preparation to the *decoctum sarzæ* of the Ph. L., and is now very frequently substituted for it in dispensing. See *Sarsaparilla* and *Extracts*, (and *below.*)

DECOCTION (Sarsaparilla, — Compound). Syn. *Decoctum Sarzæ Compositum*, — Ph. L. & E. *D. Sarsaparillæ Comp.*,—Ph. D. *Lisbon Diet Drink*, *Compound Decoction of Sarsaparilla and the Woods*, *Decoctum Lusitanicum*, — Obs. *Prep.* 1. (Ph. L.) *Decoction of sarsaparilla* (boiling), 4 pints; *sassafras chips*, *guaiacum wood* (rasped), and *fresh liquorice root* (bruised), of each, 10 dr.; *mezereon* (root-bark), 3 dr.; boil for 15 minutes, and strain.

2. (Ph. E.) As the last, but using 4 dr. of *mezereon.*

3. (Ph. D.) *Sarsaparilla* (sliced), 2 *oz.; sassafras*, *guaiacum turnings*, and *liquorice root* (bruised), of each, 2 dr.; *mezereon root-bark*, 1 dr.; *boiling water*, 1½ pint; digest for an hour, then boil for 10 minutes, cool, and strain.

4. (Extemporaneous.) *Compound extract of sarsaparilla*, 7½ dr.; *boiling water*, 1 pint; dissolve.

Obs. This decoction is an imitation of the once justly celebrated "*Lisbon Diet Drink.*" It is alterative and diaphoretic. *Dose.* A teacupful, or more, 3 or 4 times a day, either along with, or after, a mercurial course; and in syphilis, scurvy, scrofula, chronic rheumatism, lepra, psoriasis, and several other skin diseases, and especially in cachexia, or general bad habit of body. During its use the skin should be kept warm. See *Sarsaparilla.*

DECOCTION (Sarsaparilla, — Concentrated Compound). Syn. *Decoctum Sarzæ Compositum Concentratum*, *D. Sarsaparillæ C. C.*,—Lat. There is a very considerable trade done in this article, in consequence of *compound decoction of sarsaparilla* being taken in large doses, both alone, and in combination with other remedies, and the pharmacopœial preparation, spoiling if kept longer than about 12 hours, in warm weather. Like the *concentrated simple decoction*, it is said to be of 8 *times the usual strength*, so that when mixed with 7 *times its weight of water*, it forms a similar preparation to the *decoctum sarzæ compositum*,—Ph. L.; for which it is very generally substituted in dispensing.

Prep. 1. (Wholesale.) *Sarsaparilla* (red Jamaica), 96 *lb.; mezereon root* (not *root-bark*), 9 *lb.; liquorice root* (bruised), 16 *lb.* The *mezereon* and *liquorice* are first laid (loosely) on the bottom of a clean copper pan, and the *bundles* of *sarsaparilla* (untied and loosened) packed over them, in horizontal layers, alternately at right angles with each other. Three or four boards, with as many iron ½ cwt. weights, are next placed on the top of the whole. Water is now run in, to about 10 inches higher than the ingredients, and heat is applied until ebullition commences. The materials are now allowed to macerate without boiling for 3 or 4 hours, after which the liquid is gently boiled for about an hour, care being taken to add fresh water from time to time, so as to keep the whole well covered. The decoction is next run off, and set evaporating as quickly as possible. The ingredients are then washed with successive portions of *boiling water*, by allowing it to descend from a species of shower-bath, after the manner of "sparging," described under "*Scotch ale.*" This is repeated until the water runs off nearly colourless, the smallest quantity being employed that will effect the object in view. The whole of the liquid is now evaporated without delay, until reduced to 8¼ gall., when, after cooling, 2 dr. of *essential oil of sassafras*, dissolved in 2 gall. of *rectified spirit of wine*, are added, and afterwards, 1 pint of *essence of guaiacum.* The liquid is then placed in a suitably sized barrel, set upon its head, and fitted with a small cock, (*not* placed *too* near the bottom,) and allowed to repose for a week, by which time it becomes clear and brilliant, and fit for sale. This is the form adopted by the large metropolitan drug-houses most celebrated for this preparation. The *product* that may be drawn off fit for sale, is *something over* 10 *gall.* The residuum, forming the "bottoms," consists chiefly of fecula. The latter is well stirred up with 3 or 4 gall. of *cold water*, and allowed to settle. The clear decanted "washings" are used as water or liquor in making the next batch of decoction.

2. (Extemporaneous.) *Compound extract of sarsaparilla*, 7½ *oz.; boiling water*, 12 *fl. oz.;* dissolve, then add of *rectified spirit of wine*, 2½ fl. oz.; mix well, and further add of *water*, q. s. to make the whole measure a pint.

Obs. To conduct this process successfully, several large copper pans are required; one of which (to boil the ingredients in) must be capable of containing from 140 to 150 gallons at the least, and the others must be sufficiently large to receive the liquors as they are drawn off. Those for the evaporation should be very shallow, in order that it may proceed rapidly; and the whole should be heated by steam. An excellent plan is, to employ large *wooden vats*, and to apply the heat by means of pipes laid along the bottom, and supplied with high-pressure steam. This method is less expensive than the use of double steam pans, as above. When essence of guaiacum is not used, 24 *lb.* of *guaiacum shavings*, from which the dust has been sifted, are boiled with the other ingredients, instead. Parties desirous of using the proportions of the ingredients ordered by the Colleges, may do so, by taking *eight times* the given quantities, and proceeding as above.

DECOCTION (Sarsaparilla, — Feltz'). Syn. *Ptisane de Feltz; Decoctum Sarzæ cum Ichthyocollâ*, — Lat. *Prep.* From *sarsaparilla* (sliced), 3 oz.; *isinglass* and *crude antimony* (in powder), of each, ½ oz.; *water*, 5 pints; boil to one half, and strain. See *Apozems*.

DECOCTION (Sarsaparilla, — Jauperand's). Syn. *Ptisane de Jauperand; Decoctum Sarzæ cum Radice Chinâ. Prep.* (Bories.) *Sarsaparilla* and *China root*, of each, 2 oz.; *senna* and *sassafras chips*, of each, 1 oz.; *rhubarb* and *Peruvian bark*, of each, ½ oz.; *carbonate of potassa*, 1 dr.; *water*, 2 gall.; simmer, gently, for several hours, and strain 12 pints; when cold decant the clear. *Dose.* 2 fl. oz., two or three times daily; in scrofula, &c.

DECOCTION (Sarsaparilla,—Dr. Townsend's). See *Sarsaparilla.*

DECOCTION (Sarsaparilla,—Vinache's). Syn. *Ptisane de Vinache; Decoctum Sarzæ cum Sennâ*,—Lat. *Prep.* (Foy.) *Sarsaparilla, China wood*, and *guaiacum wood*, of each, 1½ oz.; *crude antimony* (tied in a rag), 2 oz.; *water*, 6 pints; macerate for 12 hours (7 in hot weather), boil to one half, add *sassafras chips* and *senna*, of each, ½ oz., infuse 1 hour longer, and strain; when cold decant the clear. Recommended in scrofula, secondary syphilis, and various cutaneous affections.

DECOCTION (Sarsaparilla, — Zittmann's). Syn. *Ptisane de Zittmann; Decoctum Zittmanni. Prep.* 1. (*Stronger decoction; D. Z. Forte*,—Ph. Bor., 1847.) *Sarsaparilla*, 12 oz.; *water*, 72 ℔ (say, 5¾ gall.); digest 24 hours, then add (suspended in a bag), *white sugar* and *alum*, of each, 6 dr.; *calomel*, 4 dr.; *cinnabar*, 1 dr.; boil to 24 ℔, adding towards the end of the process, *senna*, 3 oz.; *liquorice root*, 1½ oz.; *aniseed* and *fennel seed*, of each, ½ oz.; finally strain, with pressure, and after some time decant the clean portion. The formula in the *Ph. Suec.* 1845, is similar; that in the *Hamburg Codex* directs only 24 ℔ of water to be used, and the whole to be reduced to 16 ℔.

2. (*Weaker decoction; D. Z. Tenue*,—Ph. Bor. 1847.) Add to the *residuum* (waste) *of the last preparation, sarsaparilla*, 6 oz.; *water*, 72 ℔ (say, 5¾ gall.); boil to 24℔; adding towards the end of the process, *lemon peel, cinnamon bark, liquorice root*, and *cardamoms*, (all bruised,) of each, 3 dr.; press, strain, &c., as before. In the Ph. Suec., 1845, double the above weights of lemon peel and liquorice root are ordered; and in the Hamburg Codex (1845), 24 ℔ of water only are ordered, and the whole is to be boiled down to 16 ℔.

Obs. Both the above are used in Germany and on the Continent generally, in the same cases as those in which *compound decoction of sarsaparilla* is administered in England. They may be drunk almost ad libitum. A *trace* of mercury may be detected in the stronger decoction, when properly prepared.

DECOCTION (Senega Root). Syn. *Decoction of American Snake Root, D. of Rattlesnake Root; Decoctum Polygalæ; D. Senegæ*, —Ph. L. *Prep.* (Ph. L.) *Senega* or *seneka root*, 10 dr.; *water*, 1 quart; boil to a pint, and strain. *Dose.* ½ to 2 wine-glassfuls, three or four times daily, in humoral asthma, chronic cough, dropsy, &c. It is stimulant, expectorant, and diuretic, and in large doses, emetic and cathartic. It is frequently conjoined with ammonia. It is the antidote employed by the Senegaro Indians against the bite of the rattlesnake. (Dr. Tennant.)

DECOCTION (Simaruba Bark). Syn. *Decoctum Simarubæ*,—Lat. *Prep.* (Dr. Wright.) *Simaruba bark*, 2 dr.; *water*, 24 fl. oz.; boil to one half, and strain. Tonic. *Dose.* 1 to 2 fl. oz.; in chronic dysentery and diarrhœa.

DECOCTION (Squills,—Compound). Syn. *Decoctum Scillæ Compositum*,—Lat. *Prep.* (Ph. U. S. 1841.) *Squills*, 3 dr.; *juniper berries*, 4 oz.; *snakeroot*, 3 oz.; *water*, 4 ℔; boil to one half, strain, and add of *sweet spirits of nitre*, 4 fl. oz. In chronic coughs and other chest affections, unaccompanied with active inflammatory symptoms. *Dose.* 1 to 3 fl. oz., twice or thrice daily.

DECOCTION (Starch). Syn. *Decoctum Amyli,*—Ph. L. *Mucilago Amyli,*—Ph. E. & D.; and Ph. L. 1824. *Prep.* (Ph. L. & E.) *Starch,* ½ oz.; add, gradually, *water,* 1 pint, and boil for a short time. The Dublin preparation is nearly twice as strong. *Used* as an enema in dysentery, diarrhœa, and excoriations of the rectum.

DECOCTION (Sudorific). Syn. *Decoctum Sudorificum,*—Lat. The old name of the *compound decoctions of sarsaparilla* and *guaiacum.*

DECOCTION (Suet). Syn. *Artificial Goat's Milk; Decoctum Sevi,*—Lat. *Prep. Suet,* 1 oz.; tie it loosely in a piece of muslin and simmer it in *cow's milk,* 1¼ pint; adding towards the last, *white sugar,* ½ oz. In scrofulous emaciation and phthisis; taken ad libitum.

DECOCTION (Tamarinds). Syn. *Decoctum Tamarindorum,*—Lat. *Prep. Tamarinds,* 1½ oz.; *water,* 1 pint; boil for 5 minutes, and strain. A pleasant drink in fevers, asthma, chronic coughs, &c.

DECOCTION (Tamarinds and Senna). Syn. *Dec. Tamarindorum cum Sennâ,*—P. E. 1744. *Prep. Tamarinds,* 6 dr.; *cream of tartar,* 2 dr.; *water,* 1½ pint; boil in a glazed earthen vessel until reduced to 16 oz.; then infuse therein for 12 hours, *senna,* 4 dr.; strain, and add of *syrup of violets,* 1 oz. A gentle aperient. *Dose.* A wine-glassful, or more.

DECOCTION (Tar). Syn. *Tar Water; Decoctum Picis liquidæ,*—Lat. *Prep. Tar,* 1 oz.; *water,* 1½ pint; boil to 1 pint. *Dose.* A pint, or more, daily; in chronic catarrh; and as a wash in chronic skin diseases, especially those of the head, in children.

DECOCTION (Tonic). Syn. *Strengthening Decoction; Decoction Roborans,*—Lat. *Prep.* 1. *Peruvian bark,* bruised, ½ oz.; *Virginian snakeroot,* 2 dr.; *water,* 1 pint; boil to one half, strain whilst hot, and add *spirit of cinnamon,* 1½ fl. oz.; *diluted sulphuric acid,* 1½ dr. *Dose.* 2 oz., two or three times a day.

2. *Decoction of bark,* 5 oz.; *tincture of bark,* 6 dr.; *aromatic confection,* ½ dr.; *sal volatile,* 1 dr. *Dose.* 1 or 2 table-spoonfuls night and morning; especially in diarrhœa.

DECOCTION (Tormentil). Syn. *Decoctum Tormentillæ,*—Ph. L. *Prep.* (Ph. L.) *Tormentil root,* (bruised,) 2 oz.; *water,* 1½ pint; boil to a pint, and strain. Astringent. *Dose.* 1 to 2 fl. oz., in chronic diarrhœa, &c.

DECOCTION (Turmeric). Syn. *Decoctum Curcumæ,*—Lat. *Prep.* From *turmeric root,* (in powder,) 1½ oz.; *water,* 1 pint; boil 5 minutes, and strain. A mild aromatic stimulant and stomachic. *Dose.* A wine-glassful, ad libitum. It is principally used as a test for alkalies, which turn it brown. Unsized paper dipped into it and dried, forms the *turmeric test-paper* of the chemist.

DECOCTION (Verbena). Syn. *Decoctum Verbenæ,*—Lat. From *verbena* (vervain), 2 oz.; *water,* 1½ pint; boil to 1 pint, and strain.

Obs. The *verbena officinalis* was formerly highly recommended by Etmuller, Hartman, De Haën, Morley, and others, in scrofula, cephalalgia, &c., but afterwards fell into neglect. More recently, a decoction of the plant has been highly extolled by Boshanov, and others, as an anti-febrile.

DECOCTION (Vulnerary). Syn. *Decoctum Vulnerarium,*—Lat. *Prep.* From *ground ivy* and *broad-leaved plantain,* of each, ½ oz.; *water,* 3 pints; boil to 1 quart, strain, and add *sugar,* 1 oz. A popular pectoral and tonic, especially in old coughs; also to heal wounds. *Dose.* ½ a tea-cupful or more, twice a day.

DECOCTION (Walnut Bark). Syn. *Decoctum Juglandis,*—Lat. *Prep.* (Ph. Gen.) *Green bark of walnuts,* 1 oz.; *water,* 1 pint; boil for 15 minutes, and strain. As an anti-syphilitic. Before the general introduction of sarsaparilla, it was much esteemed in most cases in which that drug is now taken. *Dose, &c.* The same as those of *comp. dec.* of *sarsaparilla.* Pearson says, that "when the putamen (green rind) of the walnut has been omitted, either intentionally or by accident (from *decoctum lusitanicum*), the same good effects have not followed its use, as when it contained this ingredient."

DECOCTION (Walnut Leaves). Syn. *Decoctum Juglandis Foliorum,*—Lat. *Prep.* (Negrier.) *Walnut leaves,* 1 handful; *water,* 1 quart; boil 15 minutes, and strain. Detersive, diaphoretic, and alterative. *Dose, &c.* As the last, especially in chronic rheumatism, secondary syphilis, &c.

DECOCTION (Waterdock). Syn. *Decoctum Rumicis, D. R. Aquatici,*—Lat. *Prep.* (A. T. Thompson.) *Root of common waterdock* (rumex obtusifolius), 1 oz.; *water,* 1 pint; boil for 10 minutes, and strain.

Obs. This decoction is astringent, and was once much celebrated as a remedy for scurvy and some other cutaneous affections. "It is the only remedy which proves efficacious in that disease, when the ulcers are healed, and the patient is attacked with asthma." (Linnæus, on the scurvy of the Laplanders.)

DECOCTION (White,— Sydenham's). Syn. *Hartshorn Drink; Mistura Cornu Usti.* *Prep.* Prepared *burnt hartshorn,* 2 oz.; *gum arabic,* 1 oz.; *water,* 3 pints; boil to 1 quart and strain. Mucilaginous; demulcent. Taken *ad libitum.*

DECOCTION (Whortleberry). Syn. *Decoction of Bear-berry, D. Uva-ursi; Decoctum Uvæ Ursi,*—Ph. L. and D. *Prep.* 1. (Ph. L.) *Whortleberry leaves,* 1 oz.; *water,* 1½ pint; boil to a pint, and strain.

2. (Ph. D.) *Uva-ursi* (the leaves), ½ oz.; *water,* ½ pint; boil 10 minutes and strain.

Dose, &c. 1 to 3 fl. oz., two or three times daily; in phthisis and purulent affections of the urinary organs, unaccompanied with active inflammation; especially in chronic affections of the bladder.

DECOCTION (Willow Bark). Syn. *Decoctum Salicis, D. S. Corticis,*—Lat. *Prep.* 1. (Wilkinson.) *Willow bark* (salix latifolia), bruised, 1½ oz.; macerate in water, 2 ℔, for 6 hours, then boil for 15 minutes, and strain. Tonic, astringent, and febrifuge. *Dose.* A wine-glassful.

2. (Nieman.) *Willow bark* (salix alba), 1½ oz.; *water,* ¾ pint; boil to one-half. *Dose.* 1 to 2 fl. oz. Both are used as substitutes for decoction of cinchona bark.

DECOCTION (Winter-green). Syn. *Decoction of Pyrola, D. of Umbellated Winter-green, D. of Pipsissewa; Decoctum Chimaphilæ,*—Ph. L. *D. Pyrolæ,*—Ph. D. *Prep.* 1. (Ph. L.) *Chimaphila* (dried herb), 1 oz.; *water,* 1½ pint; boil to a pint, and strain.

2. (Ph. D.) *Winter-green* (dried leaves), ½ oz.; *water,* ½ pint; boil 10 minutes in a covered vessel, and strain. Tonic, stomachic, alterative, and diuretic. *Dose.* 1 to 2 fl. oz.; in dropsies, scrofula, debility, loss of appetite, &c.; and in those affections of the urinary organs in which uva-ursi is commonly given.

DECOCTION (of the Woods). See *Comp. Dec. of Guaiacum.*

DECOCTION (Wormseed). Syn. *Decoctum Santonici,*—Lat. *Prep.* 1. *Wormseed,* bruised, 2 oz.; *water,* 1 pint; boil down to 16 fl. oz., and strain.

2. (Dr. R. E. Griffith.) *Fresh leaves of wormseed* (chenopodium anthelminticum,—Linn.), 1 oz.; *water,* 1 pint; *orange peel,* 2 dr.; boil (10 minutes), and strain. The above are bitter, stomachic, and vermifuge. *Dose.* A wine glassful twice a day; in worms. It is also used as an *injection* against ascarides.

DECOCTION (Yarrow). Syn. *Decoctum Millefolii,*—Lat. *Prep.* From *milfoil* or *yarrow tops,* 1½ oz.; *water,* 1¼ pint; boil to a pint, and strain. Astringent, tonic, and vulnerary. *Dose.* A wine-glassful, thrice daily; in dropsies, &c. It is also used as a fomentation to bruises, &c.

DECOLORATION. The blanching or removal of the natural colour of any substance. *Syrups,* and many *animal, vegetable,* and *saline solutions,* are decolored or whitened by agitation with animal charcoal, and subsequent subsidence or filtration. *Many fluids* rapidly lose their natural colour by exposure to light, especially to the direct rays of the sun. In this way, *castor, nut, poppy,* and *several other oils,* are whitened. *Fish oils* are partially deodorized and decoloured by filtration through animal charcoal. *Cottons* and *linens* are still commonly bleached by the joint action of light, air, and moisture. The peculiar way in which light produces this effect has never been satisfactorily explained. The decoloration of textile fabrics and solid bodies generally is called *bleaching.* See *Oils, Tallow, Syrups, Sugar, &c.*

DECOMPOSITION. The resolution of compounds into their elements, or the alteration of their chemical constitution in such a manner that new products are formed. The gas that illuminates our streets is the result of the decomposition of pit-coal; and vinegar and brandy result from the decomposition of the saccharine matter of grape juice.

The power or force which occasions chemical decompositions and combinations, is called *chemical affinity,* or *elective attraction,* and operates between the ultimate atoms of bodies only at insensible distances. The order in which these changes occur between the atoms of different substances, is exhibited in the *tables of affinity* already given. The laws which regulate chemical affinity are doubtless fixed and immutable, although in the present state of science we are unable to reduce them to a code or system. The rules which chemists at various times have attempted to establish are subject to numerous exceptions, being modified by other forces, as those of caloric and cohesion. The following may prove useful to the reader, especially in extemporaneous prescribing and the laboratory:

1. *Two salts* which, by the *exchange of their acid and base,* are *capable* of forming a *soluble* and an *insoluble* salt, or two *insoluble* ones, suffer *mutual decomposition,* with these results, when brought together in a state of solution; unless, which is rare, the soluble and insoluble salt form a double compound during their combination. Thus,

solutions of *chloride of barium* and *sulphate of soda*, (both soluble,) when mixed, form *insoluble* sulphate of baryta, and *chloride of sodium*, which is soluble. This is known as the "*law of Berthollet.*"

2. The solutions of two salts whose acids and bases are *incapable* of forming a *soluble* and an *insoluble* salt, or *two insoluble* ones, do *not sensibly disturb each other*, or suffer any apparent decomposition.

3. A *soluble* and an *insoluble* salt, that are *capable of forming* two *insoluble* salts, suffer decomposition; but this reaction is *rare*, unless it is assisted with a considerable elevation of temperature.

4. In the mixture of a *salt* and *acid*, decomposition ensues, if the added acid is either *more fixed* or *more soluble* than that in the salt. On this fact is based the manufacture of acetic acid from acetate of soda, and the action of the common effervescing soda-water powders.

5. *Oxides* and *acids* mutually neutralize each other, producing new compounds.

6. The *alkaline oxides* (potassa, soda, &c.) precipitate the other oxides and the alkaloids from their saline solutions; but when added in excess, in some cases, redissolve the precipitate. They also *disengage* from their combinations all the *volatile bases* (ammonia, conia, nicotine, &c.) *Potassa* decomposes *most* of the *salts* of *the other alkalies*, and *all* those of the *pure earths* and *non-alkaline metals*.

7. *Organic substances* containing *albumen*, *gelatine*, *fibrine*, *vegeto-alkalies*, &c., suffer immediate decomposition when mixed with *tannic* or *gallic acid*, and all the *strong acids* (except the *acetic* and *phosphoric*), as well as most of the salts of the *non-alkaline metallic oxides*, or with substances containing any of these bodies.

Obs. The ingenious operative will find the above general facts of great value in the bustle of the laboratory and workshop, in cases in which either his memory or his experience may fail to assist him. In this way, reactions may be anticipated, the disagreeable consequences of unexpected decompositions avoided, and judicious combinations ensured. Thus, we may foresee the reactions which result from the simple *law of Berthollet*, by knowing that *all* the *bicarbonates*, *acetates*, and *nitrates*, and *sulphates*, with the *exception* of those of baryta, tin, antimony, mercury, and bismuth; the *carbonates of potassa*, *soda*, and *ammonia;* the *phosphates* of the *same bases;* all the *alkaline sulphurets;* the *iodides* of the *alkalies* and *earths;* all the *chlorides*, with the *exception* of the protochloride of mercury (calomel), and the chlorides of lead and silver; and *all* the *salts of potash*, *soda*, and *ammonia*, which have an excess of acid, are *soluble* in water, provided only that the *acid* itself is *not insoluble*, like silicic and antimonic acid; but even the *silicates* and *antimoniates of potassa* and *soda* are *soluble* in an excess of alkali. To this may be added, that many salts, as *nitrate of bismuth*, *protochloride of antimony*, and the *nitrates* and *sulphates of mercury*, are decomposed by water into *soluble* acid salts and *insoluble* basic salts.

The *sulphates of baryta*, *tin*, *lead*, *antimony*, *bismuth*, and *mercury ; all* the *carbonates*, except those mentioned above as being soluble; *all* the *phosphates*, *borates*, and *sulphurets*, except those above named; and *all* the *iodides*, except those of the alkalies and earths, are *insoluble* in water.

DEFECATION. The separation of a liquid from its lees, dregs, or impurities, by subsidence and decantation. It is commonly employed for the purification of saline solutions, and glutinous or unctuous liquids, on the large scale, in preference to filtration; than which it is both more expeditious and inexpensive. See *Clarification*, *Filtration*, *&c.*

DEFLAGRATION. The sudden combustion of any substance, for the purpose of producing some change in its composition, by the joint action of heat and oxygen. The process is commonly performed by *projecting* into a red-hot crucible, in small portions at a time, a mixture of about equal parts of *nitre*, and the *body to be oxidized.*

DEJEUNER. The morning meal; breakfast; but used of late in the fashionable world for lunch. See *Breakfast* and *Lunch.*

DELIQUESCENCE. Spontaneous liquefaction by absorption of the moisture of the atmosphere. *Deliquescent salts*, are those which by exposure gradually assume the liquid state. They should all be kept in well-closed bottles or jars.

DELIRIUM TREMENS. The madness of drunkards; a disease of the brain resulting from the excessive and protracted use of intoxicating liquors, particularly of ardent spirits. The early *symptoms* are extreme irritability and fretfulness, with unusual mobility of the body. Sleeplessness, and unpleasant dreams soon follow. At length frightful dreams and visions harass the patient. He sees remarkable sights, hears extraordinary sounds, and labours under all the strange delusions of insane persons, which, however vague and unfounded, operate on him with all the force of realities till he becomes furiously mad.

The fit almost always comes on after hard drinking; and the hands are usually, but not always, tremulous. A similar affection is occasionally produced by the abuse of opium, excessive mental anxiety, night-watching, or depletion. According to Dr. Armstrong, even respiring the fumes of ardent spirits, will, under some circumstances, produce this disease. Persons who have undergone surgical operations under the influence of chloroform, are more liable to attacks of this kind than other persons.

The *treatment* of delirium tremens consists mainly in the judicious use of *opium*, *laudanum*, or *morphia*, in rather large doses, frequently repeated. 30 to 60 drops of laudanum may be given every hour or two *during* the fit, its effects being carefully watched. The object is to produce quiet sleep, from which the patient usually wakes free from the worst symptoms of the disease. *Diaphoretics* and *mild aperients* may also be given, and a light nutritious diet adopted throughout. Depletion, especially bleeding, should be particularly avoided. Alcoholic stimulants and wine, in certain cases, have proved useful. Under this treatment, the patient, unless of a very bad habit of body or much debilitated by previous excesses, usually recovers. He is, however, very liable to relapses and subsequent attacks, which are best prevented by judicious moral management.

DELPHINE. Syn. *Delphinine*, *Delphia*, *Delphinia*, *Delphinium*, *Delphinina*. An alkaloid discovered by Lassaigne and Feneulle in *delphinium staphysagria* or *stavesacre*.

Prep. 1. The *husked seeds* (in powder) are boiled in a *little water*, and pressed in a cloth; a little *pure magnesia* is then added to the filtered decoction, the whole is boiled for a few minutes, and refiltered; the residuum, after being well washed, is digested in *boiling alcohol*, which dissolves out the alkali, and gives it up again by gentle evaporation and cooling.

2. The *bruised*, but *unshelled seeds* are digested in *dilute sulphuric acid*, the filtered liquor precipitated with *carbonate of potassa*, and the precipitate digested in *alcohol* as before.

Prop., *&c.* A semi-crystalline, white, odourless powder; extremely acrid and bitter; scarcely soluble in water; dissolves in ether, and readily in alcohol; and has an alkaline reaction. Its salts are very bitter and crystallize with difficulty. As commonly procured, it is mixed with an acrid resin called *staphysain*. (Couerbe.) Its alcoholic solution produces a burning and tingling sensation when rubbed on the skin, and a similar sensation is produced in various parts of the body when it is taken in doses of a few grains. It has been exhibited in neuralgia and rheumatism by Dr. Turnbull. *Dose.* $\frac{1}{12}$ gr., every three hours, made into a pill with 1 gr., each, of the *extracts of henbane* and *liquorice*. It is also used *externally* under the form of ointment and lotion.

DELPHINIC ACID. Syn. *Phocenic Acid.* A fatty acid, obtained by saponifying the oil of the *delphinus* or *porpoise*. It is also found in the berries of *viburnum opulus*.

DELPHINIC ACID (of Hofschläger.) A white, volatile, crystalline substance existing in the seeds of stavesacre, (delphinium staphysagria.) It is a powerful emetic.

DEMULCENTS. Syn. *Emollients; Emollientia, &c.*,—Lat. Bland, emollient substances that obviate irritation by covering the exposed part, and protecting it from the action of acrid matter; or which relax, soften, and swell the tissues, and render them more flexible. The *principal demulcents* are *gum arabic*, *gum tragacanth*, *linseed*, *liquorice*, *arrow-root*, *pearl barley*, *isinglass*, *almonds*, *spermaceti*, *almond* and *olive oils*, and most other *mucilaginous* and *oily substances*. For *internal use* these are made into MUCILAGES, DECOCTIONS, EMULSIONS, or MILKS, with *water*, and form suitable beverages in dysentery, diarrhœa, catarrh, diseases of the urinary organs, and all other diseases where diluents are useful.

DENSITY. *Comparative mass*, or the quantity of matter contained in a given space. It is commonly used synonymously with specific gravity, which, however, refers to *comparative weight*. Thus, quicksilver is said to have a *density* greater than that of copper, and alcohol, one less than that of oil of vitriol.

DENTIFRICES. Syn. *Dentifricia*,—Lat. Substances applied to the teeth, to cleanse and beautify them. The most usual form of dentifrices is that of powder, (*tooth powder*,) ; but liquids, (*tooth washes*,) and electuaries, (*tooth electuaries*, *tooth pastes*,) are also employed. The solid ingredients used in dentifrices should not be so hard or gritty as to injure the enamel of the teeth; nor so soft or adhesive as to adhere to the gums, after rinsing the mouth out with water. *Pumice-stone* (in fine powder) is one of those substances that acts entirely by mechanical attrition, and is hence, an objectionable ingredient in tooth-powder intended for *daily* use. It is, however, very generally present in the various advertised dentifrices, which are remarkable for their rapid action in whitening the teeth. *Bath brick* is another substance of a similar nature to pumice, and like that article, should be only *occasionally* employed. *Cuttle-fish bone*, *coral*, and *prepared chalk*, are also commonly used for the same purpose, but the last is rather too soft and absorbent to form the sole ingredient of a tooth-powder. *Charcoal*, which is so very generally employed as a dentifrice, acts partly mechanically, and partly by its chemical property of destroying foul smells, and arresting putrefaction. For this purpose it should be newly burnt, and kept in well-closed vessels until used; as by exposure to the air it rapidly loses its antiseptic powers. *Powdered rhatany*, *cinchona bark*, and *catechu*, are used as ASTRINGENTS, and are very useful in FOULNESS OF SPONGINESS OF THE GUMS, *Myrrh* and *mastic* are employed on account of their odour, and their presumed preservative action, and power of fixing *loose teeth*. Insoluble powders have been objected to on account of their being apt to accumulate between the folds of the gums, and in the cracks of the teeth, and thus impart a disagreeable appearance to the mouth. To remedy this defect, a *reddish* or *flesh coloured tinge* is commonly given to them with a little *rose pink*, *red coral*, or similar colouring substance, when any small portion that remains unwashed off is rendered less conspicuous. Some persons employ *soluble substances* as *tooth-powders*, which are free from the above objection. Thus, *sulphate of potash* and *cream of tartar* are used for this purpose, because of the grittiness of their powders and their slight solubility in water. *Phosphate of soda* and *common salt* are also frequently employed as dentifrices, and possess the advantage of being readily removed from the mouth by means of a little water. Among those substances that chemically *decolour* and *remove unpleasant odours*, the only ones employed as dentifrices are *charcoal* and the *chlorides of lime* and *soda*. The *first* has been already noticed; the *others* may be used by brushing the teeth with water, to which a *very little* of their solutions have been added. A *very weak solution of chloride of lime* is commonly employed by *smokers* to *remove the odour* and *colour imparted by tobacco* to the teeth. *Electuaries*, made of *honey* and *astringent substances*, are frequently employed in *diseases of the gums*. The *juice* of the *common strawberry* has been recommended as an elegant natural dentifrice, as it readily dissolves the tartareous incrustations on the teeth, and imparts an agreeable odour to the breath. See *Tooth Powders*, *Electuaries*, *Washes*, *&c.*

DENTINE. The tissue of organic and earthy matter of which the teeth are composed.

DENTITION. See *Teething.*

DEOBSTRUENTS. Medicines which remove obstructions, and open the natural passages of the fluids of the body, as the pores, lacteals, and glands. *Iodine*, *mercury*, *sarsaparilla*, and *aperients*, are deobstruents.

DEODORIZERS. Substances characterised by their power of destroying fetid effluvia. *Chlorine*, *chloride of lime*, *chloride of zinc*, *nitrate of lead*, *sulphate of iron*, and *freshly-burnt charcoal*, are the most effective and convenient bodies of this class. *Peat charcoal* has lately been highly recommended for deodorizing *manure*, *&c.*, on the *large scale*. When it is mixed with these substances, their fetor is immediately destroyed, and a *compost* produced, which, for agricultural purposes, is superior to guano. See *Disinfectants.*

DEOXYDATION. See *Reduction.*

DEPILATORIES. Syn. *Epilatories; Depilatoria*, *Epilatoria*,—Lat. Substances or preparations employed to remove hair from the human skin. They act either mechanically, (*mechanical depilatories*,) or, chemically, (*chemical depilatories*). To the *first class* belong *adhesive plasters*, that, on their removal from the skin, bring away the hair with them. The *second class* includes all those substances which act upon the hair-bulbs, and destroy their vitality. The following are the principal depilatories at present employed in the fashionable world:

1. Boudet's Depilatory.) *Hydrosulphuret of sodium* (crystallized), 3 parts; *quicklime* (in fine powder), 10 parts; *starch*, 11 parts; mix. It should not be applied longer than 2 to 4 minutes. Very effective and safe.

2. (Cazenave's "*pommade épilatoire;*" Messrs. Mahon's Depilatory.) *Quicklime*, 1 part; *carbonate of soda*, 2 parts; *lard*, 8 parts; mix. Applied as an ointment.

3. (Chinese Depilatory.) *Quicklime*, 8 *oz.; pearlash* (dry) and *sulphuret of potassium*, of each, 1 *oz.* Very effective; applied as No. 1.

4. (Colley's Depilatory.) *Nitre* and *sulphur*, of each, 1 part; *orpiment*, 3 parts; *quicklime*, 8 parts; *soap lees*, 32 parts;

boil to the consistence of cream. Very caustic.

5. (Delcroix's "*poudre subtile.*" *Orpiment*, 1 *oz.; quicklime*, 10 *oz.; starch*, 14 *oz.*

6. (Mechanical Depilatory; Depilatory Plaster.) *Pitch* and *resin*, equal parts, melted together and spread on leather. (See *above.*)

7. (Oriental Rusma.)—*a. Quicklime*, 3 *oz.; orpiment*, ½ *oz.; strong alkaline lye*, 1 *lb.;* boil together in a clean iron vessel until a feather dipped into the liquor loses its flue.

b. From *pearlash*, 2 *oz.; orpiment*, 3 dr.; *liquor of potassa*, ½ pint; boil together as before. One of the most caustic and consequently the most certain of depilatory preparations; but, with some of the others, is open to the objections of containing orpiment (*tersulphuret of arsenic*).

8. (Pâte Epilatoire.) To No. 4, add of *orris root*, 3 parts.

9. (Plenck's "*Pasta Epilatoria.*") *Orpiment*, 1 part; *quicklime* and *starch*, of each, 12 parts.

10. (Rayer's Depilatory.) *Quicklime*, 2 *oz.; salt of tartar*, 4 *oz.; charcoal*, ¼ *oz.* Less active than No. 3.

11. (Redwood.) A *strong solution of sulphuret of barium*, made into a paste with *powdered starch*, and applied immediately. Mr. Redwood says this is "the best and safest depilatory."

12. (Roseate Depilatory.) As No. 3, but coloured with a little *rose pink* or '*light red.*'

13. (Savon Epilatoire.) *Turkish depilatory* and *soft soap*, equal parts. Must not be mixed until about to be applied.

14. (Spolasco's Depilatory.) Freshly prepared *sulphuret of calcium* and *quicklime*, equal parts. Almost equal to No. 11.

15. (Turkish Rusma.) *Orpiment*, 1 part; *quicklime*, 9 parts. For *use* it is mixed up with *soap lees* and a little *powdered starch.*

Obs. Lime or orpiment, and generally both of them, have formed the leading ingredients in depilatories, both in ancient and modern times. The first acts by its well-known causticity, and also when an alkali is present, by reducing that also, either wholly or in part, to the caustic state. The action of the orpiment is of a less certain character, and its use is even dangerous when applied to a highly sensitive or an abraded surface. The addition of starch is to render the paste more adhesive and manageable.

In *using the above preparations*, those which are in the state of powder are mixed up with a little *warm water* to the consistence of a paste, and applied to the part previously shaved close. Sometimes *soap lye* is used for this purpose, and some persons spread the pulpy mass on a piece of paper, and apply it like a plaster. In 12 or 15 minutes, and sooner, if much smarting ensues, the whole should be washed off with warm water, and a little cold cream, lipsalve, or spermaceti cerate, applied to the part. The application of the *liquid preparations* is generally accompanied with gentle friction, care being taken to prevent them extending to the adjacent parts. All the above effect the object satisfactorily, with proper management; but some are much more effective than others. A small wooden or bone knife is the best for mixing them with. They must all be kept in well-stoppered bottles, and no liquid must be added to them until shortly before their application; and then no more should be mixed than is required for immediate use.

DEPOSITION (of Metals). See *Electrotype.*

DERBYSHIRE NECK. See *Goiture.*

DESICCANTS. Syn. *Desiccantia*,—Lat. Substances that check secretion and dry sores or abraded surfaces, without acting as styptics, or constringing the fibres of the parts to which they are applied. See *Astringents.*

DESICCATION. Syn. *Exsiccation.* The evaporation or dying off of the aqueous portion of solid bodies. Plants and chemical preparations are deprived of their humidity by exposure to the sun, a current of dry air, an atmosphere rendered artificially dry by sulphuric acid, or by the direct application of heat by means of a water-bath, a sand-bath, or a common fire. *Planks* and *timber* are now *seasoned*, on the large scale, in this way, by which a condition may be produced, in 2 or 3 days, which on the *old* system is barely attainable in as many years. We endeavoured to enforce the importance and value of the desiccation of woods to the builder, cabinet maker, architect, and civil engineer, so long back as 1843, but failed to obtain support in carrying out our views. Since that period, certain parties have availed themselves, commercially, of our ideas and experiments on the subject, without any acknowledgment either verbal or pecuniary.

DESSERT. The last service at dinner, consisting of fruits, confections, &c. It is here that the genius of the cuisinier revels in the happiest and most tasteful creations, whilst both hemispheres and both worlds are laid under tribute to meet the demands of man's caprice. In the dessert, the business of the cook is elevated to the dignity of one of the fine arts, and merely requires wealth and patronage, to be brought out in forms as attractive as the most enchanting statue of god or goddess that was ever raised on the altars of human idolatry. The term, as well as most of the refinements and excellencies of the dessert, are of French origin, —Soyer himself is a Frenchman. "In all the countries of Europe, the splendour of the dessert, has, ever since the period of its introduction, kept pace with the progress of refinement and civilization; and, by *gastronomes*, the qualities and arrangement of a dessert are looked upon as the most valid test of all that is *attic* in taste and refined in elegance." (Brande.)

DESTEMPER. Syn. *Distemper.* Colours ground up with *size*, *gum*, or *white of egg*, and *water*, as in *scene* painting. The art of executing work in distemper, is called *destemper painting.*

DETERGENTS. Substances that remove offensive matter from the skin. The name is now generally restricted to applications that tend to cleanse foul wounds and ulcers.

DETERGENT (Collier's). *Prep.* From *liquor of potassa*, 2 fl. dr.; *rose-water*, 5½ fl. oz.; *spirit of rosemary*, ½ fl. oz.; mix. One of the best applications known to free the head from scurf, when the hair is strong and healthy. The head should be afterwards sponged with clean soft water.

DETONATION. See *Fulminating Compounds.*

DEUTOXIDES. See *Oxides.*

DEW POINT. The temperature at which dew begins to form, as observed by a thermometer. It varies with the humidity of the atmosphere.

DEXTRINE. Syn. *Starch Gum; Dextrina, Dextrinum.* A substance formed by the action of *dilute acids* at the boiling temperature, and by *infusion of malt*, at about 150° Fahr., on *starch.* It is also formed when *potato starch*, and some of the *other farinas* are exposed to a heat of about 400°. It, for the most part, resembles gum. See *Diastase* and *British Gum.*

DEXTRO-RACEMIC ACID. See *Racemic Acid.*

DIABETES. See *Urine.*

DIACHYLON. See *Plasters.*

DIALURIC ACID. A crystalline acid, obtained by passing a stream of *sulphuretted hydrogen* through a *boiling solution of alloxantine. Dialurate of ammonia* forms colourless, silky, needle-like crystals, which become deep red when heated to 212° Fahr.

DIAMOND. The diamond is pure carbon, and differs from the carbon of charcoal and lamp black, simply in being limpid, colourless, and highly refractive of light, properties which are generally referred to its crystalline form. The *weight*, and, consequently, the *value of diamonds*, is estimated in carats, one of which is equal to 4 grains; and the price of one diamond, compared to that of another of equal colour, transparency, purity, form, &c., is as the squares of the respective weights. The *average price* of ROUGH DIAMONDS, that are worth working, is about £2 for the first carat; that of a CUT DIAMOND is equal to that of a rough diamond of double weight, exclusive of the price of workmanship. "To estimate the value of a wrought diamond, ascertain its weight in carats, double that weight, and multiply the square of this product by £2." (Ure.) Thus, a cut diamond of . . 1 carat is worth £8
2 „ „ £32
3 „ „ £72
4 „ „ £128,
&c. &c. (See *Gems.*)

DIAMOND DUST. Genuine *diamond dust* is the powder produced by the abrasion of diamonds against each other in the process of cutting and polishing them. It possesses the valuable property of polishing the gems, and giving "the finest edge to every kind of cutlery." The discovery of the latter fact, a few years since, led certain knaves to extensively advertise a spurious preparation (*powdered quartz*) under the name of *diamond dust.* The factitious article acquired a very short and bad notoriety. Instead of sharpening cutting instruments, it infallibly destroyed their edge, and was particularly unfortunate in converting razors into saws. This discovery was not made, however, until it was in the hands of nearly every adult in the kingdom; nor before the scamps who manufactured and vended it had realised enough for an honest man's fortune.

DIAPENTE. Syn. *Pulvis Diapente. Prep.* 1. (Ph. E. 1744.) *Bay-berries, birthwort, gentian, ivory dust*, and *myrrh*, equal parts. An excellent warm tonic, especially useful in the debility and rickets of children. The substance sold under this name in the shops is an inferior mixture, used principally as a tonic, in veterinary practice. The following are the forms commonly adopted in its preparation:—

2. *Turmeric*, 4 *lb.; laurel berries* and *mustard*, of each, 3 *lb.; gentian*, 2 *lb.;* (all in fine powder,) mix.

3. *Bay-berries, gentian, mustard*, and *turmeric*, equal parts.

4. *Gentian*, 6 *lb.; bay-berries*, 1 *lb.* This is the formula generally used by the farriers. Sometimes *mustard*, 1 *lb.*, is added.

DIAPHORETICS. Syn. *Sudorifics; Diaphoretica, Sudorifica*,—Lat. Medicines which promote or increase the perspiration. Those that produce this effect in a very marked degree are more particularly called *sudorifics.* The *principal diaphoretics* are —*warm diluents*, as *barley water*, *gruel*, *tea*, &c.; *salts of the alkalies*, as the *citrates* of *potassa* and *soda*, *acetate of potassa*, *acetate* and *carbonate of ammonia*, *sal ammoniac*, *nitre*, &c.; *preparations of antimony*, as *antimonial powder*, *tartar emetic*, &c.; also *alcohol*, *camphor*, *Dover's powder*, *ipecacuanha*, *opium*, *wine*, *&c.*

The *use* of *diaphoretics* is indicated in nearly all diseases accompanied by fever and a dry skin, and particularly in febrile and pectoral affections.

DIAPHRAGM. The name commonly applied to the porous cell or vessel that separates the fluid containing the positive plate from the fluid which surrounds the negative plate, in constant galvanic batteries. Those made of thin *biscuit ware* are the most convenient and durable. *Plaster of Paris*, *animal membrane*, *coarse and tightly-wove canvas*, *&c.*, are also used for the purpose. Those of *plaster* are formed by surrounding an oiled cylinder of wood with a hoop of paper, and pouring it, mixed up with water, into the space between the two. In the absence of better contrivances, we have found that an *upright gallipot*, with the bottom knocked out, and its place supplied by a piece of *good bladder* tied across it, answers the purpose well, and will last for several days.

DIARRHŒA. A purging or looseness of the bowels. The causes of diarrhœa are various, but among the most common are the presence of irritating matter, worms, or acidity, in the stomach or bowels, and exposure to cold (especially cold to the feet) or sudden changes of climate or temperature. In general, it will be proper to administer a *mild aperient*, for which purpose, *rhubarb* or *castor oil* is usually preferred. The *dose* of the *first* may be from 20 to 30 grains in sugar, or made into a bolus; that of the *second*, from $\frac{1}{4}$ *oz.* to $\frac{1}{2}$ *oz.*, with a little *mint* or *peppermint water.* After the due operation of this medicine, *opium*, *astringents*, and *absorbents*, may be taken with advantage, but *not* in *excessive* doses, as is commonly the practice. The *first* and *second* are indicated when great irritability exists, and the *third*, in cases of diarrhœa arising from the presence of acidity. *Chalk mixture*, to which a *few drops* of *laudanum* have been added, or the *compound powder of chalk* and *opium*, are excellent medicines, and will generally quiet the bowels. A small piece of *catechu* or *hard extract of logwood*, sucked in the same way as a lozenge, is a pleasant method of taking either of these powerful astringents, and will generally cure cases of simple diarrhœa arising from excessive peristaltic motion, or want of tonicity of the muscular coats of the intestines.

In *bilious diarrhœa*, characterised by the bright yellowish-brown colour of the dejections, a dose of *blue pill* or *calomel*, assisted by mild diluents and demulcents, and warmth, generally proves efficacious. Small doses of opium are also useful in some cases.

In *catarrhal diarrhœa*, *chylus diarrhœa*, and the like varieties, characterised by the dejections being nearly colourless, and consisting chiefly of water and mucous; or white and milky, showing the entire absence of bile; or, being entirely liquid, limpid, and serous, (in some cases resembling the washings of flesh,) opinions are divided as to the treatment. The majority of the best authorities, regard purging as injurious in these varieties, and rely chiefly on warm baths and warm fomentations, with the internal administration of mild salines and diaphoretics, followed by astringents, tonics, and occasional doses of opiates. *Choleraic diarrhœa* demands a nearly similar treatment.

The diet in every variety of diarrhœa should be light and non-irritating. Glutinous broths, beef-tea, and arrow-root, are among the best articles which can be taken. To these may be added a little dry toast. Arrow-root (genuine) either with or without a spoonful of port wine or brandy, (preferably the former,) will of itself cure all ordinary cases of diarrhœa, if accompanied with repose and a recumbent posture.

Among *external remedies*, warm and stimulating fomentations, liniments, &c., to the epigastrium and abdomen, will be found useful adjuncts to other treatment. A spoonful or two of *laudanum*, used as a friction, will generally allay pain, and in many cases settle the bowels when all other remedies have been tried in vain.

DIASTASE. A peculiar substance, contained in malt, which effects the conversion of starch, first into *dextrine*, and then into *grape sugar.*

Prep. A cold *infusion of malt* is heated to 158° Fahr. (to coagulate in albumen); it is then allowed to cool, and *alcohol* is added to the filtered liquor, when *diastase* is precipitated, under the form of a tasteless white powder, which is freely soluble in water.

Prop., &c. One part of diastate is capable of converting 2000 parts of *starch* into *grape sugar.* Malted barley is said to contain $\frac{1}{500}$th part of this substance; yet this small portion is quite sufficient to convert the starch of the malt into sugar during the operation of mashing, in the manufacture of beer. "The most favorable temperature for this conversion is 140° to 149° F. It is also of the utmost importance that the saccharification should take place as speedily as possible, so that the sugar produced may not remain in contact with much gummy matter, in which case the diastase will not convert the starch into sugar. In fact the liquefaction and saccharification should proceed simultaneously." (M. Guerin Varry.) It has been proved by experience, that the richest and sweetest malt-worts are obtained by employing water at a heat ranging from 157° to 160° Fahr.; beginning at the lowest of these temperatures. When three mashings are made, the mean temperature of each mash should be respectively,—145°,—160°,—175° Fahr. See *Brewing, Dextrine, Fermentation, &c.*

DIASTASE (Animal). A peculiar substance found by M. Mialhe in the saliva.

DICTAMIA. *Prep.* (Beasley.) *Sugar,* 7 oz.; *potato arrow-root,* 4 oz.; *flour of brent barley* (triticum monococcum), 3 oz.; *Trinidad* and *Granada chocolate,* of each, 1 oz.; *vanilla,* 15 gr., triturate together.

DIDYMIUM. Syn. *Didym.* A new metal found along with *lanthanium* in the ores of cerium. See *Cerium.*

DIET. "The dietetic part of medicine is no inconsiderable branch, and deserves a much greater share of regard than it commonly meets with. A great variety of diseases might be removed by the observance of a proper diet and regimen, without the assistance of medicine, were it not for the impatience of the sufferers. On all occasions it may come in as a proper assistant to the cure, which sometimes cannot be performed without a due observance of the non-naturals."

Writers on *dietetics* (dietetica) have taken much trouble to divide and classify the numerous articles of food suitable to the various conditions of the body in health and disease; but little practical advantage has resulted from their labours. *Low diet, middle diet, full diet, milk diet, farinaceous diet, fruit diet,* and *vegetable diet,* are terms which, under most circumstances, are sufficiently simple to be almost self-explanatory. See *Food* and *Hygiène.*

DIET DRINK (Lisbon). Syn. *Decoctum Lusitanicum. Prep.* 1. (Original Formula.) *Sarsaparilla* and *China root,* of each (sliced), 1 oz.; *pumice stone* (powdered), 1 oz.; *black sulphuret of antimony,* 2 oz.; (the last two loosely tied up in a rag;) *water,* 10 pints; boil to one-half, and strain.

2. (M. Pearson.) *Sarsaparilla* and *walnut peel,* of each, 8 oz.; *guaiacum shavings,* 3 oz.; *black antimony,* 3 oz.; *water,* 5 pints; boil to 3 pints, and strain.

Obs. This once celebrated preparation is now almost entirely superseded in these countries by compound decoction of sarsaparilla. See *Decoctions.*

DIETETIC COMPOSITION (Patent). *Prep.* 1. (No. 1.) *Powdered sago* and *patent cocoa,* equal parts.

2. (No. 2.) *Patent cocoa,* 6 parts; *sago* and *lump sugar,* of each, 4 parts. Very nutritious. Numerous other *dietetical compounds* will be found noticed under their respective heads.

DIGESTIVES. Substances which when applied to wounds or tumours, induce or promote suppuration. *Heat* and all *stimulating applications* are of this class. Their action is opposed to that of *Discutients,* which repel or resolve tumours and indurations.

DIGITALINE. Syn. *Digitalia, Digitalina, Picrine.* A vegetable principle discovered by M. Royer in *digitalis purpurea,* or *purple foxglove.*

Prep. 1. (Majendie.) *Foxglove leaves* (powdered), 1 ℔; are digested in *ether,* first in the cold, and then heated under pressure; when the whole has again become cold, the liquor is filtered (rapidly) and the ether is distilled off in a water bath; the residuum is dissolved in water, the filtered solution treated with *hydrated oxide of lead,* the whole gently evaporated to dryness, and the dry residuum again digested in hot *ether;* from this solution the alkali is obtained, by evaporation and repeated resolutions, in a crystalline form.

2. (Homolle & M. Ossian Henry.) *Foxglove leaves* (carefully dried and powdered), 2½ ℔; are digested in *rectified spirit,* and the tincture expressed in a tincture press; the spirit is then distilled off, and the residual extract treated with *distilled water,* ½ pint, acidulated with about 2 fl. dr. of *acetic acid,* a gentle heat being employed; some *animal charcoal* is then added, and the whole filtered; the filtrate is then diluted with *water,* and partly neutralized with *ammonia;* a fresh-made strong *decoction of galls* is next added; a copious preci-

pitation of *tannate of digitaline* ensues; the precipitate is washed with water, and mixed with a *little alcohol*, after which it is triturated with *litharge* (in fine powder) and exposed to a gentle heat; the whole is now digested in *alcohol*, the tincture treated with *animal charcoal*, and evaporated; the dry residuum is, lastly, treated with cold *sulphuric ether*, which takes up some foreign matter, and leaves the *digitaline*. 2 ℔ 8 oz. of the *dried leaves* yield 140 to 150 gr. of the *digitaline*.

Prop., *&c.* White, inodorous, porous masses, or small scales; it crystallizes with difficulty, is intensely bitter, and excites violent sneezing when smelled to; dissolves freely in alcohol; scarcely soluble in cold ether; and takes 2000 parts of water for its solution; it is neither basic nor alkaline; concentrated colourless hydrochloric acid dissolves it, forming a *characteristic* solution which passes from yellow to a fine green. (Homolle.) It is fully 100 times more powerful than the powdered leaves of the dried plant. It is used in the same cases. *Dose.* $\frac{1}{60}$ to $\frac{1}{30}$ gr.; either made into pills or dissolved in alcohol and formed into a mixture. Owing to the difficulty and uncertainty connected with dispensing such small quantities, it is now seldom employed in this country.

DILL. Syn. *Anethum*,—Ph. L. & E. "The fruit" (seed) of "*anethum graveolens*," (Ph. L.) or *garden dill*. Dill is an aromatic stimulant and carminative. The Cossacks employ it as a condiment; and in this country it is frequently employed to heighten the relish of soups and pickles, especially cucumbers. *Dill water* is a favorite remedy of nurses to promote the secretion of milk and to relieve the flatulence and griping of infants. *Dose.* Of the powder, 10 gr. to ½ dr., or more. *Oil of dill* (*oleum anethi*) and *dill water* (*aqua anethi*) are officinal in the pharmacopœias.

DILUENTS. Syn. *Diluentia*, — Lat. *Aqueous liquors;* so named because they increase the fluid portion of the blood. *Tea*, *barley water*, *water gruel*, and *similar articles*, are the most common diluents, after *pure water*. The copious use of *diluents* is recommended in all acute inflammatory diseases, not of a congestive character, and to promote the action of *diuretics* and *sudorifics*.

DINNER. The principal meal of the day, taken between noon and evening. "The *mid-day meal*, the dinner of our forefathers, the second breakfast of the French, and the luncheon of fashionable life, is taken at one or two; and the *evening meal*, the supper of our forefathers, and the dinner of the present day, at six or seven." "The lunch of fashion is a light and commendable dinner; the dinner of fashion is an early and moderate supper." (Erasmus Wilson.) See *Breakfast*, *Dejeuner*, *Food*, *Meals*, *&c.*

DINNER PILLS. See *Pills*.

DIOSMA. Syn. *Bookoo*, *Buku; Folia Barosmæ*, *F. Diosmæ; Buchu*,—Ph. L. *Bucku*,—Ph. E. *Diosma*,—Ph. L. 1836. "The leaf" of "*barosma serratifolia*, *b. crenulata*, and *b. crenata*." (Ph. L.) It is principally employed in chronic affections of the urino-genital organs, especially that of the mucous membrane of the bladder, attended with copious discharge of mucus. *Dose.* 20 gr. to ½ dr., of the powder, taken in wine; or made into an infusion or decoction.

The *officinal buchu* leaves are "glabrous, glandular; either linear-lanceolate with small serrations, or, ovato-oblong, obtuse, crenated, ovate or obovate, serrated." (Ph. L.) Their odour somewhat resembles that of rue, and their taste is warm and mint-like.

DIOSMINE. A bitter extractive matter obtained by Brande, from buchu leaves. It is very soluble in water, but not in alcohol and ether.

DISACRYLE. A white, flocculent, neutral substance, deposited by *acroleine* when long kept.

DISCUTIENTS. See *Digestives*.

DISEASE. See *Health* and *Hygiene*.

DISINFECTANTS. Syn. *Disinficientia*, —Lat. Substances which absorb, neutralize, or destroy putrescent effluvia, and miasmata, and thus remove the causes of infection. The *principal disinfectants* are *chlorine*, the *chlorides* (hypochlorites) *of lime* and *soda*, *chloride of zinc*, *peat charcoal*, the *fumes* of *nitric*, *nitrous*, and *sulphurous acids*, *heat*, and *ventilation*. The last two are the most efficient and easily applied. The *clothing*, *bedding*, *&c.*, of patients labouring under contagious diseases, may be effectually disinfected by exposure to a temperature a little higher than that of boiling water, for about an hour. Neither the texture nor colour of textile fabrics is injured by a heat of even 250° Fahr. (Dr. Henry.) It is a practice at some of the workhouses to *bake* the clothes of the paupers who have the itch, or who are infested with vermin. *Quicklime* rapidly absorbs *carbonic acid*, *sulphuretted hydrogen*, and several other noxious gases, and is therefore commonly used as a wash for the walls of buildings. *Acetic acid*, *camphor*, *fragrant pastiles, cascarilla, brown paper*, and other similar substances, are frequently burnt or volatilized by heat, for the purpose of *disguising* unpleasant odours. The *sulphates of iron* and *lime* have the property of rapidly destroying noxious effluvia. A quantity of either of these sulphates thrown into a cess-pool, for instance, will in a few hours render the matter therein quite scentless. Of *gaseous disinfectants*, "sulphurous acid gas (obtained by burning sulphur) is preferable, on theoretical grounds, to chlorine. No agent checks so effectually the first development of animal and vegetable life. All animal odours and emanations are immediately and most effectively destroyed by it." (Graham.)

The *patent disinfecting process* of Messrs. Davison and Symington, is a revival of that of Dr. Henry. The articles of clothing, &c., are exposed in a large chamber to a current of heated air, at a temperature varying from 200° to 250° Fahr. Dr. Copland has highly recommended this process for the clothing of fever and cholera patients.

The reputed *disinfectants* are also *deodorizers*, and, by analogy, are presumed to act on and render inert the poisonous matter of miasmata. Their efficacy in this way is, however, very equivocal. "Col. Calvert, whose faith in a solution of nitrate of lead as a disinfecting agent was boundless, has sickened and died of typhus fever. M. Ledoyen also has had an attack of the same disease; and from the testimony of an American journal, we learn that he has left Canada for this country. These two gentlemen were both sent out to test the efficacy of certain fluids in destroying infection, and there is no need of the survivor furnishing the Home Government with any elaborate details of the experiments instituted, and of the results which followed. The fate of his fellow-commissioner and his own illness are sufficient proofs of the utter worthlessness of chemical substances in destroying the invisible sources of disease. The fluids may be useful in mitigating the foul smells which escape from the holds of ships, or from drains and sewers, but they have no direct power in arresting and preventing disease." ('Medical Times.') See *De-odorizers, Fumigations*, and *Infection.*

DISINFECTING COMPOUNDS. — 1. *Burnett's* (Sir Wm.) *Disinfecting Liquid.* A concentrated solution of *chloride of zinc.*

2. *Collin's Disinfecting Powder.* A mixture of dry *chloride of lime*, 2 parts, and *burnt alum*, 1 part. Used either dry or moistened with water.

3. *Crew's Disinfecting Solution.* Liquid *chloride of zinc.*

4. *Ellerman's De-odorizing Fluid.* This is said to consist chiefly of the perchlorides and chlorides of iron and manganese.

5. *Labarraque's Disinfecting Solution.* A solution of chloride *hypochlorate*) of soda.

6. *Ledoyen's Disinfecting Fluid.* A solution of *nitrate of lead*, 1 part, in about 8 parts of *water*; or, of *litharge*, 13½ oz., in *nitric acid* (sp. gr. 1·38), 12 oz., previously diluted with *water*, 6 pints. Sp. gr. 1·40.

7. *Siret's Disinfecting Compounds.—a.* A mixture of *sulphate of lime*, 53 *lb.*; *sulphate of iron*, 40 *lb.*; *sulphate of zinc*, 7 *lb.*; and *peat charcoal*, 2 *lb.*; made into balls.

b. Sulphate of iron, 20 parts; *sulphate of zinc*, 10 parts; *tan* or *waste oak-bark* (in powder), 4 parts; *tar* and *oil*, of each, 1 part; as before.

8. *Smith's Fumigation.* Fumes of *sulphur.*

DISLOCATION. Syn. *Luxation; Dislocatio*, — Lat. The forcible displacement of a bone from its socket, either by violence or disease. The latter happens when the textures forming the joint have been destroyed by some independent organic affection. "A considerable share of anatomical knowledge is required to detect the nature of these accidents; and it is much to be lamented that students neglect to inform themselves sufficiently on the subject." (Sir A. Cooper.) In common cases, the bones may be frequently replaced by forcibly extending the limb. This should be done as early as possible, and before inflammation sets in. The latter should be combated by aperients, local bleeding, refrigerant lotions, &c. Dislocations frequently exist without the fact being suspected; the swelling and inflammation being referred to other causes.

DISPLACEMENT. See *Percolation.*

DISTEMPER. A disease among dogs, usually characterised by a running from the nose and eyes, and a short dry cough; followed by wasting of the flesh, and loss of strength and spirits. At length the brain suffers, and fits, paralysis of the extremities, or convulsions come on. Laxatives and emetics are the best remedies. If there is much diarrhœa, astringents may be afterwards given. The violence of the fits may be mitigated by the administration of antispasmodics, and by the warm bath. The *distemper* is a contagious disease, and is generally fatal to weakly and very young dogs. Fits in the advanced stages of the disease are seldom followed by recovery. Impatience of light, red eyes, obstinate diarrhœa, spasmodic twitchings, a yellow colour of the skin, and a pustular eruption, are also bad symptoms.

DISTEMPER POWDERS (Blane's). The basis of these is said to be *aurum musivum* or *bisulphuret of tin.* That of another advertised nostrum is a mixture of *quicksilver and chalk,* with a little *rhubarb* and *ipecacuanha.*

DISTILLATION. The evaporation, and subsequent condensation of the vapour of fluids, by means of a still and refrigerator, or other similar apparatus. *Dry distillation* is a term applied to the distillation of substances *per se,* or without the addition of water or other volatile fluid. *Destructive distillation* is the distillation of substances at temperatures sufficiently high to decompose them, by which their elements are separated, or evolved in new combinations.

DISTILLATION. The art of the distiller; the manufacture of spirituous liquors as practised on the large scale.

The *process of distillation,* as carried on in the distilleries of Great Britain, may be divided into *four* general operations, viz.—The *mashing* or formation of a saccharine infusion, from certain vegetable matters, as malt, barley, oats, rye, &c.;—the *cooling* of this wort or liquor; — the *fermentation* or process by which the sugar of the cooled wort is converted into alcohol; and—the *separation of the spirit* so formed by means of a still and refrigerator. By the *first* operation, the materials for the formation of the alcohol are obtained; by the *second,* they are brought to a temperature most favorable to the transformation that takes place in the *third,* after which it only remains to free the product of the last operation from the foreign matter with which it is associated: this is done in the *fourth,* which, correctly speaking, constitutes the only part of the process which can be called *distillation.*

The *general principles* of the first three of the preceding operations are noticed in the articles *Brewing, Diastase, Fermentation, &c.* It will there be seen, that the *amylaceous* or *starchy matter* of the grain is first *saccharified* and afterwards converted into *alcohol,* and that certain precautions are necessary to render the process successful and economical. In many of the distilleries of Great Britain, molasses and analogous saccharine substances are employed, in which case the vegetable principle (*sugar*) essential to the formation of alcohol, is already present, and merely requires simple solution in water of a proper temperature, to be ready to be subjected to immediate fermentation. In general, however, the sources of spirit in England are the various kinds of grain; *barley* and *rye* are those commonly employed. These are ground and mixed with *bruised malt,* in various proportions, and are mashed in a similar manner to malted grain. The fermentation is carried on until the density of the liquor ceases to lessen, or *attenuate;* which is determined by an instrument called a saccharometer. When this point is arrived at, the *wash* is submitted to distillation, to prevent the access of the acetous fermentation, which would lessen its alcoholic value.

During the process of distilling off the spirit of the fermented "*wash*" or "*wort,*" a hydrometer is employed to ascertain the "strength" of the liquor that passes over. As soon as this has fallen to a certain point, the operation is stopped, and the "*spent wash*" removed. The spirits obtained by the first distillation are generally called "*low wines,*" and have a specific gravity of about ·975. By *rectification* or "*doubling,*" a crude milky spirit abounding in oil at first comes over, followed by clear spirit, which is received in a separate vessel. The process is continued until the alcoholic content of the distilled liquor has considerably diminished, when the remaining weak spirit that distils over, called "*faints,*" is caught separately, and mixed with the *low wines,* preparatory to another distillation. The strongest spirit passes over first, and the condensed liquor gradually becomes weaker, until it ceases to contain alcohol. By receiving in separate vessels any given portion of the product, spirit of any required strength, within certain limits, may be obtained. The same object is more conveniently effected by surrounding the top of the capital of the still with a water bath, of a temperature corresponding to that of alcoholic vapour of the strength it is desired to obtain. Thus, if we keep the temperature of the water at about 198° Fahr., we shall obtain proof spirit; if at 192°, a spirit 20 o. p.; and so on for other strengths.

It is found from experience, and is readily accounted for by theory, that the lower the temperature at which the distillation is conducted, the stronger will be the product, and the less quantity of oil or other volatile matter will come over along with it. To promote this, it has been proposed to carry on the process in vacuo, but on the large scale this has never been adopted. The distillation of the "*wash*" is usually performed in a separate set of stills, to those employed for the rectification of the *low wines.* For very strong and tasteless spirit, a third, and even a fourth rectification is employed, conjointly with other methods to abstract the water, and to remove any foreign matter that vitiates its odour or flavour. A portion of soap is generally put into the still with the wash to prevent excessive frothing.

We have said that the processes of mashing, &c., in the distillery, are similar to those adopted in brewing beer. We may add, that as richness in alcohol, and not flavour, is the object aimed at in the distiller's wash, not only is a large quantity of *unmalted grain* employed, but the process of boiling the wort with *hops* is omitted altogether. The *wort* is commonly "*set*" at 70° Fahr., and the fermentation and attenuation of the liquor pushed as far as possible by large and repeated doses of the best *top-yeast* of the porter brewers.

It often happens that raw spirit prepared from damaged grain, is contaminated with a highly acrid and volatile fatty substance, which is powerfully intoxicating, and irritating to the eyes and nostrils, and possesses an odour very similar to that of an alcoholic solution of cyanogen. This may be got rid of by dilution with water, and skilful rectification, when most of it passes over with the first and last "runnings;" the intermediate portion being less loaded with it. *Another plan* is to filter the spirit successively through 6 or 7 separate vessels containing *pine* or *willow charcoal*, before rectifying it. In some distilleries, the contaminated spirit is well agitated with a considerable quantity of *olive oil*, and after repose decanted, diluted with water, and rectified as before. The ordinary *corn oil* or *fuselöl* of raw spirit, is generally, for the most part, intercepted by a self-regulating bath arranged between the still-head and the refrigeratory.

The *quantity of spirit* obtained from various substances, and even from pure sugar, depends upon the skill with which the several operations are conducted. By theory, *pure sugar* should yield 51% of *alcohol;* but in practice 11·925 gall. of *proof spirit* is the largest quantity which has yet been obtained from 112 *lb.* of sugar. By the *revenue authorities* this weight of sugar is estimated to afford 11½ gall. of proof spirit. The *average product* is perhaps about 1 gall. of spirit of this strength for every 10 *lb.* of sugar. According to Harmstädt, 100 *lb.* of *starch* yield 35 *lb.* of *alcohol*, or 7·8 gall. of *proof spirit;* and 100 *lb.* of the following grains produce the accompanying quantities by weight of spirit of sp. gr. ·9427, or containing 45% of pure alcohol;—*wheat*, 40 to 45%; *rye*, 36 to 42%; *barley*; 40%; *oats*, 36%; *buckwheat*, 40%; *maize*, 40%; the *mean* being 3·47 gall. of proof spirit. It is found that a *bushel* of *good malt* yields 2 gall. of *proof spirit*, and that the largest quantity of proof spirit obtained from *raw grain*, mashed with ⅕ or ⅙ of *malt*, does not exceed 22 gall. per quarter.

By the *Excise Laws*, the distiller is restricted in the *density* of his worts, to specific gravities ranging between 1·050 and 1·090; and in Scotland, between 1·030 and 1·075; nor is a distiller allowed to mash and distil at the same time. The processes must either be carried on in *separate premises*, or at separate times. See *Alcohol, Fermentation, Fuselöl, Still, Brandy, Gin, &c.*

DISTORTIONS. See *Spine, Strabismus, Surgery* (Popular), *&c.*

DITHIONIC ACID. See *Hyposulphuric Acid.*

DITHIONOUS ACID. See *Hyposulphurous Acid.*

DIURESIS. See *Urine.*

DIURETICS. Syn. *Diuretica*, — Lat. Medicines which promote the secretion of urine. The *principal diuretics* are—*aqueous fluids*, which act by increasing the watery portion of the blood, and—substances which promote the action of the kidneys. Most of the *first* produce copious diuresis, if the skin is kept cool. Among the last, are *acetate, bitartrate* and *nitrate* of *potassa; oils of juniper, turpentine, cajeput*, and *copaiba; dilute spirit*, and *sweet spirits of nitre; decoction of common broom* (decoctum scoparii), *&c.*

DIVIDIVI. An astringent substance imported from Jamaica. It contains above 5% of tannin; whilst gall-nuts contain less than 3·5%, and the best oak-bark, only 1·35%. Hence its value in tanning.

DOBEREINER'S LAMP. A portable apparatus for obtaining instantaneous light by the action of a *jet of hydrogen* on a small piece of *spongy platinum.* A few years since they were common in the shop-windows of London and all our larger towns, but have now given place to the simpler and less expensive *Congreve match.*

DOCIMACY or *Docimastic Art.* See *Assaying.*

DONARIUM. A metal recently discovered by Dr. Bergemann in combination with silicic acid, in a mineral (a species of zircon-syenite) from Brerig, in Norway. This silicate is readily acted on by acids. The solution in *hydrochloric acid* is precipitated by ammonia, and the precipitate is digested in *sulphuric acid*. From this solution nearly pure *hydrated oxide of donarium* is precipitated by ammonia. This oxide is allied to the earths, and claims a place next to zirconia and yttria. By acting on the oxide with *potassium*, metallic donarium is obtained. It is a black powder, which may be preserved under water for a day or two.

DOORS. Much annoyance is sometimes experienced from the *creaking of doors*. This may be prevented by rubbing a little *soap*, or a *mixture* of *tallow* and *black-lead* on the hinges; or by applying to them with a feather a little *sweet oil*, once or twice a year. The trifling trouble and expense (a penny or two a twelvemonth) will be amply repaid by their noiselessness and greater durability. To prevent the noise of *doors slamming*, a small piece of *vulcanized Indian rubber*, *cork*, or *leather*, may be placed so as to receive the shock. Parnell's *patent noiseless box staples* and *striking plates* are ingenious and excellent inventions for the same purpose.

DOSES. The doses of medicinals vary with the sex, age, temperament, constitutional strength, habituation, and idiosyncrasies of individuals. Different circumstances, especially of *climate*, exercise an important influence on the activity of medicines. Thus, the inhabitants of England and the northern countries of Europe, bear much larger doses in their own climates, than when they remove to warmer latitudes. Warmth, indeed, appears to promote the action of most medicinals, whilst cold acts in a contrary way. Nor does the same rule apply to all medicines. *Calomel*, for instance, is generally borne better by children than by adults; while *opium* affects them more powerfully, and requires the dose to be diminished considerably below that indicated by mere calculation or analogy with other medicines.

Prescribers ought not to forget that the action of medicines is not simply proportioned to the amount, but that each remedy has a dose below which it either produces no effect, or one contrary to that which we desire it to produce. Dr. Paris remarks, "that powerful doses are disposed to produce local rather than general effects;" and Dr. Barlow gives it as his opinion, that "practitioners often err, especially in the treatment of chronic maladies, from requiring an obvious effect from *each* dose administered." Adult women are said to require only *three fourths* the full dose for men. The following rules and tables have been framed, chiefly with reference to age; but, as Dr. R. E. Griffith correctly observes, "no scheme can be devised, founded on age alone, to which there are not many exceptions."

Dr. Young gives the following simple formula:—*For children under* 12 *years, the doses of most medicines must be diminished in the proportion of the age* to *the age increased by* 12. Thus, at 2 years, the dose will be 1-7th of that for an adult,

$$\text{for } \frac{2}{2+12} = \text{1-7th.}$$

I. *Posological Table, based on that of* Gabius.

Under	$\frac{1}{2}$	year	1-16th of a full dose.	
„	1	„	1-12th	„
„	2	yrs.	1-8th	„
„	3	„	1-6th	„
„	4	„	1-5th	„
„	7	„	1-3d	„
„	14	„	1-half	„
„	20	„	2-3ds	„
Above	21	„	*the full dose.*	
„	63	„	11-12ths	„
„	77	„	5-6ths	„
„	100	„	2-3ds	„

II. *Posological Table, from* Phoebus.

Age—*years*	80	65	50	25-40	20	16	12	8	5	2
Doses	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$
„ *Months*	12	6	2	1						
Dose	$\frac{1}{5}$	$\frac{1}{8}$	$\frac{1}{15}$	$\frac{1}{24}$						

DOUCHE. See *Baths.*

DOVER'S POWDERS. See *Powders.*

DRACONIC ACID. Obtained by the action of *nitric acid* upon the *oil* of *artemisia dracunculus*, or *tarragon*. It is said to be identical with *anisic acid.*

DRACONINE. Syn. *Dracine; Red Resin of Dragon's Blood.* A vegeto-alkaline body, discovered by M. Melandre in dragon's blood.

Prep. Dragon's blood is dissolved in *alcohol*, the solution filtered, concentrated, and precipitated with *cold water;* the red spongy precipitate is well washed, neutralized with *dilute sulphuric acid*, again liberated, and well washed with *water.*

Prop., &c. Dracine has a fine red colour; is tasteless, inodorous, and flexible; it fuses at 131° Fahr. The smallest quantity of carbonate of lime in filtering-paper, may be detected by *sulphate of dracine*, the yellow colour instantly turning red.

DRAGES. See *Sugar Plums.*

DRAGON'S BLOOD. Syn. *Sanguis Draconis*,—Lat. A rich red-coloured resin, obtained from various species of the genus *calamus.* Its colour, in the lump, is a dark brownish-red; in powder, bright red. It is friable, breaks with a shining fracture, and has a sp. gr. not higher than 1·196 or 1·197. When pure, it readily dissolves in alcohol, ether, and oils, yielding rich red *transparent* solutions. Adulterated and factitious dragon's blood is only partly soluble, and lacks the rich colour of the genuine article. Dragon's blood is chiefly used to tinge varnishes and lacquers.

DRAGON'S BLOOD (Factitious). *Prep.* 1. *Shellac,* 4 *lb.;* melt, remove from the fire, and add *Canada balsam,* 6 *oz.;* and *gum benzoin,* 2 *oz.;* mix well, stir in *red sander's wood,* 1½ *lb.,* and *Venetian red,* ¾ *lb.* (both in fine powder;) and form the mass into sticks.

2. As the last, omitting the *Venetian red.*

DRAUGHT. Syn. *Haustus,*—Lat. A single dose of liquid medicine, usually dispensed in *one-and-a-half-ounce* or *two-ounce* phials. Draughts are almost exclusively extemporaneous compounds, and differ from *mixtures* only in containing *one* dose; whereas mixtures contain *several.* The latter have now very generally superseded draughts among all but the higher classes, when the dose is to be frequently repeated. *Draughts* possess the advantages of extreme convenience, and, from only one phial being opened at a time, of preserving the preparation better than when it is exposed to the air by the frequent removal of the cork. They are usually taken from a wine-glass, which they about ⅔ds fill.

In the *preparation of draughts* the same precautions are observed as are pointed out under "*mixtures;*" regard being had to the increased volume of the dose. The ingredients of a *six-ounce mixture,* for example, containing (say) 12 doses, may be equally distributed among a dozen draught-phials, after which each may be filled up with *distilled water,* or any other simple vehicle. In most cases, a little *syrup* may be advantageously added. In many instances no addition will be required, the *doses* of each form of preparation being the same.

The *following* are *useful formulæ,* which will serve as examples for others of the class. The number might be easily multiplied, and, indeed, might be extended so as to include 3-4ths of the whole materia medica; but such a plan would lead to useless repetitions and occupy much space. See *Mixtures, Prescribing, &c.*

DRAUGHT (Abernethy's). See *Abernethy Medicines* and *Black Draught.*

DRAUGHT (Acetate of Ammonia). Syn. *Haustus Ammoniæ Acetatis,*—Lat. *Prep.* (Dr. Paris.) *Camphor mixture,* 1½ fl. oz.; *liquor of acetate of ammonia,* 4 fl. dr.; *antimonial wine,* 20 drops; mix. As a refrigerant and diaphoretic in febrile affections; taken late in the evening.

DRAUGHT (Acetate of Potassa). Syn. *Haustus Potassæ Acetatis,*—Lat. *Prep.* (Mid. Hosp.) *Acetate of potassa,* 30 gr.; *bicarbonate of potassa,* 20 gr.; *peppermint water,* 1½ fl. oz. Diuretic, antacid, and laxative.

DRAUGHT (Ammoniacal). Syn. *Haustus Ammoniacalis, H. Ammoniæ,* — Lat. *Prep.* (Brande.) *Liquor of ammonia,* 20 to 30 drops; *compound tincture of cardamoms* and *tincture of gentian,* of each, ½ fl. dr.; *camphor mixture,* 1½ fl. oz. An aromatic absorbent and stomachic; in heartburn, acidity, low spirits, &c.

DRAUGHT (Anodyne). Syn. *Haustus Anodynus,*—Lat. *Prep.* 1. *Tincture of opium,* 15 drops; *pimento water* and *syrup of poppies,* of each, 2 dr.; *water,* 1 fl. oz.

2. (Copland.) *Nitre,* 6 gr.; *laudanum,* 12 drops; *compound spirit of ether,* 1 dr.; *syrup of poppies,* 2 dr.; *camphor mixture,* 9 dr.

3. (Ellis.) *Tincture of opium,* 15 to 25 drops; *syrup of poppies,* 2 fl. dr.; *spirit of cinnamon,* 1 fl. dr.; *distilled water,* 1½ fl. oz.

4. As the above, but substituting a like quantity of *solution* of either *acetate* or *hydrochlorate of morphia* in lieu of the *laudanum.* All the above are given as soothing draughts to allay pain and produce sleep; especially the last thing at night. No. 4 is to be preferred if there are febrile symptoms present.

DRAUGHT (Antacid). Syn. *Haustus Antacidus,*—Lat. *Prep.* 1. *Bicarbonate of soda,* 20 gr.; *tincture of calumba,* 3 fl. dr.; *tincture of hops,* 1 fl. dr.; *syrup of orange peel,* 2 fl. dr.; *water,* 6 fl. dr. To improve the appetite in heartburn and dyspepsia; taken 1 hour before a meal.

2. *Liquor of ammonia,* 16 drops; *syrup of saffron,* 2 fl. dr.; *infusion of gentian,* 3 fl. dr.; *water,* 7 fl. dr. As the last, taken occasionally, especially in debility, low spirits, &c.

3. (Collier.) *Compound tincture of cardamoms,* 1 fl. dr.; *solution of bicarbonate of magnesia* (fluid magnesia), 9 fl. dr.; *simple syrup,* 2 fl. dr. Twice a day; in dyspepsia, heartburn, &c., especially in gouty patients.

4. (A. T. Thomson.) *Magnesia,* 1 dr.; *peppermint water,* 1½ fl. oz.; *tincture of orange peel,* 1 fl. dr. In dyspepsia, &c., with acidity or diarrhœa.

5. As no. 1., but using *bicarbonate of potassa* for bicarbonate of soda. In acidity, diarrhœa, &c., accompanied by great irritability of the coats of the stomach.

6. *Prepared chalk*, 30 gr.; *spirit of nutmeg* and *tincture of opium*, of each, 12 to 20 drops; *syrup of saffron*, 3 dr.; *cinnamon water*, 1 fl. oz. In acidity, with extreme looseness of the bowels.

DRAUGHT (Anti-arthritic). Syn. *Haustus Anti-arthriticus*,—Lat. *Prep.* 1. *Tincture of colchicum seeds* (Ph. L.), 1 to 1½ fl. dr.; *syrup of orange peel*, 2½ fl. dr.; *water*, 1 fl. oz. In gout; taken over-night, followed by another in the morning.

2. (Brande.) *Wine of colchicum*, ½ fl. dr.; *carbonate of magnesia*, 15 gr.; *cinnamon water*, ½ fl. oz.; *water*, 1 fl. oz. As the last.

3. (Sir C. Scudamore.) *Magnesia*, 18 gr.; *Epsom salts*, 1½ dr.; *vinegar of colchicum*, 1½ fl. dr.; *simple syrup*, 1 fl. dr.; *cinnamon water*, 9 fl. dr. As the last.

4. (Sir H. Halford's *Gout Preventive.*) From *compound infusion of gentian*, 1½ fl. oz.; *tincture of rhubarb*, 1 fl. dr.; *bicarbonate of potassa*, 15 gr.

DRAUGHT (Anti-asthmatic). Syn. *Haustus Anti-asthmaticus*,—Lat. *Prep.* 1. *Vinegar of squills*, ½ fl. dr.; *ipecacuanha wine*, 15 drops; *cinnamon water*, 1½ fl. oz. Expectorant. One to be taken three times daily during the attack.

DRAUGHT (Anti-emetic). Syn. *Haustus Anti-emeticus*,—Lat. *Prep.* 1. *Juice of 1 lemon; liquor opii sedativus*, 10 drops (or *laudanum*, 15 drops); *ether*, 20 drops; *simple syrup*, 2 dr.; *water*, q.s.

2. (*Haustus Anti-emeticus Riverii*,—P.C.) *Bicarbonate of potassa*, 30 gr.; *lemon juice*, 4 dr.; *syrup of lemon*, 1 oz.; *water*, 3 oz.; mix quickly, and tie down the cork. To check nausea and vomiting. The last is best given effervescing.

DRAUGHT (Anti-hysteric). Syn. *Haustus Anti-hystericus*,—Lat. *Prep. Cyanide of potassium*, 1 gr.; *lettuce water* (distilled), 2 fl. oz.; *syrup of orange flowers*, 1½ oz.; *water*, 5½ fl. oz.; for 6 draughts. *One* to be taken when the fit is expected, and a *second* in half an hour. Should the fit come on, the dose may be repeated at intervals of about 15 minutes until 3 or 4 have been altogether administered. The symptoms, however intense, are generally either at once arrested, or greatly alleviated by this treatment.

DRAUGHT (Antilithic). Syn. *Haustus Antilithicus*,—Lat. *Prep.* 1. (Venables.) *Borax*, 8 gr.; *bicarbonate of soda*, 10 gr.; *aërated water*, 8 fl. oz. For a draught; in red gravel.

2. (Dr. Paris.) *Carbonate of soda*, 12 gr.; *tincture of calumba*, 1 fl. dr.; *infusion of quassia*, 1 fl. oz.; *water*, 3 fl. dr. In dyspepsia and gravel, attended with the lithic acid diathesis.

DRAUGHT (Anti-neuralgic). Syn. *Haustus Anti-neuralgicus, H. Narcotinæ*,—Lat. *Prep.* (Jeston.) *Narcotine*, 2 gr.; *diluted sulphuric acid*, 20 drops; *infusion of roses*, 1½ fl. oz. *One* every 2 hours in the intermissions of neuralgia.

DRAUGHT (Antiseptic). Syn. *Haustus Antisepticus*,—Lat. *Prep.* (Dr. Collier.) *Decoction of yellow bark*, 1 fl. oz.; *tincture of opium*, 5 drops; *spirit of pimento* and *water*, of each, 2 fl. dr. In putrid fevers, gangrene, &c.

DRAUGHT (Antispasmodic). Syn. *Haustus Antispasmodicus*,—Lat. *Prep.* 1. (Dr. Collier.) *Tincture of castor*, 1 fl. dr.; *sulphuric ether*, 10 drops; *peppermint water*, 11 fl. dr.; mix. In hysteria, and that species of irregular muscular action dependent on debility.

2. (Dr. Gregory.) *Fetid spirit of ammonia*, ½ to 1 fl. dr.; *camphor mixture*, 10 fl. dr.; *syrup of saffron*, 1 fl. dr. In cases complicated with low spirits, debility, &c.

3. (A. T. Thomson.) *Musk mixture*, 14 fl. dr.; *liquor of ammonia*, 16 drops; *tincture of castor*, 1 fl. dr.; *syrup of poppies*, ½ fl. dr.; mix. Three or four times daily, in hysteria and convulsive affections, after the bowels have been well cleared by some aperient.

4. (A. T. Thomson.) *Oil of aniseed*, 10 drops; *magnesia*, 20 gr.; *tincture of senna*, 2 fl. dr.; *peppermint water*, 10 fl. dr.; mix. In flatulence and spasms of the stomach.

DRAUGHT (Aperient). Syn. *Haustus Aperiens*,—Lat. *Prep.* 1. (Paris.) *Infusion of senna*, 1 fl. oz.; *tincture of senna, tincture of jalap*, and *syrup of senna*, of each, 1 fl. dr.; *tartrate of potassa*, 1 dr.; mix.

2. (Ryan.) *Epsom salts*, 4 dr.; *tincture of senna*, 1½ fl. dr.; *syrup of ginger*, 1 fl. dr.; *spirit of sal volatile*, 20 drops; *infusion of senna*, 1½ fl. oz.

3. (Thomson.) *Tartrate of potassa*, 3 dr.; *tincture of senna* and *syrup of saffron*, of each, 1 dr.; *infusion of senna*, 1½ oz. The above are good aperients, and in their composition and action resemble the ordinary "*black draught.*"

4. (*Effervescing.*)—*a.* (Dr. Barker.) *Bisulphate of potassa*, 73 gr.; *carbonate of soda*, 72 gr.; *water*, q.s.; dissolve the two in separate glasses, mix the solutions, and drink whilst effervescing, in the same way as soda water.

b. (W. Cooley.) *Bicarbonate of soda*, 1 dr.; *potassio-tartrate of soda*, 2 dr.; dissolve in about 1-3d of a glassful of *cold water;* and pour it on another like quantity of *water* holding in solution *tartaric acid*, 40 gr., and *syrup of orange peel*, 1½ fl. dr.; and drink it instantly.

c. (Paris.) *Potassio-tartrate of soda*, 2 dr.; *bicarbonate of soda*, 40 gr.; dissolve, and add *lemon juice*, 1 or 2 table-spoonfuls.

d. (Young.) *Cream of tartar*, 3 dr.; *carbonate of soda*, 2½ dr.; throw them into a soda-water bottle three parts filled with cold *water*, cork *immediately*, and wire down the cork. The *last three* are examples of *factitious effervescing Seidlitz water*, and are good saline aperients. The *method of taking them* may be varied by mixing the *dry ingredients* (in fine powder) on a piece of paper, and throwing the mixture *suddenly* into a tumbler 2-3ds filled with *water*, and drinking the liquid whilst effervescing.

DRAUGHT (Appetite). See *Dinner Draught.*

DRAUGHT (Aromatic). Syn. *Aromatic Antacid Draught; Haustus Aromaticus. Prep.* 1. *Aromatic confection*, 1 dr.; *spirit of sal volatile*, ½ dr.; *syrup of saffron*, 2 dr.; *pimento water*, 9 fl. dr. Excellent in dyspepsia with acidity, and in diarrhœa, preceded by an aperient.

2. (*H. Arom. cum Rheo*,—St. B. Hosp.) *Aromatic confection*, 1 dr.; *infusion of rhubarb* and *cinnamon water*, of each, 6 fl. dr. In diarrhœa and dyspepsia, especially when there is acidity and deficiency of bile.

DRAUGHT (Astringent). Syn. *Haustus Astringens*,—Lat. *Prep.* 1. *Tannin*, 3 gr.; *rectified spirit*, 1 fl. dr.; *simple syrup*, 2 fl. dr.; *water*, 6 fl. dr.

2. (Dr. Paris.) *Chalk mixture*, 1½ fl. oz.; *tincture of catechu*, 1 fl. dr.; *laudanum*, 15 drops.

3. (Thomson.) *Extract of logwood*, 12 gr.; *tincture of catechu*, 1 fl. dr.; *cinnamon water*, 15 fl. dr. The above are excellent remedies in diarrhœa (preceded by a purgative), and in dysentery, &c. One may be taken after each motion.

DRAUGHT (Black). See *Mixtures.*

DRAUGHT (Camphor). Syn. *Haustus Camphoræ*,—Lat. *Prep.* (Guy's Hosp.) *Camphor*, 6 gr.; *rectified spirit*, q. s. to powder; *white sugar*, 1 dr.; *mucilage*, 3 dr.; *water*, 1½ fl. oz. Anodyne and diaphoretic, &c.

DRAUGHT (Castor Oil). Syn. *Haustus Olei Ricini*,—Lat. *Prep.* (Guy's Hosp.) *Castor oil*, 4 dr.; *yelk of egg*, q. s. (2 in No.); *simple syrup*, 1 fl. dr.; *cassia* or *cinnamon water*, 1 fl. oz. Aperient.

DRAUGHT (Cathartic). Syn. *Haustus Catharticus*,—Lat. The following are given as additions to those under *Draught* (Aperient), and other heads:—*Prep.* 1. (Dr. Thomson.)—*a. Tartrate of potassa*, 5 dr.; *tincture of senna*, 1 fl. dr.; *infusion of senna*, 14½ fl. dr.; *syrup of saffron*, ½ fl. dr.; mix. In acute diseases, taken early in the morning.

2. (Thomson.) *Epsom salts* and *manna*, of each, 2 dr.; *infusion of roses*, 14 fl. dr.; *dilute sulphuric acid*, 10 drops. In inflammatory affections, and to check vomiting in low fevers.

3. (Thomson.) *Carbonate of magnesia*, 1 dr.; *powdered rhubarb*, 20 gr.; *peppermint water*, 12 fl. dr. In dyspepsia, attended with costiveness and acidity, taken an hour before dinner.

4. (Thomson.) *Castor oil*, 5 fl. dr.; *powdered gum*, 20 gr.; *rose water*, 1 fl. oz.; *compound tincture of lavender*, 8 drops; *syrup of poppies*, 1 fl. dr. In colic and calculus. The above differ from *aperient* draughts simply in their greater strength.

DRAUGHT (Chalk). Syn. *Haustus Cretæ*,—Lat. *Prep.* From *powdered gum*, *chalk*, and *simple syrup*, of each, 1 dr.; *aromatic water* (as that of caraway, cinnamon, nutmeg, pimento, or peppermint), 1½ fl. oz.

DRAUGHT (Chalk,—Chalybeated). Syn. *Haustus Cretæ et Ferri*,—Lat. *Prep.* (Paris.) *Chalk mixture*, 7 fl. dr.; *compound mixture of iron*, 3 fl. dr.; *sesquicarbonate of ammonia*, 5 or 6 gr. In diarrhœa, particularly in that arising from debility and anæmia.

DRAUGHT (Chalk, — Rhubarbarated). Syn. *Haustus Cretæ cum Rheo*,—Lat. *Prep.* 1. *Simple chalk mixture* (see above), 1½ fl. oz.; *powdered rhubarb*, 12 gr.

2. (Lond. Hosp.) *Compound powder of chalk with opium*, 12 gr.; *rhubarb*, 15 gr.; *syrup of saffron* and *compound tincture of cardamoms*, of each, 1 dr.; *caraway water*, 10 fl. dr. In heartburn, dyspepsia, and certain forms of diarrhœa.

DRAUGHT (Chlorine). Syn. *Haustus Chlorinii*,—Lat. *Prep.* (Copland.) *Chlorine water*, ½ fl. dr.; *water*, 1½ fl. oz.; mix, and add of *syrup of poppies*, ½ fl. dr. *One* every 6 hours; in the worst forms of typhus fever, scarlet fever, and other putrid diseases, &c.

DRAUGHT (Citrate of Ammonia). Syn. *Haustus Ammoniæ Citratis, H. A. Sesquicarbonatis Effervescens*,—Lat. *Prep.* (Guy's Hosp.) *Sesquicarbonate of ammo-*

nia, 20 gr.; *water,* 1 fl. oz.; dissolve, and add of *lemon juice,* ½ fl. oz. An agreeable cooling saline draught in febrile cases.

DRAUGHT (Citrate of Potassa). Syn. *Haustus Potassæ Citratis,*—Lat. *Prep.* From *carbonate of potassa,* 24 gr. (or *bicarbonate,* 29 gr.); *water,* 1 fl. oz.; dissolve, and add of *lemon juice,* 5 fl. dr. As the last. 20 gr. of *citric acid* may be used instead of the lemon-juice.

DRAUGHT (Colchicum). See *Anti-arthritic Draught.*

DRAUGHT (Copaiba). Syn. *Haustus Copaibæ,*—Lat. *Prep.* (St. B. Hosp.) *Balsam of copaiba,* ½ fl. dr.; *mucilage* (thick), 4 fl. dr.; *pimento water,* 3 fl. dr.; *water,* 5 fl. dr. In gonorrhœa, &c.

DRAUGHT (Cough). See *Mixtures.*

DRAUGHT (Diaphoretic). Syn. *Haustus Diaphoreticus,*—Lat. *Prep.* 1. (Collier.) *Infusion of serpentary,* 1½ fl. oz.; *tincture of ditto,* 1 fl. dr. Tonic and diaphoretic.

2. (Thomson.) *Sesquicarbonate of potassa,* 20 gr.; *fresh lemon-juice,* 4 fl. dr.; *tartrate of antimony,* ⅙ gr.; *water,* 11 fl. dr.; *syrup of poppies,* 1 fl. dr. Antifebrile and diaphoretic.

3. (Thomson.) *Liquor of acetate of ammonia,* 6 fl. dr.; *camphor mixture,* 10 fl. dr.; *nitrate of potassa,* 10 gr.; *syrup of tolu,* ½ fl. oz. Anodyne and diaphoretic. All the above are used in inflammatory affections.

DRAUGHT (Dinner). Syn. *Appetite Draught; Haustus Dictus ante cibum. Prep.* 1. *Tinctures of cascarilla, hops,* and *rhubarb,* of each, 1 fl. dr.; *spirit of sal volatile,* ½ fl. dr.; *tincture of capsicum,* 20 drops; *syrup of orange peel,* 2 dr.; *water,* 1½ fl. oz.

2. *Compound tincture of gentian,* ½ fl. oz.; *sal volatile,* ½ a teaspoonful; *cinnamon water,* 1 fl. oz.; *compound tincture of cardamoms,* 1 teaspoonful. Either of the above to be taken an hour before a meal.

DRAUGHT (Diuretic). Syn. *Haustus Diureticus,*—Lat. *Prep.* 1. (Collier.) *Tincture of jalap,* 2 fl. dr.; *vinegar of squills,* 1 fl. dr.; *peppermint water,* 10 fl. dr.; mix.

2. (Copland.) *Acetate of potassa,* ½ dr.; *infusion of quassia* and *cinnamon water,* of each, 6 fl. dr.; *vinegar of squills* and *sweet spirits of nitre,* of each, ½ fl. dr.

3. (Thomson.) *Nitre,* 8 gr.; *tincture of digitalis,* 16 drops; *infusion of roses,* 13 fl. dr.; *syrup of roses,* 1 fl. dr.

4. (Turner.) *Nitre* and *powdered gum,* of each, 15 gr.; *almond mixture,* 1½ fl. oz. The above are used as diuretics in dropsy; the last, also in scurvy, and in the incontinence of urine of children.

DRAUGHT (Donovan's). Syn. *Draught of Hydriodate of Arsenic and Mercury; Haustus Hydriodatis Arsenici et Hydrargyri,*—Lat. *Prep.* (Donovan.) *Liquor of hydriodate of arsenic and mercury* (Donovan's), 2 fl. dr.; *distilled water,* 3½ fl. oz.; *syrup of ginger,* ½ fl. oz.; mix for 4 draughts. One, night and morning; in lepra, lupus, psoriasis, and some other obstinate cutaneous affections. It must not be allowed to touch anything metallic.

DRAUGHT (Effervescing). *Prep.* (Lond. Hosp.) *Sesquicarbonate of soda,* 30 gr.; *water* or *peppermint water,* 1½ fl. oz.; *syrup of orange peel,* 2 fl. dr.; *tincture of calumba,* ½ fl. dr.; *tartaric* or *citric acid,* 25 gr.; add the acid last, and drink whilst effervescing. Stomachic, tonic, and anti-emetic; in acidity, dyspepsia, &c. (See *ante.*)

DRAUGHT (Emetic). Syn. *Haustus Emeticus,* — Lat. *Prep.* 1. *Sulphate of zinc,* 15 gr. to 30 gr.; *water,* 9 fl. dr; dissolve. In cases of poisoning, and at the commencement of an attack of ague.

2. (Copland.) *Ipecacuanha,* 30 gr.; *sesquicarbonate of ammonia,* 20 gr.; *tincture of capsicum,* 30 drops; *oil of chamomile,* 10 drops; *mint water,* 2 fl. oz. As a stimulant emetic in cases of poisoning by laudanum or other narcotics.

3. (Guy's Hosp.) *Antimonial wine,* 2 fl. dr.; *ipecacuanha wine,* 6 fl. dr.; *water,* 4 fl. dr. For unloading the stomach in ordinary cases.

4. (Mid. Hosp.) *Tartar emetic,* 1 gr.; *ipecacuanha,* 20 gr.; *syrup,* 2 fl. dr.; *water,* 10 fl. dr. As the last.

5. (Dr. Pickford.) *Sulphate of zinc,* 20 gr.; *sulphate of magnesia,* 4 dr.; *water,* 1¾ oz. When it is also desired to act rapidly on the bowels.

6. (Rodier.) *Sulphate of copper,* 10 gr.; *water,* 2 fl. oz. In poisoning by laudanum.

7. (Sprague.) *Ipecacuanha,* 30 gr.; *sesquicarbonate of ammonia,* 20 gr.; *tincture of capsicum,* 1 fl. dr.; *peppermint water,* 3 fl. oz. In poisoning by narcotics.

8. (A. T. Thomson.) *Ipecacuanha,* 20 gr.; *ipecacuanha wine,* 2 fl. dr; *water,* 10 fl. dr. For unloading the stomach in ordinary cases.

9. (Trousseau.) *Ipecacuanha,* 8 gr.; *syrup of ipecacuanha,* 1 fl. oz.; *water,* q. s. for 4 draughts. One every 10 minutes, until vomiting occurs.

DRAUGHT (Ether). Syn. *Haustus Æthereus,*—Lat. *Prep.* (Neligan.) *Sulphuric ether,* 1 fl. dr.; *spermaceti,* 3 gr.; rub together (expertly), and add of *peppermint water,* 10 fl. dr. An excellent stimulant and antispasmodic, febrile symptoms being absent.

DRAUGHT (Expectorant). Syn. *Haustus Expectorans,*—Lat. *Prep.* 1. (Collier.) *Mixtures of ammoniacum* and *almonds,* of each, 6 fl. dr.; *tincture of squills,* 12 drops. In hoarseness, chronic coughs, &c.

DRAUGHT (Henbane). Syn. *Haustus Hyosciami,*—Lat. *Prep. Tincture of henbane,* 30 to 60 drops; *syrup of saffron,* 1 fl. dr.; *water,* 10 fl. dr. Anodyne and soporific. *Used* to allay nervous excitement, and induce sleep, when laudanum is inadmissible.

DRAUGHT (Henbane and Squills). Syn. *Haustus Hyoscyami cum Scillâ,* — Lat. *Prep.* (Dr. Bree.) *Extract of henbane,* 3 gr.; *tincture of squills,* 10 drops; *dilute nitric acid,* 6 drops; *water,* 1½ fl. oz. Anodyne and expectorant; in asthmas, chronic coughs, &c.

DRAUGHT (Hydrocyanic). Syn. *Haustus Hydrocyanicus,*—Lat. *Prep.* 1. (Donovan.) *Cyanide of potassium,* 1 gr.; *syrup of lemons,* ½ fl. oz.; *distilled water,* 7½ fl. oz. For 8 draughts. One for a dose.

2. (Dr. S. Dickson.) *Medicinal hydrocyanic acid,* (Ph. L.) 15 drops; *liquor of ammonia,* 20 drops; *syrup of orange flowers* (or simple syrup), 3 fl. dr.; *water,* 8½ fl. oz.; mix, and divide into 6 draughts. One, two or three times a day; in gastrodynia, and all those nameless nervous and hysterical affections arising from excessive irritability, mental anxiety, &c. In a case that came under our notice recently, in which life was an absolute burden to the patient, relief was afforded by the first draught, and 4 or 5 effected a comparative cure, although almost every other remedy had been tried in vain.

DRAUGHT (Laennec's). Syn. *Laennec's Contra-stimulant Draught; Haustus Contra-stimulans,*—Lat. *Prep.* From *tartar emetic,* 2 gr.; *syrup of poppies,* 2 fl. dr.; *orange flower-water,* 1½ fl. oz. Every two hours in pneumonia, &c.

DRAUGHT (Laxative). Syn. *Haustus Laxans,* — Lat. *Prep.* 1. See *Aperient Draughts.*

2. (Dr. Copland.) *Infusion of senna* and *compound infusion of gentian,* of each, 6 fl. dr.; *sulphate of potassa,* 20 to 30 gr.; *extract of taraxacum,* 30 to 40 gr.; *compound tincture of cardamoms,* 1½ fl. dr. Aperient, stomachic, and alterative.

DRAUGHT (Morphia). Syn. *Haustus Morphiæ,*—Lat. *Prep.* (Brera.) *Morphia,* ¼ gr.; *syrup of poppies,* 1 fl. dr.; *water,* 11 fl. oz. Two or three drops of *acetic acid* may be advantageously added. At bed time, as a soporific.

DRAUGHT (Narcotic). Syn. *Haustus Narcoticus, H. Opiatus,*—Lat. *Prep.* 1. (St. B. Hosp.) *Laudanum,* 12 to 20 drops; *syrup of red poppies,* 1 fl. dr.; *pimento water,* 3 fl. dr.; *water,* 1 fl. oz. To induce sleep in slight cases, when fever is absent.

2. (A. T. Thomson.) *Camphor mixture,* 1½ fl. oz.; *laudanum,* 35 drops; *sulphuric ether* and *syrup of saffron,* of each, 1 fl. dr. In intermittent headache.

3. (Thomson.) *Carbonate of ammonia,* 15 gr.; *fresh lemon juice,* ½ fl. oz.; *water,* 1 fl. oz.; *spirit of nutmeg,* 1 fl. dr.; *syrup of orange-peel,* ½ fl. dr.; *tincture of hemlock,* 10 drops. In diseases of increased irritability.

4. (Thomson.) *Carbonate of potassa,* 20 gr.; *fresh lemon-juice,* ½ fl. oz.; *peppermint water,* 1 fl. oz.; *laudanum,* 25 drops; *syrup of tolu,* ½ fl. dr. To procure sleep in the majority of diseases. (See *above.*)

DRAUGHT (Nux Vomica). Syn. *Haustus Nucis Vomicæ,*—Lat. *Prep.* (Dr. Joy.) *Nux vomica* (in fine powder), 3 gr.; *powdered gum,* 2 dr.; *compound tincture of cardamoms,* 1 fl. dr.; *cinnamon water,* 10 fl. dr. Diuretic, narcotic, stimulant, and tonic; in paralysis, impotence, debility, &c., unaccompanied by inflammation of the nervous centres. See *Strychnia.*

DRAUGHT (Peruvian Balsam). Syn. *Haustus Balsami Peruviani,*—Lat. *Prep.* (St. B. Hosp.) As *Draught of Copaiba.*

DRAUGHT (Refrigerant). Syn. *Haustus Refrigerans,*—Lat. *Prep.* 1. *Carbonate of Potassa,* 20 gr.; *syrup of orange peel,* 1 fl. dr.; *spirit of nutmeg,* ½ fl. dr.; *water,* 1½ fl. oz.

2. (Thomson.) *Nitre,* 12 gr.; *almond mixture,* 1½ fl. oz.; *syrup of tolu,* 1 fl. oz.

3. (Collier.) *Carbonate of potassa,* 20 gr.; *antimonial wine,* 20 drops; *syrup of orange peel,* 1 fl. dr.; *tincture of orange peel,* ½ fl. dr.; *water,* 1½ fl. oz.; mix, and add a large tablespoonful of *lemon juice.* In inflammatory diseases, &c.

DRAUGHTS (Saline). See *Effervescing Draughts, &c.*

DRAUGHT (Stomachic). See *Dinner Draughts, &c.*

DRAUGHT (Tonic). Syn. *Strengthening Draught, Haustus Tonicus,* — Lat. *Prep.* 1. (Collier.) *Disulphate of quinine,* 2 gr.; *tincture of orange-peel,* 1 fl. dr.; *diluted sulphuric acid,* 5 drops; *laudanum,* 10 drops; *infusion of cascarilla,* 1½ fl. oz. In pyrosis, &c., 1 hour before dinner.

2. (A. T. Thomson.) *Infusion of yellow bark,* 1½ fl. oz.; *compound tincture of cinchona,* 1 fl. dr.; *powdered cinchona,* 40 gr.; *syrup of orange peel,* ½ fl. dr. In intermittents and acute rheumatisms.

3. (Thomson.) *Infusion of cascarilla,* 1½ fl. oz.; *tincture of cascarilla* and *ginger,*

of each, 1 fl. dr. In dyspepsia, arising from intemperance.

4. (Walton.) *Infusion of cascarilla*, 9 fl. dr.; *tinctures of rhubarb* and *ginger*, of each, 1 fl. dr.; *syrup of saffron*, ½ fl. dr.; *ammonio-citrate of iron*, 6 gr.; *tincture of capsicum*, 5 drops. In anæmia, and debility accompanied by paleness and relaxation.

DRAUGHT (Tolu). Syn. *Haustus Balsami Tolutani.* As *Draught of Copaiba.*

DRAUGHT (Turpentine). Syn. *Haustus Olei Terebinthinæ*,—Lat. *Prep.* As *Draught of Copaiba.*

DRAUGHT (Vermifuge). Syn. *Haustus Vermifugus, H. Anthelminthicus*, — Lat. *Prep.* (M. Levacher.) *Castor oil*, 4 dr.; *essence of turpentine*, 2 dr.; *mint water*, 2 fl. oz.; *syrup*, 1 fl. oz.; *powdered gum*, 2 dr.; for an emulsion. In Tapeworm.

DRAWING (Mechanical). See *Camera.*

DRAWINGS. *Chalk* and *pencil drawings* may be fixed, so as not to suffer from slight abrasion, by washing them with *skimmed milk*, or with *water* holding in solution a little *isinglass* or *gum*. When the first is used, great care must be taken to deprive it of the whole of the cream, as the latter substance would cause the drawing to look streaky. An easy way of applying these fluids, is to pour them into a shallow vessel, and to lay the drawing flat upon the surface of the liquid; after which it should be gently removed and placed on white *blotting-paper*, in an inclined position, to drain and dry.

DREAMS. See *Sleep.*

DRENCHES or *drinks*, in veterinary practice, are *liquid medicines* or *mixtures*, which are administered to horses and neat cattle, and chiefly to the latter. A drench for a *horse* should not be *less* than half-a-pint, nor *more* than a quart; about a pint, is, perhaps, the best quantity; that for a *cow* or *ox* should measure about a quart, and not *more* than about 5 half-pints. See *Veterinary Medicine.*

DRESS. The principles which should direct us in the choice of colours for external articles of clothing, have been already briefly referred to under the heads *Accidental Colours*, and *Colours* (complementary), and will be found more fully noticed in the articles on *Personal Beauty*, the *Toilet, &c.* For the connexion of clothing or dress with health and personal comfort, see *Cold, Flannel, Hygiène, Season, Warmth, &c.*

DRESSING. *Gum, starch, size, &c.*, employed in stiffening or "finishing off" textile fragments and paper. Among *Surgeons*, the term is appropriated to any application to a wound or sore, made by means of lint, linen, or leather. *Simple dressing*, is simple cerate or spermaceti cerate. Among *cooks*, the stuffing of fowls, pork, veal, &c., is commonly called *dressing.*

DRINKS. See *Drenches.*

DRINKS (Summer). See *Ginger Beer, Lemonade, Sherbet, &c.*

DROGUE AMERE. The basis of this mixture is the root and herb of *justicia paniculata*, or *creata*, an East Indian plant, much esteemed as a bitter and stomachic. The mixture is in some repute in cholera and dysentery, and as an alexipharmic.

DROP. See *Measures.*

DROPS (Confectionery). These are confections of which the principal basis is sugar. They differ from lozenges chiefly in the ingredients being combined by the aid of heat. Occasionally, they are medicated.

Prep. Double refined sugar is reduced to powder, and passed through a *hair sieve* (not too fine,) and afterwards through a *gauze sieve*, to take out the fine dust, which would destroy the beauty of the drop. It is then put into a clean pan, and moistened with any favorite aromatic, as *rose* or *orange-flower water*, added slowly, stirring it with a paddle all the time, from which the sugar will fall, as soon as it is moist enough, without sticking. The *colouring* (if any) is next added, in the liquid state, or that of a very fine powder. A small polished copper, or tinned-copper pan, furnished with a lip, is now one-half or three parts filled with the paste, and placed over the fire, or over the hole of a stove, or preferably on a sand-bath, and the mixture stirred with a little bone or glass spatula until it becomes liquid. As soon as it almost boils, it is taken from the fire, and if it is too moist, a little more *powdered sugar* is added, and the whole stirred, until it is of such a consistence as to run without too much extension. A *tin plate*, very clean and smooth, and very slightly oiled, being now ready, the pan is taken in the *left* hand, and a bit of bright *iron, copper*, or *silver wire*, about 4 inches long, in the *right*. The melted sugar is next allowed to fall regularly on the tin-plate, the wire being used to remove the drop from the lip of the pan. In two or three hours afterwards the drops are taken off with the blade of a knife, and are at once put into bottles or tins. See *Candies, Essences, Stains, Sugar Plums, &c.*

The following are a few of the principal *confectionery drops* kept in the shops:—

Acidulated Drops. Prepared by adding *tartaric acid*, ½ *oz.*, dissolved in a *very little water* to each *lb.* of *sugar*, as above; with *essence of lemon, orange,* or *jargonelle pear* to flavour, as desired.

Chocolate Drops. Chocolate, 1 *oz.*, is reduced to fine powder by scraping, and added to *powdered white sugar,* 1 *lb.;* when the mixture is made into drops as above, care being taken to avoid heating it a second time.

Coffee Drops. A clarified concentrated infusion of *coffee,* 1 oz., is used for each *lb.* of *sugar.*

Fruit Drops. These are prepared according to the general description. (See *above.*) The *flavouring essences* (volatile oils or essences of *lemon, orange, citron, raspberry, jargonelle pear, &c.*) not being added until the sugar is melted, to avoid, as much as possible, loss by evaporation. The *colouring matter* may be any of the transparent stains usually employed for cakes, jellies, and confectionery. In this way are made the majority of the first-class *fruit drops* and *bons-bons* of the sugar-bakers. In some cases, the plan is varied by adding the *clarified concentrated juice,* or *jelly of the fruit* to the *sugar.* One variety of *raspberry* and *currant* (red and black) *drops* are made in this way.

Ginger Drops. From *essence* or *tincture of ginger,* as above. An *inferior kind* is made in the way described under *Ginger candy.*

Jargonelle drops. Fruit drops flavoured with essence of jargonelle pear (*solution of acetate of amyle*).

Lemon Drops. Acidulated drops flavoured with *essence of lemon.* They are usually stained with an *infusion of turmeric.* (See *above.*)

Peppermint Drops. From the *whitest refined sugar,* flavoured with *English oil of peppermint* or its *spirituous solution* (essence of peppermint), or with *peppermint water.*

Raspberry Drops. (See *above.*)

DROPS (Medicated). Syn. *Guttæ,*—Lat. This term is commonly applied to compound medicines that are only taken in small doses. At the present time they are almost exclusively confined to empirical and domestic medicine. The *plan* of directing *liquids* to be *measured by dropping* is objectionable, because the drops of different fluids vary in size, and are also further influenced by the size of the bottle and the shape of its neck, as well as the quantity of liquid it is poured from. See *Essences,* and *below.*

Acidulated Drops. See *Lozenges* and *confectionary drops.*

Acoustic Drops, Acoustic Balsam; Guttæ Acousticæ, Balsamum Acousticum,—Lat. *Prep. Oil of almonds,* 1 oz.; *laudanum* and *oil of turpentine,* of each, 1 dr.; mix. For hardened wax, and to allay pain.

2. *Tinctures of benzoin, castor,* and *opium,* of each, 1 fl. oz.; *essential oil of assafœtida,* 5 drops. As the last, and in deafness arising from debility of the organism.

3. (Baumé's.) Tinctures of *ambergris, assafœtida, castor,* and *opium,* of each, 1 oz.; *terebinthinated balsam of sulphur,* and *oil of rue,* of each, 15 drops. In atonic deafness.

4. (Bouchardat.) *Compound spirit of balm,* $2\frac{1}{2}$ dr.; *oil of almonds,* 5 dr.; *ox-gall,* 10 dr.; *creasote,* 10 or 12 drops. In cases complicated with hardened wax, fetid discharges, &c.

5. (Dr. Hugh Smith.) *Ox-gall,* 3 dr.; *balsam of Peru,* 1 dr. In fetid ulcerations of the ear. One or two drops of the above are poured into the ear; or a piece of cotton wool moistened therewith is introduced instead. The last is the safest plan.

6. (T. Wakley, Jun.) *Glycerine,* either alone or diluted with water. In deficiency of the natural secretions of the ear; used in sufficient quantity to moisten the first passages. See *Deafness.*

Ague Drop (Tasteless). *Prep.* From *white arsenic,* 1 gr.; *hot water,* 1 oz.; dissolve. *Dose.* $\frac{1}{2}$ to 1 teaspoonful twice a day. See *Solution of Arsenite of Potassa.*

Anodyne Drops; Guttæ Anodynæ,—Lat. The *solutions* of *acetate* and *hydrochlorate of morphia* are commonly vended in the shops under this name.

Antacid Drops; Guttæ Antacidæ,—Lat. *Prep.* (U. C. Hosp.) *Liquor of potassa,* 3 fl. oz.; *powdered myrrh,* 1 oz.; triturate together until thoroughly incorporated, add of *liquor of ammonia,* 1 fl. oz., mix well, place the mixture in a stoppered bottle, and the next day decant the clear portion. Antacid, tonic, and stomachic; useful in various indications. *Dose.* 10 to 20 drops, or more, in water.

Antihysteric Drops; Guttæ Antihystericæ,—Lat. *Prep. Cyanide of potassium,* 2 gr.; *rectified spirit,* 5 fl. dr.; *syrup of orange flowers,* 3 fl. dr. *Dose.* 10 drops to $\frac{1}{2}$ teaspoonful, when the attack is expected, and repeated occasionally as required; in hysterical affections, gastrodynia, &c.

Antiscorbutic Drops; Guttæ Antiscorbuticæ,—Lat. *Prep.* 1. *Expressed juice of water-cress,* 2 fl. oz.; *salt of tartar,* 1 oz.; agitate together occasionally for a few hours, and in 2 or 3 days decant the clear. *Dose.*

12 or 15 drops, to a teaspoonful, twice a day in a cupful of new milk.

2. *Citrate of potassa*, 4 dr.; *ammonio-citrate of iron*, 2 dr.; *water*, 10 fl. dr. *Dose.* As the last, in water.

Antiscrofulous Drops; Guttæ Antiscrofulosæ,—Lat. *Prep.* 1. *Iodine*, 10 gr.; *iodide of potassium*, 1 dr.; *water*, 1 fl. oz.

2. (Augustin.) *Chlorides of iron* and *barium*, of each, ½ dr.; *distilled water*, 1 fl. oz. *Dose.* 10 to 30 drops, 2 or 3 times a day.

Antispasmodic Drops; Guttæ Antispasmodicæ,—Lat. *Prep.* *Tinctures of castor*, *valerian*, and *assafœtida*, of each, 2 dr.; *tincture of capsicum* and *balsam of Peru*, of each, 1 dr.; *camphor*, 20 gr.; *acetate of morphia*, 3 gr. *Dose.* 10 to 20 drops, as required.

Bateman's Drops. See *Pectoral Drops.*

Battley's Drops. See *Liquor Opii Sedativus.*

Bitter Drops; Guttæ Amaræ, — Lat. *Gouttes Amères*,—Fr. *Prep.* From *nux vomica* (rasped), 1℔; *liquor of potassa*, ½ fl. oz.; *bistre*, 1 dr.; *compound spirit of wormwood*, 32 fl. oz.; digest 10 days, express the tincture, and filter. A most unscientific preparation; said to be tonic and stomachic. *Dose.* 1 to 8 drops in water or any bitter infusion. In large doses it is *poisonous.*

Black Drop, Armstrong's Black Drop, Lancaster's do., Quaker's do., Toustall's do., Braithwait's Genuine do.; *Gutta Nigra*, —Lat. This celebrated preparation was originally prepared nearly a century and a half ago by Edward Toustall, a medical practitioner, in the county of Durham, and one of the Society of Friends. The formula passing into the possession of a near relative of his, (John Walton, of Shildon) was found among his brother's papers, and, by the permission of Thomas Richardson, of Bishop's Wearmouth, one of his executors, was handed to Dr. Armstrong, who subsequently published it in his work on Typhus fever.

Prep. 1. (Original formula.) *Opium* (sliced) ½ ℔; *good verjuice*, 3 pints; *nutmegs*, 1½ oz.; *saffron*, ½ oz.; boil them to a proper thickness; then add of *sugar* ¼ ℔; and *yeast*, 2 tea-spoonfuls. Set the whole in a warm place, near the fire, for 6 or 8 weeks, then place it in the open air until it becomes of the consistence of a syrup; lastly, decant, filter, and bottle it up, adding a *little sugar* to each bottle. To yield 2 pints of strained liquor.

2. (*Acetum Opii*, Ph. U. S.) *Opium*, 8 oz.; *nutmeg*, 1½ oz.; (both in coarse powder;) *saffron*, ½ oz.; *distilled vinegar*, 24 fl. oz.; digest on a sand-bath with a gentle heat for 48 hours, and strain; digest the residuum with an equal quantity of *distilled vinegar* for 24 hours; then put the whole into a percolator, and return the filtered liquid as it passes until it runs clear; afterwards pour on the material *fresh distilled vinegar*, until 48 fl. oz. of filtered liquor shall be obtained; in this dissolve *sugar*, 12 oz., and gently evaporate the whole to 52 fl. oz.

3. (Wholesale.) *Opium*, 10 *oz.;* and *distilled vinegar*, 1 quart; are digested together for about a fortnight, and after sufficient repose, the clear portion is *decanted.* This is the form commonly adopted by the wholesale trade in England. *Dose.* 5 to 10 drops. It is usually considered to be of fully 4 times the strength of laudanum.

Carminative Drops; Guttæ Carminativæ, —Lat. *Prep.* (Radius.) *Oil of mace*, 1 dr.; *nitric ether*, 3 dr. *Dose.* 6 to 10 drops on sugar; in flatulent colic, &c.

Chamomile Drops. See *Essences.*

Dalby's Drops. See *Dalby's Carminative.*

Durande's Drops; Guttæ Ætheris Terebinthinatæ,—Lat. *Prep.* (M. Durande.) *Rectified sulphuric ether*, 3 parts; *oil of turpentine*, 1 part. *Dose.* 20 to 30 drops, or more; in the passing of gall-stones.

Dutch Drops, Haerlem Drops, Turpentine Drops; Balsamum Terebinthinæ,—Lat. The genuine or imported *Dutch drops* are the *residuum* of the rectification of *oil of turpentine.* It is also prepared by distilling *rosin*, and collecting the product in different portions. At first a *white*, then a *yellow*, and lastly, a *red oil*, comes over. The last is the balsam. The article commonly sold under the name in this country is prepared by one or other of the following formulæ:—

1. *Oil of turpentine*, *tincture of guaiacum*, and *sweet spirit of nitre*, of each, 1 oz.; *oils of amber* and *cloves*, of each, 15 drops.

2. *Balsam of sulphur*, 1 part; *oil of turpentine*, 5 parts. This last is the form most generally employed. They are all regarded by those who use them as detergent, diuretic, stimulant, and vulnerary.

Female Drops, Emmenagogue do.; Guttæ Emmenagogæ, — Lat. *Prep.* (Brande.) *Compound tincture of aloes* and *tincture of valerian*, of each, 2 fl. oz,; *tincture of sesquichloride of iron*, 1 fl. oz. *Dose.* A teaspoonful in water or chamomile tea; in obstructed menstruation, &c.

Fit Drops, Soot Drops; Tinctura Fuliginis, Guttæ F.,—Lat. *Prep.* From *wood-soot,* 2 oz.; *sal ammoniac,* 1 oz.; *salt of tartar,* ½ ℔; *soft water,* 4 ℔; digest a week and filter. Reputed antispasmodic, and also useful in scurvy and certain skin diseases. *Dose.* A teaspoonful or more, occasionally, in water.

Golden Drops, De la Motte's do.; Bestucheff's Nervous Tincture; Elixir d'Or, Gouttes d'Or du Général Lamotte; Guttæ Aureæ,—Lat. 1. (Original.) *Chloride of iron* (obtained by distilling iron pyrites with twice its weight of corrosive sublimate), 3 oz.; *alcohol,* 7 oz.; expose the mixture in a closely stoppered bottle to the rays of the sun until it becomes decoloured.

2. *Chlorlde of iron,* 1 part; *alcohol* and *ether,* of each, 3 parts. These drops have the remarkable property of losing their yellow colour in the sun, and recovering it in the shade. They are taken in gout, hypochondriasis, and nervous complaints, in *doses* of from 10 to 60 drops.

Green's Antiscorbutic Drops. A disguised solution of *corrosive sublimate.* Most of the other *advertised antiscorbutic* and *antivenereal drops,* have a like composition.

Hooping-Cough Drops; Guttæ Antipertussicæ,—Lat. *Prep.* 1. (Dr. Graves.) *Tincture of assafœtida* and *compound tincture of camphor,* of each, ½ fl. oz.; *compound tincture of bark,* 5 fl. oz. *Dose.* A teaspoonful, 2 or 3 times a day.

2. (Potestates Succini.) *Oil of amber,* 1 oz.; *carbonate* (not sesquicarb.) *of ammonia,* ½ oz.; *strongest rectified spirit* (alcohol), ½ pint; digest 3 or 4 days, and decant the clear portion. *Dose.* 10 drops to 1 dr., as a friction.

Infantile Drops. Several *anoydne, carminative,* and *absorbent preparations,* which pass by this name, will be found under mixtures, &c.

Jesuits' Drops; Elixir Antivenereum, Balsamum Polychrestum,—Obs. Lat. *Prep.* 1. *Gum guaiacum,* 7 oz.; *balsam of Peru,* 4 dr.; *root of sarsaparilla,* 5 oz.; *rectified spirit of wine,* 1 quart; digest for 14 days.

2. (Quincy.) *Copaiba,* 1 oz.; *gum guaiacum,* 2 dr., *oil of sassafras,* 1 dr.; *salt of tartar,* ½ dr.; *rectified spirit,* 5 fl. oz.; digest a week.

3. (Walker's) *Copaiba,* 6 oz.; *gum guaiacum,* 1 oz.; *chio turpentine* and *salt of tartar,* of each, ½ oz.; *cochineal,* 1 dr.; *rectified spirit,* 1 quart; digest a week. See *Tincture of Benzoin* (Comp.)

Kœchlin's Drops. Prep. (Augustin.) *Solution of ammonio-chloride of copper and mercury,* 1 fl. dr.; *water,* 10 fl. dr. In obstinate venereal affections, scrofula, &c. *Dose.* A teaspoonful after each meal.

Lavender Drops, Red do.; Guttæ Lavandulæ. The same as *compound tincture of lavender.*

Life Drops, Salmon's Drops of Life; Guttæ Vitæ,—Lat. *Tincture of castor,* 8 fl. oz.; *antimonial wine* and *water,* of each, 1 ℔.; *opium,* 3 oz., *saffron,* ½ oz.; *cochineal, camphor,* and *nutmegs,* of each, 2 dr.; digest for 10 days, and filter. Anodyne and diaphoretic. *Dose.* 20 to 60 drops.

Mercurial Drops; Guttæ Hydrargyri Bichloridi,—Lat. *Prep.* 1. *Bichloride of mercury,* 2 gr.; *hydrochloric acid,* 3 drops; *rectified spirit* and *distilled water,* of each, ½ fl. oz. *Dose.* 12 to 20 drops.

2. *Bichloride of mercury,* 2 gr.; *sal ammoniac,* 3 gr.; *compound decoction of sarsaparilla,* 2 fl. oz. *Dose.* A teaspoonful.

3. (Sir A. Cooper.) *Corrosive sublimate,* 1 gr.; *dilute hydrochloric acid,* ½ dr.; dissolve, and add, *tincture of bark,* 2 fl. oz. *Dose.* As the last. They are all taken 2 or 3 times daily, as alteratives in scrofula, syphilis, cancer, &c. It should not be measured in a metal spoon.

Norris's Drops. An aqueous solution of tartar emetic, mixed with spirit of wine, and coloured.

Odontalgic Drops, Tooth-ache Drops; Guttæ Odontalgicæ,—Lat. *Prep.* 1. (Dr. Blake.) *Alum* (in fine powder), 1 dr.; *sweet spirit of nitre,* 7 fl. dr.; agitate together occasionally for an hour.

2. (Dr. Copland.) *Powdered opium* and *camphor,* of each, 10 gr.; *oils of cloves* and *cajeput,* of each, 1 dr.; *highly rectified spirit* and *sulphuric ether,* of each, ½ fl. oz.

3. (Cottereau.) A saturated *ethereal solution of camphor,* to which a few drops of *liquor of ammonia* is added.

4. (Dr. R. E. Griffith.) *Wine of opium, Hoffman's anodyne,* and *oil of peppermint,* equal parts. *Used* as a friction on the cheek or gum, as well as applied to the teeth.

5. (Perry's.) A concentrated *ethereal tincture of camphor* and *pellitory.*

6. (Righini.) *Creasote,* 6 dr.; *rectified spirit,* 4 dr.; *tincture of cochineal,* 2 dr.; *oil of peppermint,* ½ dr.

Obs. The above are applied to the tooth with a camel-hair pencil, or a little wad of lint or cotton wool is moistened with them, and placed *in* or *against* the tooth.

Pectoral Drops, Bateman's do. do.; Guttæ Pectorales,—Lat. *Prep.* 1. *Paregoric,* 10 fl. oz.; *tincture of castor,* 4 fl. oz.; *lauda-*

num, 1 fl. oz.; *tincture of saffron* or of *cochineal*, ½ fl. oz.; *oil of aniseed*, 15 drops.

2. *Castor*, 1 oz.; *oil of aniseed*, 1 dr.; *camphor*, 5 dr.; *cochineal*, 1½ dr.; *opium*, ¾ oz.; *treacle*, 1 lb.; *proof spirit*, 1 gall.; digest for a week.

3. (Phil. Coll. of Pharm.) *Camphor*, *catechu*, *powdered opium*, and *red sanders wood*, of each, 2 oz.; *oil of aniseed*, 4 fl. dr.; *proof spirit*, 4 old wine-gallons; digest 10 days, and filter. *Dose.* A teaspoonful, or more, in coughs, colds, hoarseness, &c., assisted by an aperient.

Peppermint Drops. See *Essences.*

Rheumatic Drops; Guttæ Rheumaticæ,—Lat. *Prep.* 1. *Iodide of potassium*, 1 dr.; *tincture of guaiacum*, 2 fl. oz.; dissolve. *Dose.* 20 to 30 drops. In both chronic and occasional rheumatism, assisted with the copious use of lemon juice.

2. (Lampadius.) *Bisulphuret of carbon* and *ether*, of each, 2 fl. dr. *Dose.* 6 to 12 drops, on sugar, or in milk.

3. (Wutzer.) *Bisulphuret of carbon*, 1 fl. dr.; *alcohol*, 2 fl. dr. *Dose.* As No. 2. The last two are sudorific, alterative, resolvent, and emmenagogue, and besides rheumatism, have been used with advantage in amenorrhœa, in some cutaneous affections, in glandular swellings, &c.

Rousseau's Drops. See *Wine of Opium* (by fermentation.)

Sedative Drops; Guttæ Sedativæ,—Lat. The *solutions of acetate* and *hydrochlorate of morphia*, *black drop*, *Rousseau's drop*, and *Battley's liquor opii sedativus*, are frequently sold under this name by the druggists. The *anti-hysteric drops* (p. 340) is also an excellent sedative.

Spilbury's Drops. *Prep.* 1. (Dr. Paris.) From *bichloride of mercury*, *gentian root*, and *dried orange peel*, of each, 2 dr.; *precipitated sulphuret of antimony* and *red sander's wood*, of each, 1 dr.; *proof spirit*, 16 fl. oz.; digest ten days, and strain.

2. *Levigated crocus metallorum* (crocus of antimony), 6 dr.; *corrosive sublimate*, 45 gr.; *red sanders*, ½ dr.; *gentian root* and *dried orange peel*, of each, 2 dr.; *brandy*, (or equal parts of *rect. sp.* and *water*), 16 fl. oz.; digest as before. *Dose.* 5 to 30 drops; as an antiscorbutic, &c.

Steel Drops. See *Tincture of sesquichloride of iron.*

Swartz's Drops. See *Worm Drops.*

Tonic Drops. *Prep.* (Collier.) *Elixir of vitriol*, 2 fl. dr.; *tincture of calumba*, 6 fl. dr. A teaspoonful three times daily, in a wine-glassful of cold water.

Torrington's Drops. See *Compound Tincture of Benzoin.*

Van Swieten's Drops. An aromatised *solution of corrosive sublimate.*

Ward's White Drop. From *quicksilver*, 4 oz.; *nitric acid*, 16 fl. oz.; dissolve, add *sesquicarbonate of ammonia*, 7 oz.; evaporate and crystallize; then dissolve the resulting salt by the heat of a sand bath, in 4 times its weight of *rose-water*. Very poisonous. *Dose.* 5 to 15 drops, as an antiscorbutic, antivenereal, &c.

Worm Drops; Guttæ Anthelminticæ, *G. Vermifugæ*,—Lat. *Prep.* 1. *Creasote*, 1 dr.; *oil of turpentine*, 7 fl. dr. *Dose.* A teaspoonful, 3 or 4 times a-day.

2. (Peschier.) *Oil of male-fern*, 3 fl. dr.; *rectified oil of turpentine*, 5 fl. dr. As the last; in tape worm.

3. (Schwartz'.) *Barbadoes tar*, 1 fl. oz.; *tincture of assafœtida*, 1½ fl. oz. *Dose.* 30 to 40 drops, three times a day; in tape worm.

DROPS (Scouring). *Prep.* 1. *Oil of turpentine* and *oil of lemons*, equal parts. Both of the ingredients should have been recently distilled or rectified.

2. *Oil of lemon bottoms*, 1¾ *lb.*; *oil of turpentine*, 1 quart; mix well, and distil by the heat of a sand bath, until 3 pints have come over, or as long as the distillate is clear, pale, and sweet. *Used* to remove paint, grease, &c., from cloth.

DROPSY. Syn. *Hydrops*,— Lat. An unnatural collection of aqueous fluid in any part of the body. Dropsy has received different names, according to the part of the body affected by the disease. When it occurs in the cellular membrane it is called *anasarca;* when in the cavity of the abdomen, *ascites;* in the cavity of the cranium, *hydrocephalus;* in the scrotum, *hydrocele;* in the uterus, *hydrometra;* and in the chest, *hydrothorax.* Dropsy is mostly a symptom of extreme debility and a broken-down constitution, and frequently follows lengthened attacks of exhausting chronic diseases.

The *treatment of dropsy*, perhaps, more than any other disease, depends upon the circumstances with which it is connected, and, more especially, upon those which have caused it. The *acute inflammatory forms* of dropsy generally require depletion. In most *other cases*, tonics may be advantageously administered. To promote the absorption of the accumulated fluids, diuretics are commonly resorted to. *Confirmed dropsy* (especially *hydrocephalus* and *hydrothorax*,) occurring in parties either much debilitated by previous disease, or of a bad habit of body, is seldom curable.

DROWNING. The cause of death from submersion in water, is the entire seclusion of air from the lungs, by which the *aëration* of the *venous blood* is prevented, and, consequently, the latter circulates through the arterial system, while the pulmonary vein ceases to convey *oxygenized blood* to the heart. Under ordinary circumstances, in the course of 4 or 5 minutes after the access of air has been cut off, life becomes extinct. Many cases have, nevertheless, occurred of persons being submerged for 15 or 20 minutes, and even longer, and where perfect insensibility has existed, in which recovery has taken place.

Prev. The specific gravity of the human body is *less* than that of water, so long as the lungs are partially filled with air; and this difference is sufficient to keep the body floating with the mouth and nostrils free for respiration, provided the face is turned upwards by throwing the head back on the shoulders, by which the weight of the head is sustained by the water. When a person throws himself into the water, the body rises rapidly to the surface and assumes nearly the erect position, the upper part of the head, down to a little below the eyes, remaining above the surface of the water. This arises from the greater density of the legs and thighs compared to that of the chest, which acts as a species of float or buoy to the rest of the body. In this situation, the head may be thrown back, so that the face may form the exposed portion, as before mentioned, when respiration may be carried on without inconvenience in still water, and regularly, but sufficiently, so as to sustain life for some time, even in a rough sea. The adoption of this simple precaution would have saved thousands of valuable lives.

Another point which should be remembered by every person in danger of drowning, is, that there is always a considerable amount of residual air in the lungs, in a nearly deoxidized state, and that if this air is expelled by two or three forced inspirations, and a deep inspiration is then taken, a larger quantity of vital air will be introduced into the lungs, and the blood will continue aërated for a proportionally longer time; and, consequently a longer period will elapse before another inspiration will be required. If we prepare ourselves by taking two or three forced inspirations, and then take a full inspiration, we may remain for 1½ or 2 minutes before a second attempt at respiration need be made. This is the plan adopted by the pearl fishers, and other divers who are remarkable for remaining beneath the surface of the water for some time. A person in danger of shipwreck, or expecting immediate submersion, in any other situation, should have recourse to this expedient, which would prevent the dreadful effects of attempting respiration whilst under water.

The writer of this article nearly lost his life a few years since, from not exercising the precautions which he is now recommending to others. He had been swimming for about a quarter of an hour, as was his daily custom at the period alluded to, and was returning to the bank, when a species of paralysis seized both extremities, and instead of preserving his presence of mind, and patiently waiting until the fit went off, he exhausted himself in fruitless endeavours to reach the land. The result was, that after a few vain struggles, he sunk utterly helpless and exhausted. The recollection of a comrade that was drowned a few days before, near the same spot, and the conviction of inevitable death, instantly flashed across his mind like an electric shock,—life, death, and eternity,—the dread of leaving his friends in ignorance of his fate,—and a thousand other subjects, were idealized in a moment, and were followed by others in incessant and rapid succession. Space and time seemed annihilated,—they presented no visible horizon to the mind's eye,—all was present,—all the events of life seemed collected and performing at the same moment—as in a day-dream, where individual distinctness is blended with general confusion. A pleasing state of mental serenity ensued; the prospect gradually changed, and surrounding space seemed covered with verdure of the softest green, and illuminated with green light of the most subdued and soothing tone, which gradually faded into twilight, and—here consciousness ceased. During the whole of this time, which occupied about 3½ minutes, no great bodily suffering was experienced; after the first sensations of suffocation were passed, none at all are recollected to have been felt. The feeling in the later moments of consciousness, indeed, approached in delectable serenity, the visions of the *opium eater* in the earlier periods of his devotion to that drug. A quarter of a century has now nearly elapsed since the occurrence of the accident alluded to, but though time has erased from the memory of the writer many events of more recent date, and with a busy hand, has scattered trials and afflictions in his path, yet the incidents that occurred on that almost fatal morning, still occasionally start up before his mind, as distinctly as the doings of yesterday.

Treat. The first object is the restoration of the animal heat. For this purpose, the wet clothes should be removed, and the body, after being well dried, surrounded with warm air. In the absence of a warm-air bath, the body may be laid between well-heated blankets, and bottles of hot water applied to the feet and arm-pits. Gentle friction with warm flannel or the hands, should also be assiduously employed. Meanwhile, attempts should be made to excite respiration artificially; and when the apparatus is at hand, slight shocks of electricity should be kept up at the same time. On the appearance of returning life, such as sighing or convulsive twitching, a vein may be opened. The throat may be tickled with the finger or a feather, to excite vomiting, and a teaspoonful of warm water administered. If the power of swallowing exists, a tablespoonful of *warm wine* or *brandy-and-water* may be given. *Even if no symptom of returning animation appear, these means of recovery should be persisted in for three or four hours.*

In the treatment of this species of asphyxia, nasal stimulants, as *ammonia*, *aromatic vinegar*, *&c.*, should be avoided, as well as the injection of tobacco smoke, both of which have been found highly prejudicial. The practice of holding the body with the head downwards, which is sometimes adopted by the vulgar and ignorant, under the idea of allowing the water to run out by the mouth, is still more dangerous and absurd. The supposition that water is inhaled by drowning persons, instead of air, is perfectly fallacious. The peculiar mechanism of the glottis, or upper portion of the windpipe, is such as to prevent, by the spasmodic closure of the epiglottis, the entrance of more than a very trifling and accidental quantity of water, which is altogether too insignificant to produce any very injurious effects. See *Accidents*, *Animation* (suspended), *&c.*

DRUGS. Our continental neighbours, wiser than ourselves, not merely require that persons engaged in selling and dispensing drugs and pharmaceuticals shall be fully qualified by previous education and training for the task, but also that the various articles they sell and use, shall be commercially pure and of the proper quality. In the United States of America this subject has also engaged the attention of the government and legislature. Under the Act of the 26th June, 1848, inspectors were appointed to examine the quality of imported articles of this class, before allowing them to pass the Customs for home use. An abridged copy of the order addressed to the "collectors and other officers under this act," is appended, and will be useful to the reader, as assisting to establish a standard by which the value of the substances named therein may be estimated.

TREASURY DEPARTMENT, *June 4th*, 1853.

The following articles are to be entitled to entry when ascertained by analysis to be composed as under, viz.:—

Aloes . . .	when affording	80% of *pure aloetic extract.*
Assafœtida .	do.	50% of its *peculiar bitter resin*, and 3% of *volatile oil.*
Cinchona bark (of whatever denom^{n}·)	do.	1% of *pure quinine*, or 2% of the several alkaloids, as *quina*, *cinchona*, *quinidine*, *aricine*, *&c.*
Benzoic . .	do.	80% of *benzoin resin.*
Do. . .	do.	12% of *benzoic acid.*
Colocynth .	do.	12% of *colocynthine.*
Elaterium .	do.	30% of *elaterine.*
Galbanum .	do.	60% of *resin;*
Do. .	do.	10% of *gum*, and 6% *volatile oil.*
Gamboge . .	do.	70% of *pure gamboge resin*, and 2% of *gum.*
Guaiacum .	do.	80% of *pure guaiacum resin.*
Gum ammoniacum	do.	70% of *resin*, and 18% of *gum.*
Jalap (root or powder)	do.	11% of *pure jalap resin.*
Myrrh . .	do.	30% of *pure resin*, and 50% of *gum.*
Opium . .	do.	9% of *pure morphia.*
Rhubarb . .	do.	40% of *soluble matter.*
(Only Turkey, East Indian, and Russian, admissible.)		
Sagapenum .	when affording	50% of *resin*, 30% of *gum*, and 3% of *volatile oil.*
Scammony .	do.	70% of *pure scammony resin.*
Senna . .	do.	28% of *soluble matter.*

Medicinal leaves, flowers, barks, roots, extracts, &c., not specified above, must be, when imported, in *perfect condition*, and of as *recent collection* and *preparation* as practicable.

Pharmaceutical and *chemical preparations*, whether crystallized or otherwise, used in medicine, to be *pure*, and of a *proper consistence* and *strength*, as well as of *perfect manufacture*, conformably with the standard authorities named in the Act; and must, in no instance, contain over 3$^0_0$ of excess of moisture or water of crystallization.

Essential or *volatile oils*, and *expressed oils* used in medicine, must be *pure* and of the *standard sp. gr.* noticed and declared in the dispensatories named in the above act.

"*Patent*" or "*Secret Medicines*" are by law subject to the same examination as other medicinal preparations, and *cannot be permitted to pass the Custom-house for home consumption, but must be rejected and condemned*, unless the special examiner is satisfied, after due investigation, that they are *fit* and *safe* to be used for medical purposes.

An appeal from the examiner to the collector to be admitted within 10 days.

James Guthrie,
Secretary of the Treasury.

DRUMMOND LIGHT. See *Illumination.*

DRUNKENNESS. See *Abstinence, Intemperance, &c.*

DRYERS (Painter's). *Prep.* 1. *Litharge* (best) ground to a paste with *drying oil.* For dark colours.

2. From *white copperas* and *drying oil;* as the last.

3. From *sugar of lead* and *drying oil.* The last two are for pale colours.

4. From *white copperas* and *sugar of lead*, of each, 1 *lb.; pure white lead*, 2 *lb.* For "whites," and opaque light colours, grays, &c. *Dryers* are employed, as the name implies, to increase the drying and hardening properties of oil paints. A little is beat up with them at the time of mixing them with the oil and turpentine for use.

DRYING. See *Desiccation, &c.*

DRYING OIL. See *Oils.*

DRY-ROT. A peculiar disease that attacks wood, and renders it brittle and rotten. It principally attacks "ill-seasoned" timber, and more particularly that of ships and badly ventilated buildings.

Prev. Various means have been proposed to prevent the attacks of dry-rot, and to arrest its progress when it has commenced, among which the process called "*Kyanising*" (after *Kyan*) is that most generally known, and most extensively adopted. It consists in immersing the timber in a *bath* of *corrosive sublimate.* A *solution* of *pyrolignite of iron* has also been used for the same purpose and in a similar way with the best effect. It is asserted, however, that "*Kyanised*" wood that has been exposed for a considerable time in unfavorable situations, has, in some cases, suffered from *dry-rot* in a nearly equal degree with unprepared wood. Lately the process termed "*Paynising*" (after *Payne*) has been extensively tested, and appears likely to supersede every other method. This plan consists in first filling the pores with a solution of *chloride of calcium*, under pressure, and next forcing in a *solution of sulphate of iron*, by which an insoluble *sulphate of lime* is formed in the body of the wood, which is thus rendered nearly as hard as stone. Wood so prepared is now largely employed in our public works and railways.

DUBBING. *Prep.* 1. By boiling the *waste cuttings of sheep-skins* in *crude cod-oil.* 2. *Black rosin*, 2 *lb.; tallow*, 1 *lb.; crude cod-oil* or *train oil*, 1 gall.; boil to a proper consistence. *Used* by the curriers to dress leather, and by shoemakers and others to soften leather, and to render boots and shoes waterproof.

DUCKS. See *Poultry.*

DUCTILITY is the property of being drawn out in *length* without breaking. See *Metals.*

DULCAMARA. See *Woody Nightshade.*

DULCAMARINE. Syn. *Dulcarine*,—Desfosses; *Picroglycion*,—Pfaff. A crystallizable substance obtained from the stalks of *solanum dulcamara* (Linn.) or *woody nightshade.* It has a bitter-sweet taste; is fusible; soluble in water, alcohol, and acetic ether; and its solutions are unaffected by tincture of galls or metallic salts. It is probably a combination of sugar and solanina, (Pelletier,) an alkaloid present in several species of the genus *solanum.*

DUMASINE. An oily liquid hydrocarbon obtained, along with the other products, by distilling *acetate of lime.*

DUMBNESS. Syn. *Aphonia*,—Lat. As speech is an acquired and imitative faculty, persons who are either born deaf or become so in early infancy, are also, necessarily, dumb. The first step in treating dumbness, must therefore be directed to the removal of the deafness on which the imperfection rests. The exertions of modern philanthropists have, however, been so far successful in such cases, as to enable the *deaf-mute* to converse with those around him by signs. Those interested in the subject may consult an admirable treatise on "*Deaf-dumbness*" by M. E. Hubert-Valleroux, of which an excellent translation appeared in the 'Medical Circular,' vol. ii. for 1853. See *Deafness.*

DUNGING. A bath formed of *cow-dung* diffused through *hot water* (130° to 212° Fahr.) is used for cotton goods in a particular stage of their manufacture, alternately with scouring. According to M. Camille Kœchlin, the action of cow-dung is due to its albuminous constituents combining with the alumina and iron of the acetates of these bases dissolved by the hot water of the bath. The acids set free render the bath acidulous after being used for a short time, as shown by test-paper; and this acidity must be got rid of, either by a fresh bath, or by the addition of chalk to the old one. Fresh cow-dung is generally neutral, but is sometimes sufficiently alkaline to turn turmeric-paper brown. *Bran* is frequently used as a substitute for cow-dung, and answers better for delicate yellows, pinks, and lilacs; but for other colours is said to be less effective.

Dunging is one of the most important steps in the process of calico printing. It serves to fix the bases on the cloth, and exercises a deoxidizing power on the iron mordant, which it thus restores to a state more suited for combining with the colouring matter of the ordinary dyes. See *Cow-dung* and *Dyeing.*

DUTCH LIQUID. See *Olefiant Gas.*

DYEING. Dyeing is a chemical process, and the mode of its performance requires to be modified to suit the substance operated on. Thus, it is found, that the process by which *wool* is dyed black, only imparts a rusty brown to linen. *Wool* unites with almost all the colouring matters of dye-stuffs with great facility; *silk* possesses this property in the next degree; *cotton* is inferior in this respect to silk; whilst *linen* is dyed of permanent colours with even more difficulty than cotton. Preparatory to the operation of dyeing, each of these substances undergoes a species of preparation to free the fibres from adhering foreign matter, (dirt, grease, &c.) which would prevent the equal absorption of the aqueous fluids to be afterwards applied, as well as impair the brilliancy of the dye. WOOL is *cleaned* or *scoured* by means of weak alkaline lyes, soap and water, or putrid urine; the last being the one most generally employed for this purpose. SILK is *cleaned* from the natural varnish that covers it, by boiling it with white soap and water. COTTON and LINEN are *cleaned* with alkaline lyes of more or less density. The substances after this preparation are ready to undergo the various operations of dyeing.

Among the *colouring materials* employed by the dyer, some impart their tints to the substances submitted to their action, by simple immersion in their infusions or decoctions, and are hence called "*substantive*" or "*direct colours*" or "*dyes.*" Far the greater number, however, only impart a *fugitive colour*, unless the fibres of the stuff have been previously prepared with some substance, which has a strong affinity for the latter on the one hand, and the colouring material on the other. The articles employed with this intention are called "MORDANTS," and generally exercise the double property of "*fixing*" and "*striking*" the colour. Thus, *calico* dyed with a decoction of madder, only receives a fugitive and dirty red tinge; but when it is previously run through a solution of acetate of alumina, then dried at a high temperature, and after being washed, passed through a madder bath, it comes out of a permanent and lively red. The *principal mordants* are the *acetates of iron, copper,* and *alumina, sulphate of iron, alum,* and some other *chemical salts.* A perfect knowledge of the behaviour of mordants, with different colouring substances, is of the utmost importance to the practical dyer.

After the "goods" have received the proper mordants, they are dried and rinsed, and passed for a shorter or longer time, according to the effect desired, through an infusion, decoction, or solution of the dyeing materials, which constitute the "*dye-bath.*" They are then dried, aired, and rinsed. In many cases, the immersion in the dye-bath is repeated, either with the same materials, or with others to vary or modify the colour. The final *rinsing* or *washing* should be in *soft water*, and the operation should be continued until the liquid runs off uncoloured.

The modification of the art of dyeing called "*calico printing,*" has been already briefly referred to. The leading *fast dyes* of the calico printers are produced as follows:—

Black. The cloth is mordanted with *acetate of iron* (iron liquor), and dyed in a bath of *madder* and *logwood.*

Blue. The most durable are given by *indigo*, rendered soluble by potash and orpiment, or by *quicklime* and *copperas*. The *blue vat*, for white spots on a blue ground of cloth, is made by applying to those points a paste of *solution* of *sulphate of copper* and *pipeclay;* and after they are dried, immersing it, stretched on frames, for a definite number of minutes, in a yellowish-green vat of *indigo*, 1 part; and *copperas* and *lime*, of each, 2 parts; with *water*, q. s.

Brown or *Pompadour.* From a mixed mordant, containing a somewhat larger proportion of the *red* than of the *black;* and a dye-bath of *madder.*

Buff. A yellow or golden yellow, but more dilute.

Crimson. The *mordant* for *purple* united with a portion of *acetate of alumina* or red mordant, with a *purple bath.*

Golden. From a bath of *annotta* dissolved in an *alkaline lye;* or the cloth is immersed alternately in a solution of copperas and lime water, observing to 'air' and rinse it well before each immersion.

Green. The cloth is dyed blue, then mordanted with *acetate of alumina*, dried and passed through the *quercitron bath.*

Orange. From a *red mordant;* and a bath first of *madder*, and then of *quercitron.*

Purple. The *mordant of iron*, for black, diluted; followed by a bath of *madder* and *logwood.*

Red. From *acetate of alumina* as the mordant, and *madder* for the *dye-bath. Pale red* and *red* of *different shades* are made by using a weaker mordant and bath.

Yellow. From a *strong red mordant*, followed by the *quercitron bath*, only hot, not boiling.

Obs. In the above cases, for *calico-printing*, the cloth, after receiving the mordant, made into a paste with *British gum*, and applied topically by blocks or cylinders, is dried, and passed through a mixture of *cow-dung* and *warm water.* In *ordinary dyeing*, without patterns, the goods are simply immersed in the mordants. In both cases the calicoes are then put into the dyeing vat or copper. See *Calico Printing*, *Dunging*, *Mordants*, and the *respective dyes* and *dye-stuffs.*

DYER'S SPIRITS. See *Tin Mordants.*

DYES. See *Dyeing.*

DYE-STUFFS. The colouring materials used in dyeing are so called. The more important of them are noticed under the respective names.

DYSENTERY. Syn. *Bloody Flux; Dysenteria*,—Lat. A disease arising from inflammation of the mucous membrane of the large intestines, and characterized by stools consisting chiefly of blood and mucus, or other morbid matter, accompanied with griping of the bowels, and followed by tenesmus. There is generally more or less fever, and the natural fæces are either retained or discharged in small hard balls, (*scybala.*) The *common causes* of this disease are marsh miasma, improper diet, excessive exhaustion and fatigue, and above all, exposure to the cold and damp air of night after a hot day.

Treat. The common dysentery of this country generally gives way to gentle aperients, (*castor oil* or *salts-and-manna*,) to cleanse the bowels, followed by *mild opiates* or *morphia*, to allay irritation. The chronic symptoms, which frequently hang about for some time, are best combated by mild tonics and vegetable bitters, (*bark, calumba, cascarilla.*) Occasionally, chalybeates (*ammonia-citrate of iron, lactate of do., wine of do., saccharine carbonate of do.*,) will be found useful during coalescence. Throughout, the diet should be light and nutritious.

The *contagious dysentery*, of camps and hot climates, is a severe and often fatal disease, in which the preceding symptoms are complicated with remittent or typhoid fever. Its treatment is tedious and difficult, and depends chiefly on judiciously meeting the several symptoms as they develope themselves. *Aperients, diaphoretics*, and *nauseants*, followed by *tonics*, are the remedies generally relied on. The febrile symptoms must be treated according to their inflammatory or putrid tendency. This variety of the disease frequently gives rise to organic diseases of the abdominal viscera, dropsy, &c. It is regarded by some as contagious, but without sufficient reason.

DYSLYSINE. A resinous substance, insoluble in water, formed, along with other substances, when *glyco-cholalic acid* is boiled for some time in *concentrated sulphuric* or *hydrochloric acid.*

DYSMENORRHŒA. See *Menstruation.*

DYSPEPSIA. See *Indigestion.*

DYSPNŒA. Difficulty of breathing. It is generally symptomatic of some other affections. When it occurs in persons of a nervous or irritable habit of body, perfect quiet, a semi-recumbent posture, fresh air, and some small doses of *ether, ammonia*, or *opium*, will generally effect a cure. Those of a full habit, require aperients and depletion. To prevent attacks of the kind, excess in eating and drinking, and the use of stimulants, should be avoided.

DYSURIA. Syn. *Dysury.* Difficult urination. It is generally symptomatic of disease of the kidneys, bladder, or urethra. The *treatment* depends on the exciting cause.

EAR. See *Deafness* (and *below.*)

EAR (Inflammation of). Syn. *Otitis,*—Lat. This affection, when it attacks the internal part of the ear, is generally accompanied with confusion of sound, deafness, and more or less fever. It is most frequent among children, and is commonly produced by exposure to draughts of cold air, and, occasionally, by foreign matters, as cherry-stones, insects, &c., having got into the external ear. In such cases, the removal of the offensive matter, and due attention to warmth and cleanliness, with a dose of laxative medicine, will be all the treatment required. Cases of *acute inflammation* of the internal ear are occasionally met with in adults, which assume a very serious character, and demand the most active antiphlogistic treatment, as bleeding, blistering, and purgation, for which proper medical advice should be sought. See *Deafness.*

EARACHE. Pain in the ear may arise from various causes, amongst which, in the absence of organic disease, cold, and that peculiar derangement of health popularly called "nervousness," are the most common. In the one case, the proper remedy is warmth; in the other, the attention should be directed to the restoration of the body to the healthy standard.

EARTHS. Syn. *Terræ,*—Lat. The earths of the *agriculturist* are soils wholly or nearly destitute of organic matter. Among *chemists,* the term is applied to a certain class of bodies which constitute the principal portion of the various stony and pulverulent masses, that form our mountains, valleys, and plains. The *primitive earths* are ten in number,—*baryta, strontia, lime, magnesia, alumina, glucina, zirconia, yttria, donaria,* and *thorina.* The first four are termed *alkaline earths,* from their partial solubility in water, their alkaline taste, and their action on vegetable colours. The remainder constitute the *earths* (proper), and are insoluble in water, and only imperfectly neutralize the acids. *Silica* and *lithia* have also been classed with the earths, but the first, from its power of neutralizing bases, is more correctly placed among the acids; and the last, from its behaviour with the acids, and the solubility of its carbonate in water, may certainly be closed with the alkalies. In a state of purity they are all *white* and *incombustible;* but as they exist in nature they appear under various forms, occasioned by their being combined with other substances, as the acids, and the oxides of the common metals. Prior to the splendid discoveries of Sir H. Davy in electro-chemistry, the several earths were regarded as elementary or undecompounded bodies, instead of the oxides of metals, which, from their peculiar characters, are obtained with difficulty, and possess but an evanescent existence.

The term *earth* was very loosely applied by the older chemical and pharmaceutical writers, and the practice is still common among the vulgar at the present day. Thus, —*Absorbent earth* (chalk); *aluminous earth, argillaceous do.* (alumina); *bolar earth* (bole); *bone-earth* (phosphate of lime); *fuller's earth* (an absorbent clay); *heavy earth* (baryta); *Japan earth, terra Japonica* (catechu); *sealed earth* (bole); &c., are names even now frequently encountered both in trade and in books.

EAU. (Fr.) Water. This word, like its English synonyme, is applied to numerous substances, differing in their composition, sensible properties, and uses, of which the following are a few useful examples:—*Eau douce,* fresh or river water; *Eau de mer,* sea or salt water; *Eau de fontaine, eau de source,* spring water; *Eau de puits,* well or pump water; *Eau de rivière,* river water; *Eau distillée,* distilled water; *Eau de rose,* rose water; *Eau de vie,* brandy; *Eau de Cologne,* Cologne water; *Eau d'Hongrie,* Hungary water; *Eau bénite,* holy water; *Eau forte,* aquafortis; *Eau de savon,* soap-suds; *Eau de senteur,* scented water, &c.

Eaux, in perfumery, are solutions of the fragrant essential oils in spirit, as *eau de Cologne, eau de bouquet,* &c.; or they are *distilled waters,* largely charged with the odorous principles of plants, as *eau de rose, eau de fleurs d'oranges,* &c.

Eaux, of the *liqueuriste,* are *aromatized spirits* or *cordials.*

Eaux (Médicinales), are either simple watery solutions (*hydrolés, hydrolatures, solutions par l'eau*), or distilled water (*eaux distillées*); or they are vinous or alcoholic tinctures or solutions of essential oils, aromatics, or more active drugs. See *Cordials, Hair Dyes, Perfumery, Spirits, Tinctures, Waters, &c.*

EBLANINE. The yellowish-red, crystallizable, solid substance, which is left behind in the retort, when *wood spirit* is rectified from *quicklime.* It is insoluble in water, and sublimes without fusion at 273° Fahr.

EBONY is the wood of the *diospyrus melanoxylon*, an East Indian tree, of the natural order *ebenaceæ*. Pale-coloured woods are stained in imitation of ebony (*factitious ebony*), by washing them with or steeping them in a strong *decoction of logwood* or of *galls*, and, when dry, washing them over with a *solution of sulphate* or *acetate of iron*. They are then rinsed in clean water, and the process is repeated, if required. The wood is lastly *polished* or *varnished*.

EBRIETY. See *Intoxication*.

EBULLITION. The state of boiling. The *boiling points* of liquids are constant under precisely the same circumstances. The causes which induce variation are increased or diminished atmospheric pressure, the greater or less depth of the liquid, and the character of the containing vessel. Thus, boiling water is colder, by some degrees, in bad weather, when the barometer is low, and at the top of a hill, than in fine weather, or at the bottom of a valley or mine, when the barometer is higher. Boiling water contained in a deep vessel is also hotter than that in a shallow one, on account of the greater resistance in the one case than the other to the escape of the steam. It is also found that fluids boil at a lower temperature and more quietly in vessels with rough and spicular surfaces, than in those with smooth or polished ones. The boiling point of water, as marked on the scale of the thermometer, is 212° Fahr., but in glass vessels, under common circumstances, it varies from 212·54° to 215·6°; whilst in perfectly pure and smooth glass vessels, water may be heated to 221° Fahr., without boiling. The cause of this may be at once demonstrated by throwing into water, about to boil in a glass mattras, a little iron filings or coarsely powdered glass, when ebullition will commence with almost explosive violence, at the same time that the temperature of the fluid will sink about 2° Fahr. The fact of liquids boiling in metallic vessels at fully 2° less heat than in vessels of glass, is also accounted for on the same principle. From 5° to 9° are usually lost by the heat passing through the vessel, according to the thickness and material. *In vacuo* all liquids boil at a temperature about 124° lower than in the open air, at the average barometric pressure.

The boiling point of water contained in ordinary vessels, may be raised considerably above 212° Fahr., by the addition of saline matter, as will be seen in the following table. In practice it is found inconvenient to employ a saturated saline solution for a bath (by which the highest temperature would be obtained), as the constant evaporation of the water induces the crystallization of the salt. It is hence usual to keep it considerably below that point. By means of these liquids and oil baths, the chemist is enabled to evaporate fluids and desiccate solids at any required temperature.

TABLE *of the Boiling Points of Saline Solutions, abridged from the researches of* Biot, Gay-Lussac, Griffith, Ure, and others.

Names of Salts.	Dry Salt in 100.	Boiling Point.
Chloride of calcium . .	sat^{d}.	285°F.
Acetate of soda . .	60	256
Nitrate of soda . .	60	246
Chloride of calcium . .	41	240
Rochelle salt . . .	90	240
Nitre	74	238
Hydrochlorate of ammonia	50	236
Tartrate of potassa . .	68	234
Chloride of calcium . .	34	230
Chloride of sodium . .	30	224
Ditto	20	218·75
Sulphate of magnesia .	57·5	222
Supersulphate of potassa .	?	222
Borax	52·5	222
Phosphate of soda . .	?	222
Carbonate of soda . .	?	220
Chloride of barium . .	45	220
Alum	52	220
Acetate of lead . .	sat^{d}.	215·6
Sulphate of potassa . .	17·5	215
Bitartrate of potassa .	9·5	214
Sulphate of soda . .	31·5	213

EBULLIOSCOPE. Syn. *Ebullition Alcoholmeter*, *Thermo-alcoholmeter*. This instrument is essentially a thermometer, and its application to alcoholmetry is based upon the fact, that the boiling point of a spirituous liquid is scarcely altered by the presence, within certain limits, of the substances which may be dissolved in it, and which, by increasing its specific gravity, render the ordinary alcoholmeters or hydrometers useless for the purpose of indicating its alcoholic richness. The ebullioscope was invented by the Abbé Brossard-Vidal, of Toulon, and in its original form, consisted of a *spirit-lamp* surmounted by a *small boiler*, into which a large *cylindric glass bulb* was plunged, having an *upright stem* of such calibre that the *quicksilver* contained in them, by its expansion and ascent when heated, raised before it a little *glass float* in the stem, which was connected by a thread with a similar *glass bead*, hanging in the air. This thread passed round a *pulley*, which, turning with the motion of the beads, caused an *index* to move along a *graduated circular scale*, which represented on its face the per centage of absolute alcohol in spirituous liquors of different boiling points. This form of the apparatus being found inconvenient and liable to get disarranged, various improvements were made in it by MM. Conaty, Lerebour, and others. The modification of the instrument now in use, and known as *Field's "Patent Alcoholmer,"* was made by Dr. Ure, and can scarcely be improved on. It consists of a *thermometer* having a very minute bore and a large bulb, similar to that employed to determine the height of mountains from the boiling point of water, but instead of thermometric degrees being marked upon the scale, the *per centage under proof* is placed on the *left-hand side* of the stem, and the *per centage content of proof spirit*, on the *right hand side.* These commence at 178·6° Fahr., the temperature at which proof spirit boils, and which here forms the bottom of the scale. The succeeding numbers are based upon the boiling points contained in the *tables* given at *page* 36. The *little boiler* being charged, and about a *teaspoonful of salt* (35 gr.) being added, to prevent loss of alcohol by evaporation, the *thermometer* is set in its place, and the *spirit-lamp* lighted. When the *mercury* begins to rise out of the bulb of the thermometer, the *damper-plate* is pushed in a little way, to moderate the heat. The eye is now kept steadily on the instrument, and *as soon as* the liquor boils freely, and the *mercury becomes stationary in the stem*, the indication is carefully noted, and the *damper-plate* pushed home to extinguish the flame.

The *ebullioscope* is adjusted to the mean boiling point of water under an atmospheric pressure of 29·5 inches. When the pressure is either higher or lower, both water and alcohol boil at a somewhat different temperature, to meet which a barometrical equation is attached to the thermometer by means of a small *subsidiary scale.* It is therefore necessary, prior to commencing the operation of testing any liquor, to charge the little boiler with *pure water* only, and to fix the thermometer in its place. When the *water* boils freely, the *mercury* becomes stationary in the stem, exactly opposite the true barometrical indication at the time. Should this be against the line 29·5, no correction will be required; but should it stand at any other line, above or below, then the various boiling points will bear reference to that boiling point only. In the latter case, the *boiling point of the water on the barometrical indicator*, must be set against the *boiling point of the liquid on the scale*, when *opposite the line*—29·5, will be found the *true strength.* Thus:—the barometer being at 30 inches, and the indication or boiling point being 72 u. p., 30 on the *indicator* must be placed against 72 u. p. on the *thermometer*, when against the *line of* 29·5, will be seen 69·6 u. p., the *real* strength of the sample tested.

When a spirit is stronger than the excise proof, its boiling point varies too little with its alterations of strength to render the ebullioscope of much practical value. To make it applicable to the stronger spirits, it is therefore necessary to dilute them with exactly their own bulk of pure water before testing them, and then to double the resulting indication, as suggested by Dr. Ure. Our own plan is always to do this when the spirit is stronger than 20 u. p.

By *means of the ebullioscope* the alcoholic content of *beer*, *wines*, and *spirits*, of *every variety* and *class*, may be readily determined with sufficient accuracy for all practical purposes; and by methods which we shall hereafter point out, the amount of *saccharine extractive*, or *sugar*, in *cordialized spirit*, *malt liquors*, and *wines*, may also be ascertained.

The ebullioscope (*Field's alcoholmeter*) employed by us in our numerous and extensive investigations connected with public hygiène, was made by Mr. Long, of Little Tower Street, and is an instrument which should be in the hands of every wine and spirit merchant and licensed victualler, as well as every private gentleman who feels interested in the quality of the liquors in his cellar. The instrument is accompanied by a useful little pamphlet of directions and tables, which has been very accurately got up, as we understand, by Dr. Ure, expressly for Mr. Long.

EDULCORATION. The affusion of water on any substance for the purpose of removing the portion soluble in that fluid. *Edulcoration* is usually performed by agitating or triturating the article with *water*, and removing the latter, after subsidence, by decantation or filtration. It is the method commonly adopted to purify precipitates and other powders which are insoluble in water.

EEL. The *common eel* is the *muræna anguilla* of Linnæus, a fish of the order *malacopterygii apodes.* As an article of food it is said to be laxative and far from wholesome. The fat (*eel fat; adeps anguillæ, oleum do.;*) is among the simples of the Ph. L. 1618, and was formerly considered "good against stripes," and is even now used by the vulgar as a friction for stiff joints. For *the table,* eels are generally dressed by *stewing, frying, baking,* or *potting them,* which is done in the usual way, the fish being cut into pieces 2 or 3 inches long, and *melted butter, onions, sweet herbs,* and *anchovy sauce,* added at will. The *conger eel* is the *murœna conger* (Linn.), a distinct and gigantic species of the same family. Its flesh is coarse and oily, but is much esteemed by the inhabitants of the southern coast of Devon, on which it abounds.

EFFERVESCENCE. See *Draughts, Powders, &c.*

EFFLORESCENCE. The spontaneous conversion of a solid into a dry pulverulent form. Crystals which in a dry atmosphere lose their water of crystallization, and become crusted over with a mealy powder, are said to be *efflorescent.*

EGGS. Syn. *Ova,*—Lat. The eggs of birds are nutritious and easily digestible; and when *lightly* cooked by boiling, and eaten with a little salt, are admirably adapted as an aliment for the sick and delicate. When boiled *hard* or *fried,* they are rendered less digestible, and possess no advantage in this respect over butcher's meat. A *new-laid egg,* beaten up in a *cup of tea, coffee,* or *chocolate,* is an excellent ingredient in the breakfast of a person with a poor appetite, and is very supporting. A *glass* of *wine, beer,* or *porter,* similarly treated, along with a *biscuit,* has been recommended as a light and *nutritious luncheon* or *supper,* well suited to the debilitated and dyspeptic. *Raw eggs* are powerfully antiscorbutic, and from containing a large quantity of iodine and the phosphates, are superior to cod-liver oil in all the cases in which this last is ordered, occurring in persons with delicate or irritable stomachs. These good qualities are, however, lost, if they are boiled longer than about 2 minutes for a small one, and 3 minutes for a large one, or are eaten with much salt. The addition of fresh *salad oil* vastly increases their medicinal virtues. A *fresh egg* contains about the same amount of nourishment as 1½ *oz.* of *fresh meat* and 1 *oz.* of *wheaten bread,* but in a more digestible form.

White of egg (*ovi albumen*), and yelk of egg (*ovi vitellus*), are officinal in the Ph. L. The *first* has been already noticed under "*albumen.*" The *second* is an ingredient in the brandy mixture (*mixtura spiritus vini gallici*) of the London College. It is also a popular application to chaps, cracked nipples, abrasions, &c., and is largely used to render oleaginous substances miscible with water, in the preparation of emulsions.

The *average weight* of the *new-laid egg of a hen* is about 2½ *oz.*, and its sp. gr. is 1·080 to 1·090; the *white* generally weighs about 1½ *oz.;* the *yelk,* a little under ¾ *oz.;* and the *shell* and *skin,* ¼ *oz.* Dr. Prout found that an egg on being kept for 2 years in a dry situation, lost 544$\frac{3}{10}$ gr., from the evaporation of a portion of its water through the shell. By *boiling in water* an egg loses from 2% to 3% of its weight.

Choice. The larger end of a new-laid egg feels cold, when placed against the tongue. New-laid eggs appear semi-transparent when placed between the eye and a strong light, and have a small and perceptible division of the skin from the shell, which is filled with air. This examination among the trade is called "*candling them.*" When they shake they are stale. The *eggs* of the large black fowls called *Minorcas* or *Spanish,* and which have a very white and rough shell, are those that possess the most delicate flavour. The *eggs of turkeys* are much esteemed for some purposes; those of *ducks* and *geese* are coarse and inferior.

Pres. Eggs may be preserved for any length of time by excluding them from the air. One of the *cleanest* and *easiest* methods of doing this, is to pack them with the small end downwards, in *clean dry salt,* in barrels or tubs, and to place them in a *cool* and *dry* situation. We have eaten eggs thus preserved that were more than a twelvemonth old, and that had been for some months on shipboard, in a tropical climate, and which yet retained all the peculiar sweetness of new-laid eggs. With a like intention, eggs are placed in vessels containing *milk of lime,* or *strong brine,* or are rubbed over with *butter, lard,* or *gum water;* all of which act by excluding the air. *Eggs* for *keeping* should *never be laid on their sides,* and when kept in the air, should be occasionally turned to prevent the yelk attaching itself to the side, instead of floating in the albumen. *Some persons* place the *eggs* in a *netting,* or on a *sieve* or *colander,* and immerse them for an *instant* in a caldron of *boiling water,* before packing them away. The practice of packing eggs in *damp straw,* or anything else that can convey a flavour, should be carefully avoided. The shells of eggs are porous, and readily admit the passage of gaseous substances, especially of fetid odours. It is from inattention to this point that a large portion of the eggs imported from the coast of France have a less delicate flavour than those of our poultry yards. Damp chopped-straw, as well as most other organic substances exposed to warmth and moisture, readily ferment or putrefy; and during fermentation, a considerable increase of temperature takes place, as any one may readily perceive, by examining the common hotbeds in our gardens, which are merely masses of organic matter in a state of decomposition. Eggs, as long as they retain the embryo of the future chick, in a vital state, possess in themselves a certain degree of warmth, which tends materially to promote the decomposition of the substances they are packed in, particularly in the presence of moisture.

EGG (Elastic). Take a *good* and *sound egg*, place it in *strong vinegar*, and allow it to remain for twelve hours; it will then become quite soft and elastic. In this state it can be squeezed into a tolerably *wide-mouthed bottle;* when in, it must be covered with *water*, having a little *soda* dissolved in it. In a few hours the egg will be restored to nearly its original solidity; after which the *liquid* may be poured off, and the bottle dried, the whole being kept as a curiosity to puzzle one's friends for an explanation how the egg got there. (*'Parlour Pastime.'*)

EGG (Glaire of). *Prep.* Separate the *whites* from the *yelks*, and whisk them to a froth, let them stand 24 hours, and strain them through muslin. Used as a glaze or varnish by bookbinders and others.

EGG FLIP. *Prep.* 1. *Beer*, 1 pint; *eggs*, 3 in no.; *sugar*, 2 *oz.; nutmeg* and *ginger*, q.s. to flavour; the eggs are broken into one half of the beer, the sugar added, and the whole beaten well together; the mixture is then placed in a clean "warmer," and heated over the fire to *nearly* the boiling point, and stirred *one way* all the time, care being taken not to let it either boil or curdle; the other portion of the beer and the spices are then added, and the whole mixed well together.

2. As above, but adding *a glass of spirit*. Some persons also add a little *lemon peel.*

EGG LIQUID (Jayne's). *Prep.* From *lime*, 1 bushel (slaked with water); *common salt*, 2 or 3 *lb.; cream of tartar*, ½ *lb.; water*, q. s. to form a mixture strong enough to float an egg. *Used* to preserve eggs, which it is *stated* it will do for two years, by simply keeping them in it. Once patented. Simple milk of lime answers quite as well.

EGG WINE. As *egg flip*, but using equal parts of *white wine* and *water* instead of beer.

EISOL. See *Sulphuric Acid.*

ELÆOMETER. See *Hydrometer* and *Oils.*

ELÆOPTENE. See *Oils* (Volatile).

ELAIDIC ACID. An acid compound formed by the action of nitrous acid or nitrate of mercury on oleic acid.

Prep. (Meyer.) A current of *nitrous acid gas* is passed through pure *oleic acid,* at a low temperature, for about 5 minutes; the crystalline mass, that shortly afterwards forms, is washed with *hot water*, and then dissolved in an equal volume of *hot alcohol.* The crystals deposited as the liquor cools, are purified by pressure, re-solution, and re-crystallization.

Prop., &c. Elaïdic acid resembles sublimed benzoic acid; melts at 113° Fahr., and is soluble in alcohol and ether; with the alkalies and their carbonates it forms hydrated salts (*elaidates*), which yield strong soapy solutions.

ELAIDIN. A fatty compound of elaïdic acid and glycerine, formed by the action of *nitrate of mercury* on *olive oil.* It is neutral; melts at 90° Fahr.; and is very soluble in ether, scarcely so in alcohol. It is one of the components of citrine ointment. By saponification it is resolved into *glycerine* and *elaïdic acid.*

ELAINE. See *Oleine.*

ELALDEHYDE. A peculiar crystalline substance which forms in aldehyde when kept for some weeks at a temperature of 32° Fahr. It melts into a colourless liquid at about 38°, in which state it is miscible with water, alcohol, and ether. It is isomeric with aldehyde, but its vapour has about three times the density of that substance, whilst it neither combines with ammonia, nor comports itself with potassa and solution of silver like aldehyde.

ELATERINE. Syn. *Momordicine; Elaterinum,*—Lat. The active principle of elaterium. It was discovered by Dr. Clutterbuck in 1819, but first obtained in a state of purity in 1830, by the late Mr. Hennel.

Prep. 1. (Dr. Morries.) *Elaterium* is digested in *hot alcohol*, the resulting tincture filtered, evaporated to the consistence of thin oil, and then thrown into boiling distilled water; when the whole is cold, the precipitate is collected and purified by redissolving it in *alcohol* and precipitation by water, as before.

2. (Hennel.) The *alcoholic extract of elaterium* is digested in *ether*, and the residuum dissolved in *hot alcohol;* crystals form as the solution cools.

3. An *alcoholic tincture* is evaporated to the consistence of a syrup, and thrown into a *mixture* of equal parts of *liquor of potassa* and *water* at a boiling temperature. Almost pure *elaterine* separates as the liquid cools.

Obs. Elaterine forms delicate white silky crystals, having a bitter taste; it is fusible at about 365° Fahr.; tastes bitter; odourless; neutral; insoluble in water; and dissolves readily in hot alcohol. Its medicinal action is similar to that of elaterium, differing only in its greater activity. *Dose.* $\frac{1}{16}$ gr. to $\frac{1}{20}$ gr.

ELATERIUM. "The fresh unripe fruit" of the *wild cucumber*, "*ecbalium officinarum.* (Richard; *momordica elaterium*, Linn.)" — Ph. L. According to present usage, the word is more generally applied to the deposit obtained from the juice of the wild cucumber. (See *below.*)

ELATERIUM. Syn. *Extract of Elaterium*, *Ext. of Squirting Cucumber; Elaterium,*—Ph. D. 1807; & Ph. L. 1788. *Extractum Elaterii,* — Ph. L. E. & D. The feculence of the juice of the fruit of *momordica elaterium*, or *wild cucumber.*

Prep. 1. (Ph. L.) Slice *wild cucumber* in the long direction, and strain the juice, *very gently expressed*, through a fine hair sieve; then set it aside for some hours, until the thicker part has subsided. The thinner supernatant fluid being rejected, dry the thicker portion with a gentle heat. The processes of the other colleges are essentially the same.

2. (Dr. Clutterbuck.) The *cucumbers* (fully ripe) are cut longitudinally, and sprinkled with *cold water*, and the juice allowed to strain through a fine sieve into an earthenware vessel. The *seeds* and *surrounding pulp* are next placed on the sieve, with the split fruit, and washed repeatedly with *cold water.* The *washings* being received in the same vessel with the juice, the whole is allowed to repose for a few hours, when the clear portion is decanted and the sediment spread thinly on fine linen, and dried by exposure to the air and a gentle heat; avoiding the sunshine or a bright light. Quality very fine. Forty fruits, by this process, yield only 6 gr. of elaterium.

3. (Apothecaries' Hall.) The *fruit*, slit into halves, is placed in hempen or horsehair bags, and submitted to slight pressure in a *tincture press.* The juice, as it runs off, passes through a fine hair sieve into a cylindrical glass jug or jar, where it is allowed to remain for two hours, when the clear supernatant liquor is poured off, and the thick portion containing the sediment is poured on a paper filter, supported on linen, and allowed to drain, after which it is dried by a gentle heat in a stove. The product has a green colour, and constitutes the *finest elaterium* of commerce. A darker and inferior article is obtained from the liquor, poured from the first sediment by placing it in shallow pans and allowing it again to deposit.

Prop., &c. Pure elaterium has a light greenish hue, floats on water, is easily pulverized by pressure, and forms with rectified spirit a rich green-coloured tincture. Elaterium obtained as a second deposit, (*elaterium nigrum,*) is dark and inferior.

Good elaterium yields from 50% to 60% of its weight to strong alcohol, and from 25% to 44% of elaterine. Its "colour is pale (greenish) gray: when exhausted by rectified spirit, the solution, concentrated, and poured into hot *dilute solution of potassa*, deposits, on cooling, minute silky, colourless crystals (of *elaterine*), weighing from $\frac{1}{7}$th to $\frac{1}{4}$th of the elaterium operated on." (Ph. E.)

Obs. To procure a fine article of elaterium, it is necessary to remove it as soon as it is deposited, as a heavy mucilage falls down soon afterwards, which materially injures its quality and appearance. *English elaterium* is the best. The foreign is uniformly adulterated with chalk or starch, and coloured with sap green.

Dose. $\frac{1}{16}$ gr., to $\frac{1}{2}$ gr., formed into a pill with extract of gentian and liquorice powder; as a hydragogue and cathartic in dropsies, twice a day, repeated every other day for a week or ten days. Its use must be avoided when there is much debility or any inflammatory symptoms. Larger doses than $\frac{1}{2}$ gr. of pure elaterium are poisonous. The *antidotes*, are emetics, followed by demulcents, opium, and stimulants.

ELATINE. Obtained by Dr. Paris by treating the *alcoholic extract of elaterium* with *boiling water*, which dissolves out the bitter matter and leaves the *elatine.* It has since been shown to consist of elaterine and green resin of elaterium.

ELDER. Syn. *Sambucus,* — Ph. L. "The recent flowers of the *sambucus niger,*" (Ph. L.) or *common elder.* They are regarded as diaphoretic and pectoral, and a distilled water (*elder-flower water; aqua sambuci;*) is made of them. The *inner bark* of the same tree is purgative and emetic, and is used in dropsy; the *leaves* are purgative; the *juice* of the *fresh berries* is made into wine, (*elder wine*,) and is largely used to make *factitious port wine*, and to adulterate that beverage. See *Waters* (Distilled).

ELECAMPANE. Syn. *Helenium; Inula*, —Ph. L. "The root of *inula helenium*," (Ph. L.) Tonic, diaphoretic, and expectorant. *Dose.* 20 gr. to 1 dr., or more, either in the form of powder or decoction; in catarrh, dyspepsia, &c. It is now seldom used.

ELECAMPINE. See *Inulin*.

ELECTIVE AFFINITY. See *Affinity* and *Decomposition*.

ELECTROTYPE. This name was originally given to the impression or copy of a medal or bas-relief obtained by electro-chemical decomposition. It is now extended so as to include any object produced by means of voltaic electricity. At the present time, *electrotyping* or *electro-metallurgy*, ranks high among our fine-art manufactures; and in the rapidity of its development and the usefulness of its application, is, perhaps, inferior to none of them. A description of this new art will be found under the heads *Gilding*, *Metallurgy*, *Silvering*, *Voltatype*, *&c.*

ELECTRUM MINERALE. Syn. *Tincture of the Metals.* A once celebrated preparation made of *tin*, *copper*, and a *little gold*, melted with double their weight of *martial regulus of antimony;* the resulting mass being powdered, and deflagrated with *nitre* and *charcoal*, and the scoriæ thus obtained, reduced to powder whilst still hot, and digested in *rectified spirit.* The product was a rich red-coloured tincture, reputed to possess the most extraordinary virtues.

ELECTUARY. Syn. *Electuarium*,—Lat. Electuaries (*electuaria*) are formed of light powders, generally vegetable, mixed up with honey, syrup, or sugar, to the consistence of a stiff paste. In the present Pharmacopœia, they are included under the title *Confection*, but this arrangement is manifestly improper, as the words are not synonymous. In *Conserves* and *Confections*, the addition of the saccharine matter is in much larger proportion, and is designed to preserve the vegetable matter; in *Electuaries*, the syrup is designed merely to communicate the required form. (Dr. Murray.)

The *preparation* of *electuaries* is similar to that of confections and conserves, and the same precautions must be observed to reduce the dry ingredients to very fine powder before adding them to the syrup or other substances used to give them form. Care must also be taken to diffuse the ingredients *equally* through every portion of the mass, by patient and laborious stirring. The neglect of this point has often led to disagreeable consequences, from some portion of the electuary being nearly inert, while another portion has possessed increased activity. See *Confections*, *Conserves*, *Linctus*, *&c.*

ELECTUARY (Acetate of Potassa). See *Conserves.*

ELECTUARY (Alum). Syn. *Electuarium Aluminis*,—Lat. *Prep.* 1. (Phœbus.) *Alum*, 1 dr.; *extract of logwood*, 4 dr.; *balsam of Peru*, 6 drops; *water of sage*, q. s. Astringent and antiseptic; in diarrhœa, sponginess of the gums, &c.

2. (St. Marie.) *Alum*, 1 dr.; *catechu* and *extract of bark*, of each, 2 dr.; *conserve of roses*, 6 dr.; *simple syrup*, q. s. *Dose.* A teaspoonful, every 4 hours, in chronic diarrhœa, leucorrhœa, hemorrhages, &c. See *Confections.*

ELECTUARY (Anodyne). Syn. *Electuarium Anodynum*,—Lat. *Prep.* See *Confection of Opium.*

ELECTUARY (Arabic). Syn. *Electuarium Sarzæ Compositum, E. Arabicum*,—Lat. *Electuaire Arabique*,—Fr. *Prep.* From *sarsaparilla*, 5 oz.; *senna* and *China root*, of each, 3 oz.; *dried walnut-peel*, 1 oz.; (all in fine powder;) *honey*, q. s. *Dose.* 1 to 4 dr. See *Traitement Arabique.*

ELECTUARY (Aromatic). Syn. *Electuarium Aromaticum*,—Ph. E. This preparation differs from the *aromatic confection* of the other British Colleges, in not containing *chalk.* It is aromatic and stomachic, but not antacid or absorbent. See *Confections.*

ELECTUARY (Bath). Syn. *Electuarium Anticachecticum, E. Martiale, E. Ferri Compositum*, — Lat. *Prep.* From *blacksmith's clinkers*, reduced to an impalpable powder, and made into an electuary with *honey or treacle*, q. s.; afterwards adding, *powdered ginger* and *carbonate of magnesia*, of each, 1 *oz.*, to every *lb.* of the mixture. *Dose.* A teaspoonful night and morning every day for 3 or 4 days, and again, after an equal interval, as long as thought necessary; as a chalybeate tonic, and in worms.

ELECTUARY (Bitartrate of Potassa). Syn. *Electuarium Potassæ Tartratis*,—Lat. *Prep.* (Monro.) *Cream of tartar*, 1 oz.; *powdered ginger* and *conserve of roses*, of each, 1 dr.; *syrup of orange peel*, q. s. *Dose.* 1 to 3 dr., as a hydragogue purge. It is also a useful laxative in common cases. See *Confection of Cream of Tartar.*

ELECTUARY (Black). Syn. *Trousseau's Electuary, Trousseau's Black Tonic; Electuarium Nigrum, E. Ferri Tannatis,*—Lat. *Prep.* From *sesquichloride of iron,* 4 dr.; *tannin,* 1 dr.; *confection of roses,* 2 oz.; *syrup of orange peel,* 1 oz. Tonic and astringent. *Dose.* 5 to 30 gr.

ELECTUARY (Black Pepper). See *Confection of Pepper.*

ELECTUARY (Burnt Sponge). Syn. *Electuarium Spongiæ Ustæ,*—Lat. *Prep.* (Hulse.) *Burnt Sponge,* 10 gr.; *rhubarb,* 4 gr.; *conserve of roses,* q. s. For a *dose,* to be taken night and morning; in scrofula, glandular swellings, &c. See *Confection of Sponge.*

ELECTUARY (Cassia). Syn. *Electuarium Cassiæ,*—Ph. D. 1826. *E. C. Fistulæ,*—Ph. E. *Prep.* (Ph. D. 1826.) *Fresh cassia pulp* and *syrup of orange,* of each, ½ ℔; *manna,* 2 oz.; *tamarind pulp,* 1 oz.; mix and evaporate to a proper consistence. *Dose.* 2 *dr.* to 1 *oz.;* as a gentle laxative for children, or as a vehicle for other cathartics. *That of the shops* is commonly made with equal parts of *tamarind* and *cassia pulps,* mixed with ⅛th of *manna,* and flavoured with a few drops of *tincture of orange peel,* without any evaporation. See *Confections.*

ELECTUARY (Catechu). Syn. *Electuarium Catechu, Confectio do., C. Japonica,* —Lat. *Prep.* (Ph. E.) *Powdered catechu* and *kino,* of each, 4 oz.; *cinnamon* and *nutmegs,* of each, 1 oz.; *opium* (dissolved in a little sherry), 1½ dr.; *syrup of red roses* (evaporated to the consistence of honey), 1½ pint. See *Confections.*

ELECTUARY (Catechu,—Compound). Syn. *Electuarium Catechu Compositum,*—Ph. D. See *Confections.* Both the above are astringent, aromatic, and anodyne. *Dose.* 15 gr. to 1 dr., or more; in diarrhœa, dysentery, &c.

ELECTUARY (Cathartic). Syn. *Electuarium Catharticum,*—Lat. *Prep.* 1. *Confection of senna,* 1½ oz.; *flowers of sulphur,* ½ oz.; *syrup of roses* or of *orange peel,* q. s. *Dose.* A teaspoonful, 3 or 4 times a day, in piles; or, 2 to 3 teaspoonfuls, as a gentle laxative for females, and in skin diseases, gonorrhœa, &c. A mild and excellent medicine. It may be safely given in larger doses.

2. (Brera.) *Aloes,* 8 gr.; *cream of tartar,* 2 dr.; *honey,* q. s. For a *dose.* In amenorrhœa, attributed to abdominal engorgement.

ELECTUARY (Cephalic). Syn. *Electuarium Cephalicum, E. Valerianæ Compositum,*—Lat. *Prep.* (Hosp. F.) *Valerian root* and *mistletoe of the oak,* of each, 1 oz.; *honey,* 1½ oz.; *tincture of henbane,* q. s. to make an electuary. In nervous and rheumatic headache, &c.; assisted by an aperient.

ELECTUARY (Charcoal). Syn. *Electuarium Carbonis, E. Carbonii, Confectio do.,*—Lat. *Prep.* 1. (Hosp. F.) *Confection of senna,* 2 oz.; *fresh burnt charcoal,* ½ oz.; *carbonate of soda,* ¼ oz.; *syrup of orange peel,* q. s.

2. (Radius.) *Electuary of senna,* 2 oz.; *powdered charcoal* and *carbonate of soda,* of each, 1 dr. Both the above are given in obstinate constipation. *Dose.* 1 to 3 teaspoonfuls twice a day. See *Tooth Electuary.*

ELECTUARY (Cinchona Bark). Syn. *Electuary of Bark; Electuarium Cinchonæ,* —Lat. *Prep.* 1. From *yellow bark* and *simple syrup,* of each, 1 oz.; *conserve of red roses* and *confection of orange peel,* of each, ½ oz. Tonic and febrifuge. *Dose.* 1 to 4 dr.; in debility, agues, &c.

2. (Radius.) *Peruvian bark,* 1 oz.; *syrup of orange peel,* q. s. As the last. *Dose.* A teaspoonful or more, 3 or 4 times daily.

ELECTUARY (Cinchona,—Compound). Syn. *Electuarium Cinchonæ Compositum,* —Lat. *Prep.* 1. (*Acidulated,*—Copland.) *Yellow bark,* 1 oz.; *confection of roses,* ½ oz.; *diluted sulphuric acid,* 1 dr.; *syrup of ginger,* 1½ oz.

2. (*Astringent,*—Saunders.) *Powdered Peruvian bark, orange peel,* and *conserves of roses* and *hips,* of each, 6 dr.; *crabs' eyes* (or prepared chalk), 2 dr.; *syrup of catechu,* q. s. *Dose.* A teaspoonful, 2 or 3 times daily; in chronic diarrhœa, &c.

3. (*With Catechu,*—Pierquin.) *Peruvian bark,* 1 oz.; *catechu* and *balsam* of *tolu,* of each, 1 dr.; *syrup of comfrey* (symphytum officinale,—Linn.), q. s. *Dose.* As the last; in spitting of blood, hemorrhages, &c.

4. (*With Cloves,*—Dewees.) *Peruvian bark,* 2 oz.; *cloves,* 1 dr. (better, 4 dr.); *simple syrup,* q. s. A piece the size of a walnut, every hour or two, during the intermission of an ague.

5. (*With Iron,*—Cadet.) *Peruvian bark,* 6 dr.; *oxide of iron* and *confection of opium,* of each, 2 dr.; *syrup of cinnamon,* q. s. *Dose.* A teaspoonful, or more, twice a day; in dropsy of the belly, after the evacuation of the fluid, and as a tonic in debility, accompanied by nervous excitement, &c., in the absence of fever.

6. (Quarin's.) *Red bark,* 1 oz.; *ammoniated iron,* 1 dr.; made into an electuary with equal parts of *oxymel of squills* and *syrup* of the "*five roots*" (diuretic). Tonic, febrifuge, and pectoral.

7. (*With Sal Ammoniac,*—P. Cod.) *Gray bark,* 2¼ oz.; *hydrochlorate of ammonia,* 1 dr.; *honey* and *syrup of wormwood,* of each, 2 oz. In intermittents occurring in scrofulous subjects.

8. (*With Soda,*—P. Cod.) *Powdered cinchona,* 1 oz.; *carbonate of soda,* 2 dr.; *thin mucilage,* q. s. to mix. Tonic, febrifuge, and stomachic. *Dose.* 2 dr., 2 or 3 times a day; in agues, complicated with acidity and dyspepsia.

9. (*With Sulphur,*—Cadet.) *Peruvian bark,* 1 dr.; *sulphur, crabs' eyes* (chalk), and *spermaceti,* of each, 2 dr.; *extract of opium,* 4 dr.; *conserve of roses,* 4 dr.; *syrup of milfoil,* q.s. Highly praised in debility from phthisis. *Dose.* A teaspoonful, 2 or 3 times a day, assisted with the liberal use of raw or lightly boiled eggs and cod-liver oil.

10. (*With Tin,*—Cadet.) *Peruvian bark,* 1 oz.; *tin filings* and *valerian root,* of each, ½ oz.; *syrup of saffron,* q. s. In epilepsy, worms, &c. *Dose.* A teaspoonful morning and evening. See *Confection of Bark.*

ELECTUARY (Copaiba). Syn. *Electuarium Copaibæ,*—Lat. *Prep.* 1. *Copaiba* and *powdered cubebs,* equal parts; *conserves of roses* and *orange peel,* of each (in equal quantities), q. s.

2. (Caspar.) *Blanched almonds,* 6 dr.; *powdered marsh-mallow root,* 1 dr.; *catechu,* ½ dr.; *balsam of copaiba,* 3 dr.

3. (Ricord.) *Confection of almonds,* 1 oz.; *copaiba,* ½ oz.; *hard extract of rhatany,* 3 dr.; *syrup of orange peel,* q. s. All the above are excellent in gonorrhœa, gleets, &c. The last two agree better with the stomach than most other like preparations. *Dose.* 1 teaspoonful, or more (rapidly increased to 2 or 3 dr.), 3 or 4 times daily. See *Confections.*

ELECTUARY (Cowhage). Syn. *Electuarium Dolichos, E. Mucunæ,*—Lat. *Prep.* 1. Dip the *pods of dolichos* in *treacle,* allow them to drain a moment, and then scrape off the hairs for use.

2. (Chamberlain.) As the last, nearly.

3. (Correa.) *Cowhage* (the hairs or setæ), 40 gr.; *syrup,* ½ oz.

4. (Ellis.) *Cowhage* (hairs), 1 dr.; *honey,* q. s.

5. (Guy's Hosp.) *Cowhage* (hairs), any quantity, made into an electuary with treacle, q. s. In worms. *Dose.* For a *child,* a teaspoonful; for an *adult,* a table-spoonful; in the morning, fasting, and at night, for 3 or 4 days; followed by a dose of castor oil, to which a *teaspoonful of turpentine* may be advantageously added. See *Cowhage.*

ELECTUARY (Cubebs). Syn. *Electuarium Cubebæ,*—Lat. *Prep.* 1. See *Electuary of Copaiba.*

2. (Beral.) *Cubebs* and *copaiba,* of each, 2 oz.; *powdered alum,* 1 oz.; *extract of opium,* 5 or 6 gr.; mix.

3. (Bouchardat.) *Cubebs,* 1½ oz.; *copaiba,* 1 oz.; *sweet spirit of nitre,* ½ fl. dr.; *oil of peppermint,* 8 or 10 drops; *powdered sugar,* q.s.

4. (Radius.) *Cubebs,* ½ oz.; *honey,* 1 oz. In gonorrhœa, mucous discharges from the vagina, bladder, &c. *Dose.* 1 teaspoonful, afterwards increased to 2 or 3 teaspoonfuls, twice or thrice daily. See *Confection of Copaiba, Electuary of do., &c.*

ELECTUARY (Demulcent). Syn. *Electuarium Demulcens,*—Lat. *Prep.* From *spermaceti, syrup of poppies,* and *syrup of tolu,* of each, 2 dr.; *powdered gum tragacanth,* 1 dr.; *confection of roses,* 6 dr.; *nitre,* ½ dr. *Dose.* A piece the size of a small filbert, frequently; as a pectoral and demulcent in coughs, hoarseness, &c.

ELECTUARY (Deobstruent). Syn. *Electuarium Deobstruens,*—Lat. *Prep.* (Copland.) *Confection of senna,* 1½ oz.; *cream of tartar,* 1 oz.; *sulphur* and *syrup of ginger,* of each, 6 dr.; *borax,* 3 dr.; *syrup of poppies,* 2 dr. *Dose.* A teaspoonful or more nightly; in the obstinate constipation of females, painful and suppressed menstruation, &c.

ELECTUARY (Emmenagogue). Syn. *Electuarium Emmenagogicum,*—Lat. *Prep.* From *myrrh,* 1 dr.; *ammoniated iron,* 1 scrup.; *syrup of ginger,* q.s. to mix. *Dose.* ½ dr. to 1 dr., night and morning; in deficient or suppressed menstruation.

ELECTUARY (Febrifuge). See *Electuary of Cinchona, &c.*

ELECTUARY (for Cholera). Syn. *Electuarium Anti-cholericum,*—Lat. The preparations that come under this name are numerous, including *aromatic confection,* and several like absorbent or astringent preparations. A late writer has dignified the American remedy for cholera, noticed at page 251, with this name.

ELECTUARY (for Dysentery). Syn. *Electuarium Anti-dysentericum,*—Ph. E. 1744. *Electuary of catechu,* mixed with half its weight of *Locatel's balsam.*

ELECTUARY (for Epilepsy). Syn. *Electuarium Anti-epilepticum,*—Lat. *Prep.* 1. See *Electuary of Cinchona* (Comp.) No. 10.

2. (Dr. Mead.) *Powdered cinchona,* 1 oz.; *valerian* and *tin* (both in powder), of each, ½ oz.; *syrup,* q. s. to mix. *Dose.* A teaspoonful, night and morning.

ELECTUARY (for Piles). Syn. *Elec-*

tuarium Hæmorrhoidale,—Lat. *Prep.* 1. See *Confection* and *Electuary of Pepper.*

2. (Dr. Copland.) *Cream of tartar,* 1 oz.; *precipitated sulphur* (pure), 3 dr.; *confection of senna,* 2 oz.; *syrup of orange peel* or *ginger,* q.s. to mix.

3. (Dr. Graves.) *Confection of senna* and *sulphur,* of each, 1 oz.; *balsam of copaiba* and *cream of tartar,* of each, ½ oz.; *jalap* and *ginger,* of each, 1 dr.; *syrup of orange peel,* q. s.

4. (Hosp. F.) *Confection of senna,* 2 oz.; *black pepper* and *precipitated sulphur,* of each, ½ oz.; *oil of cubebs,* 1 dr.; *syrup,* q. s. The last three are useful laxatives in piles, and by their preventing the accumulation and hardening of the fæces often remove the affection. *Dose.* A teaspoonful 3 or 4 times a day. From the difficulty experienced in procuring *pure* precipitated sulphur, *washed sublimed sulphur* may be advantageously substituted.

ELECTUARY (for Scurvy). See *Conserve* (Antiscorbutic).

ELECTUARY (for the Teeth). Syn. *Electuarium Dentifricum,* — Lat. See *Tooth Pastes, Dentifrices, &c.*

ELECTUARY (for Worms). See *Electuary* (Vermifuge).

ELECTUARY (Indigo). Syn. *Electuarium Indigi, E. Pigmenti Indici,*—Lat. *Prep.* (Phœbus.) *Powdered Indigo,* 4 dr.; *aromatic powder,* ½ dr.; *syrup,* 1 fl. oz. or q. s. In spasmodic diseases, especially in epilepsy, chorea, and hysteria, and the convulsions of children. It has also been used with advantage in that species of impotence in which strychnia is useful. The above quantity is to be all taken, in divided doses, during the day. To be of permanent advantage it should be continued for several weeks.

ELECTUARY (Ipecacuanha). See *Confections.*

ELECTUARY (Jalap). See *Confections.*

ELECTUARY (Kermes). *Marmelade de Zanetti; Electuarium Kermetis, E. K. Mineralis,* — Lat. *Prep.* From *manna,* 4 oz.; *pulp of cassia* and *oil of almonds,* of each, 2 oz.; *butter of cacao,* ½ oz.; *Kermes mineral,* 10 gr.; *syrup of marsh-mallow,* 3 fl. oz.; *syrup of orange flower,* q. s. A diaphoretic laxative. *Dose.* 1 to 4 teaspoonfuls, or more.

ELECTUARY (Laurel Berries). See *Confection of Rue.*

ELECTUARY (Lenitive). See *Confection of Senna.*

ELECTUARY (Mahomed's). *Prep.* 1. From *grocer's currants,* 2 oz.; *powdered senna,* ½ oz.; *powdered ginger,* 1 dr.; *finely powdered capsicum* and *cloves,* of each, 20 gr.; *croton oil,* 3 drops; *conserve of roses* and *syrup of saffron,* of each, in equal parts, q. s. to mix.

2. (Bateman.) *Currants,* 1 oz.; *senna,* ½ oz.; *ginger,* ½ dr.; *syrup of roses,* q. s.; *croton oil,* 1 drop. *Dose.* 1 or 2 teaspoonfuls, early in the morning; in dyspepsia and habitual constipation. The first formula produces a most useful medicine, particularly for free-livers.

ELECTUARY (Male Fern). Syn. *Electuarium Felicis Maris,*—Lat. *Prep.* 1. *Powder of male fern,* 3 dr.; *conserve of roses,* 1 oz.

2. (Radius.) *Ethereal extract of male fern,* ½ dr.; *honey of roses,* 1 oz. The half of either to be taken at night, and the remainder the next morning. In worms.

ELECTUARY (Nitre). Syn. *Electuarium Potassæ Nitratis,* — Lat. *Prep.* (Hosp. F.) *Nitre,* 3 dr.; *Confection of roses,* 2 oz. *Dose.* A piece of the size of a filbert, where the use of nitre is indicated. See *Confections.*

ELECTUARY (Opium). See *Confection of Opium.*

ELECTUARY (Pectoral). Syn. *Electuarium Pectorale,*—Lat. *Prep.* 1. (Ph. E. 1744.) From *conserve of roses,* 2 oz.; *compound powder of tragacanth,* 4 dr.; *flowers of benzoin,* 1 dr.; *syrup of tolu,* q. s. *Dose.* A little, ad libitum.

2. *Oxymel of squills, syrup of marsh-mallows, mucilage of gum arabic,* and *syrup of tolu,* of each, ½ oz.; *powdered lump sugar,* 2 oz. As the last.

ELECTUARY (Pepper). See *Confections,* (and *above.*)

ELECTUARY (Pomegranate). Syn. *Electuarium Granati,* — Lat. *Prep.* 1. From the *root-bark,* 1 dr.; *assafœtida,* ½ dr.; *croton oil,* 6 drops; *conserve of roses,* 1 oz. *Dose.* A teaspoonful night and morning.

2. (Radius.) *Extract of the root bark,* 6 dr.; *lemon juice,* 2 fl. dr.; *linden water,* 3 fl. dr.; *gum tragacanth,* q. s. to make an electuary. One half to be taken at once; the remainder in an hour. Both are given in tape-worm.

ELECTUARY (Rhubarb.) Syn. *Electuarium Rhei,*—Lat. *Prep.* (Saunders.) *Powdered rhubarb,* 1½ dr.; *sulphate of potassa,* 1 dr.; *cream of tartar,* 4 dr.; *pulp of tamarinds,* 2 oz. *Dose.* A teaspoonful as a mild stomachic laxative.

ELECTUARY (Scammony). See *Confections.*

ELECTUARY (Senna). See *Confection of Senna.*

ELECTUARY (Squills). Syn. *Electuarium Scillæ*,—Lat. *Prep.* 1. *Oxymel of squills*, 2 fl. oz.; *cream of tartar* and *powdered sugar*, of each, 1½ oz. *Dose.* 1 to 2 teaspoonfuls, as a laxative and expectorant; in old coughs, &c.

2. (Radius.) *Squills*, *nitre*, *gum ammoniacum*, and *tartrate* (bitartrate) *of potassa*, of each, 2 dr.; *sal ammoniac*, 20 gr.; *syrup of cinnamon*, q.s. *Dose.* 2 dr., three times a day, in dropsies. See *Conserve of Squills.*

ELECTUARY (Steel). Syn. *Electuarium Ferri*, *E. Chalybeatum*,—Lat. *Prep.* 1. (Dr. Collier.) *Potassio-tartrate of iron*, ½ oz.; *confection of roses*, 1 oz.; *syrup*, q. s. to mix.

2. (Collier.) *Precipitated sesquioxide of iron*, 1 oz.; *honey*, 2 oz.; *ginger syrup*, ½ fl. oz. Both the above are tonic and emmenagogue. *Dose.* One teaspoonful, thrice a day. See *Confections.*

ELECTUARY (Stimulant). Syn. *Electuarium Stimulans*,—Lat. *Prep.* From *gum ammoniacum* (strained), 1 oz.; *vinegar of squills*, ½ oz.; mixed with a gentle heat and spread on leather. Applied to the chest or pit of the stomach, as a mild counter-irritant and antispasmodic; and as a discutient to tumid glands and indolent tumours. It is wrongly called an electuary.

ELECTUARY (Stomachic). Syn. *Dinner Electuary; Electuarium Stomachicum, Confectio Stomachica*,—Lat. *Prep.* 1. *Rhubarb*, *ginger*, and *extract of chamomile*, of each, 1 dr.; *confection of orange peel*, 4 dr.; *syrup*, q.s.

2. *Rhubarb* and *gentian*, of each, 1½ dr.; *extract of hops* and *powdered capsicum*, of each, ½ dr.; *oil of chamomile*, 12 drops; *confection of hips* and *syrup of orange peel*, of each, ½ oz.

3. *Green peppermint*, *lump sugar*, and *confection of orange peel*, equal parts. *Dose.* A teaspoonful an hour before a meal. They are all excellent stomachics, and are useful to improve the appetite, and in dyspepsia.

ELECTUARY (Sulphur). See *Confection of Sulphur.*

ELECTUARY (Sulphur,—Compound). Syn. *Electuarium Sulphuris Compositum*,—Lat. *Prep.* 1. *Sulphur*, ¾ oz.; *cream of tartar*, 1 oz.; *confections of senna* and *black pepper*, of each, 2 oz.; *syrup of ginger*, 1 fl. oz. An excellent medicine in piles. *Dose.* A teaspoonful twice a day.

2. (With Borax.) *Flowers of sulphur*, 1 oz.; *cream of tartar*, 1½ oz.; *borax*, ½ oz.; *confection of senna*, 2½ oz.; *syrup of orange-peel*, q.s. to mix. *Dose.* 1 to 3 teaspoonfuls in diseases of the uterine organs and lower bowels. See *Confections.*

ELECTUARY (Tin). See *Confection of Tin.*

ELECTUARY (Tin,—Compound). Syn. *Electuarium Stanni Compositum*,—Lat. *Prep.* 1. *Powdered tin*, 1 oz.; *confection of oil of turpentine*, 2 oz.

2. (Dr. Cheston.) *Tin filings*, 4 dr.; *carbonate of iron* (sesquioxide), 1 dr.; *conserve of wormwood*, 3 dr.

3. (Foy.) *Powder of tin*, 1 oz.; *extract of wormwood* and *powdered jalap*, of each, 1 dr.; *compound syrup of chicory*, q. s. In worms. *Dose.* A table-spoonful, or more, for 2 or 3 successive mornings, fasting; followed by a purge.

ELECTUARY (Turpentine). Syn. *Electuarium Terebinthinæ*,—Lat. *Prep.* 1. (St. B. Hosp.) *Common turpentine*, 1 oz.; *honey*, 2 oz. *Dose.* 1 to 2 teaspoonfuls in complaints of the urinary organs, worms, &c.

2. (Radius.) *Turpentine*, *soap*, and *rhubarb*, of each, 1 dr.; *syrup of wormwood*, q. s. *Dose.* Three teaspoonfuls a day; in dropsy, worms, &c.

3. (*E. Olei Terebinthinæ*,—Copland.) As *Confection of Turpentine*,—Ph. D. See *Confections.*

ELECTUARY (Vermifuge). Syn. *Electuarium Anthelminticum*, *E. Vermifugum*,—Lat. *Prep.* 1. (Bresmer.) *Worm-seed* and *tansy-seed*, of each, 4 dr.; *powdered valerian root*, 2 dr.; *jalap* and *sulphate of potassa*, of each, 1½ to 2 dr.; *oxymel of squills*, q. s. to mix. *Dose.* A teaspoonful, or more; repeated night and morning, followed by a brisk purge.

2. (Rosenstein.) *Worm-seed*, 10 gr.; *sulphate of iron*, 4 gr.; *jalap* and *honey*, of each, 20 gr. For two doses, as the last. 2 or 3 dr. of *confection of senna* are often substituted for the jalap and honey.

3. (Foy.) *Aloes*, ½ oz.; *common salt*, 3 dr.; *flour*, 2 oz.; *honey*, q. s. to form a stiff paste. *Used* as a suppository in ascarides.

4. *Flowers of sulphur*, 4 oz.; *powdered jalap*, 1 oz.; *powdered bark*, 1 oz.; *syrup of buckthorn*, q. s. *Dose.* Two or three teaspoonfuls every morning early. See *Confections* and *Electuaries of Tin, Turpentine, Worm-seed, &c.*

ELEMENTS. Syn. *Elementary Bodies, Simple do., Undecompounded do.; Elementa*,—Lat. The elements of the *modern chemist* are those substances or bodies which have *hitherto* resisted every attempt which has been made to decompose them, or to resolve them into simpler forms of matter. The *old chemists* applied the term to certain imaginary principles or essences of matter, such as *earth*, *air*, *fire*, and *water*. These were also regarded by the ancients as simple bodies of which all others are composed, and they still constitute the "*four elements*" of the vulgar. The elements of the *alchemists* are *salt*, *sulphur*, and *mercury*. The progress of analytical chemistry has now long shown the fallacy of such suppositions.

The *elementary bodies*, at present recognised as such, are *sixty-three* in number; of which no less than *forty-eight* are metals. Of the remainder, *thirteen* are either gaseous or non-metallic, and *two* possess properties of an intermediate character. To these some chemists add the *three* imponderable bodies or forces, *light*, *heat*, and *electricity*.

TABLE *of Elementary Bodies, arranged in classes.*

IMPONDERABLE ELEMENTS.

Heat | Light | Electricity.

PONDERABLE ELEMENTS.

(*Non-Metallic.*)

- Oxygen
- Hydrogen
- Nitrogen
- Chlorine
- Iodine
- Bromine
- Fluorine
- Carbon
- Silicon
- Boron
- Sulphur
- Selenium
- Phosphorus.

(*Intermediate.*)

Arsenic | Tellurium.

(*Metals.*)

- Antimony
- Chromium
- Vanadium
- Tungsten
  - (or Wolfram)
- Molybdenum
- Tantalum
  - (or Columbium)
- Niobium
- Pelopium
- Titanium
- Uranium
- Platinum
- Palladium
- Rhodium
- Iridium
- Ruthenium
- Osmium
- Gold
- Aluminium
- Beryllium
  - (or Glucinum)
- Zirconium
- Norium
- Thorium
- Donarium
- Yttrium
- Cerium
- Erbium
- Terbium
- Lanthanum
- Didymium
- Bismuth
- Tin
- Mercury
- Silver
- Lead
- Barium
- Strontium
- Calcium
- Magnesium
- Zinc
- Cadmium
- Nickel
- Cobalt
- Copper
- Iron
- Manganese
- Lithium
- Sodium
- Potassium.

See *Equivalents, &c.*

ELEMI. Syn. *Gum Elemi; Elemi,*—Ph. L. "A terebinthinate concretion," from "an uncertain plant."—Ph. L. In the previous pharmacopœia (1836) it was assigned by the London College to the *amyris elemifera*, (Linn.) Dr. Pereira has suggested, that it may be the produce of the *icica icicaribo*, the *canarium zephyrinum*, or the *canarium balsamiferum*, but the question is still undecided.

The elemi of commerce is of a pale yellow colour, exteriorly brittle, but soft and tough within; it has a warm bitter taste, and a fragrant aromatic smell, partaking of fennel and juniper. It is only partially transparent even in thin plates, is very fusible, and has a density a little greater than that of water. It contains 12½ per cent. of volatile oil (*oil of elemi*). It is used to give *toughness* to lacquers and varnishes, and in *medicine* in the preparation of *elemi ointment*.

The elemi of the shops is often adulterated, but more frequently a factitious kind is sold for the genuine gum. This fraud may be detected by exposing the suspected article to heat, along with a little water, when the factitious fragrance of the spurious article evaporates, and the coarse terebinthinate smell of the resin used to adulterate it, or which is sold for it, becomes readily distinguishable.

ELEMI (Factitious). *Prep.* 1. *Yellow resin,* 8 *lb.;* melt, add *Canada balsam,* 2 *lb.;* withdraw the vessel from the heat, and further add of *oil of juniper,* 2 *dr.; oil of sweet fennel,* 1 *dr.; oil of nutmeg,* ½ dr.

2. *Yellow resin,* 7 *lb.; Canada balsam,* 1 *lb.; juniper oil bottoms,* 4 dr.; *oil of mace,* 3 dr.; mix as before.

ELEMINE. The crystalline resin of *gum elemi.*

ELEPHANTIASIS. Syn. *Elephantiasis Græcorum.* A disease which chiefly attacks the lower extremities, which become rough, scaly, hard, and ultimately the skin gets thick, unctuous, and insensible, and the limb gradually becomes enormously swollen. In some cases the forehead, cheeks, &c., grow hard and tumid, or become covered with enormous tubercles, until the countenance resembles that of a satyr or wild beast, (*satyriasis, leontiasis.*) It is presumed to have formed one of the varieties of *leprosy* that afflicted the inhabitants of Europe during the middle ages. It is now chiefly confined to Africa, the East and West Indies, Madeira, and the Isle of France. No cure is known. In its early stages, however, the use of the *asclepias gigantea*, in combination with alterative doses of calomel and antimony, with topical stimulants, is said to be generally successful. (Mr. Robinson.)

ELIXIR. A name formerly applied to various compound tinctures, and to preparations supposed to contain the quintessence of other substances. The *elixirs* of the *alchemists* were solutions employed in their fruitless attempts to transmute the baser metals into gold.

ELIXIR (Acid). Syn. *Elixir Acidum,*—Lat. *Prep.* 1. (Dippell's.) *Sulphuric* *acid,* 1 part, dropped gradually into *rectified spirit of wine,* 5 parts; placed in a large flask, and afterwards coloured by digestion on *animal kermes* and *saffron,* of each, 1 part.

2. (Haller's,—*Ph. Sax.,* 1837.) From *sulphuric acid* and *rectified spirit,* of each, 1 part; as before.

3. (Vogler's.) From *sulphuric acid* and *nitrous ether,* equal parts, as above. Astringent and antiseptic. *Dose.* A few drops, in water. See *Eau de Rabel.*

ELIXIR (Aloes). Syn. *Elixir Aloës,*—Lat. *Compound tincture of aloes.*

ELIXIR (Aloes—Compound). Syn. *Elixir Aloës Compositum,*—Lat. *Prep.* (Dr. Copland.) *Acetate of potassa, inspissated ox-gall, socotrine aloes,* and *myrrh,* of each, 2 dr.; *hay saffron,* 1 dr.; *brandy* (or *proof spirit*), 3½ fl. oz.; digest a week, and strain. Stomachic and laxative. *Dose.* A teaspoonful, or more, in dyspepsia, constipation, &c.

ELIXIR (Anti-asthmatic). Syn. *Elixir Anti-asthmaticum,*—Lat. *Prep.* 1. *Oil of aniseed, camphor,* and *balsam of tolu,* of each, 1 oz.; *cochineal,* 1 dr.; *proof spirit,* 1 gall.; digest a week, and filter.

2. As the last, adding *powdered opium,* 1¼ oz. *Dose.* A teaspoonful, to allay irritation, assisted by an occasional dose of aperient medicine; in asthma, chronic coughs, &c.

3. (Boerhaave's.) *Aniseed, asarabacca, elecampane, liquorice root, orris root,* and *sweet flag* (calamus), of each, equal parts; made into a tincture, with *brandy. Dose.* 20 to 40 drops.

ELIXIR (Antiscrofulous). Syn. *Elixir Anti-scrofulosum,*—Lat. 1. (P. Cod.) See *Ammoniated Tincture of Gentian.*

2. (Desforges.) *Guaiacum,* 5 oz.; *cinchona bark* and *pellitory,* of each, 3 oz.; *cloves,* 5 dr.; *orange peel* and *benzoin,* of each, 2 dr.; *hay saffron,* ½ dr.; *rectified spirit* and *brandy,* of each, ½ pint; digest a week, and filter. *Used* as an application to scorbutic gums.

ELIXIR (Anti-syphilitic). Syn. *Elixir Anti-venerium, E. Anti-syphiliticum,*—Lat. See *Jesuit's Drops* and *Compound Tincture of Benzoin.*

ELIXIR (Boerhaave's Asthmatic). See *Anti-asthmatic Elixir.*

ELIXIR (Boerhaave's Visceral). Syn. *Elixir Boerhaavii, E. B. Viscerale. Prep.* (Ph. Han.) *Aloes, myrrh,* and *saffron,* of each, 1 oz.; *tartrate of potassa,* 2 oz.; *alcohol* (strongest rectified spirit), 14 oz.; *water,* 8 oz.; macerate 3 days, and filter. This preparation "has been highly praised in visceral obstruction." (Dr. Griffith.) *Dose.* 1 to 3 teaspoonfuls.

ELIXIR (Clauder's). *Prep.* (Pideret.) *Salt of tartar, sal ammoniac, strained aloes,* and *myrrh,* of each, 1 oz.; *elder-flower water,* 1¼ pint; digest, with agitation, for 24 hours, and filter. *Dose.* As the last; in amenorrhœa, constipation, scurvy, visceral obstructions, &c.

ELIXIR (Cough), Syn. *Elixir Anti-catarrhale,* — Lat. *Prep.* 1. See *Anti-asthmatic Elixir.*

2. (Hufeland.) *Extracts of blessed thistle* and *dulcamara,* of each, 1 dr.; *cherry-laurel water,* 1 fl. dr.; *fennel water,* 1 fl. oz. *Dose.* 1 to 2 teaspoonfuls 3 or 4 times a day. It is a most useful remedy in coughs occurring in nervous, hysterical, or irritable patients. (See *below.*)

ELIXIR (Daffy's). Syn. *Elixir Salutis E. Sennæ Compositum, Tinctura Sennæ Composita,*—Lat. This is an aromatized and sweetened tincture of senna, to which other cathartics are generally added. Nearly every drug-house has its own formula for this article. The following are those employed in the London trade:—

Prep. 1. *East India senna,* 1½ *lb.; jalap,* 5 *oz.; coriander seed* and *aniseed,* of each, ½ *lb.; rhubarb,* ¼ *lb.; red sanders wood,* 2 *oz.; salt of tartar,* 2 *oz.; treacle,* 7 *lb.; rectified spirit of wine,* 2½ gall.; *water,* 3¼ gall. All the solids are well bruised, and macerated in the mixed fluids for 14 days, when the whole is pressed, and strained through a flannel bag. It is too glutinous to run through filtering paper.

2. *Senna, rhubarb,* and *aniseed,* of each, 2 *lb.; jalap* and *caraways,* of each, 1 *lb.; red sanders wood,* ½ *lb.; brown sugar,* 7 *lb.; proof spirit,* 10 gall.; as the last.

3. *Senna,* 56 *lb.; aniseed,* 7 *lb.; rhubarb* (East India), 14 *lb.; coriander seed,* 6 *lb.; caraway seed* and *red sanders wood,* of each, 5 *lb.; cassia bark* and *jalap,* of each, 3 *lb.; proof spirit,* 100 gall.; digest for 14 days, press, strain, and add *molasses,* 84 *lb.;* mix well, and either clarify, or strain through flannel.

4. For *proof spirit* in the last two formulæ, *equal parts* of *spirit of wine* and *water,* are employed by the smaller houses.

5. (Redwood.) *Senna,* ½ ℔; *aniseed, caraways,* and *jalap,* of each, 1 oz. 2 dr.; *juniper berries,* 2½ oz.; *proof spirit,* 6 pints; macerate for 14 days, then add of *treacle,* 10½ oz.; *water,* 1 ℔ 5 oz.; mix and strain.

6. (Dicey's.) *Senna,* 1 ℔; *guaiacum shavings, elecampane root* (dried), *aniseed, caraway seed, coriander seed,* and *liquorice root,* of each, ½ ℔; *stoned raisins,* 2 ℔; *proof spirit* or *brandy,* 9 quarts; macerate for 10 days.

7. (Swinton's.) *Senna,* 1 *lb.; jalap,* 3 *lb.; coriander seed, caraway seed, liquorice root,* and *elecampane root,* of each, 4 *oz.; moist sugar,* 2 *lb.; rectified spirit of wine* and *water,* of each, 1 gall.; as the last.

Obs. Daffy's elixir is a favorite purge with drunkards, and is a common and very popular remedy in flatulent colic, dyspepsia, diarrhœa, &c. *Dose.* 1 to 4 table-spoonfuls, or more.

ELIXIR (The Devil's). Syn. *Elixir Capsici Compositum,*—Lat. *Prep.* From *pods of capsicum,* and *cloves,* (bruised,) of each, 1 oz.; *ginger* and *saffron,* of each, 3 oz.; *cantharides,* 5 dr.; *proof spirit,* 7 ℔; digest for 10 days. *Dose.* ½ dr. to 3 dr., in mixtures. It is stimulating, anticholeraic, and aphrodisiac.

ELIXIR (Garlic). Syn. *Elixir Allii,*—Lat. *Prep.* From *garlic roots* (bruised), 80 in no.; *rectified spirit,* 1 pint; digest, distil to dryness, and repeat the process with the *same spirit* from fresh roots, a *second* and a *third* time; lastly, add *camphor,* 2 dr. Diaphoretic and pectoral. *Dose.* A teaspoonful twice a day; in asthma, old coughs, diarrhœa from debility, &c.

ELIXIR (Garus'). Syn. *Elixir Gari, E. de Garus, E. dictum de Garus,* — Lat. *Prep.* 1. *Myrrh,* 1 oz.; *aloes* and *saffron,* of each, ½ oz.; *cinnamon, cloves,* and *nutmeg,* of each, 1 dr.; *proof spirit,* 1 quart; digest a week, add *water,* 5 fl. oz., and distil over 1 quart; to the distillate (*alcoolat de Garus*) add of *syrup of maidenhair,* 2 ℔.; *orange-flower water,* 1½ fl. *oz.*

2. (Foy.) *Compound tincture of saffron,* 8 pints; *syrup of maidenhair,* 10 pints; mix, add *caramel,* q. s. to colour, dissolved in *orange-flower water,* ½ pint.

3. (P. Cod.) *Aloes* and *saffron,* of each, 1 oz.; *myrrh, cinnamon,* and *cloves,* of each, ½ oz.; *nutmeg,* ½ dr.; *proof spirit,* 12 pints; *orange-flower water,* 16 fl. oz.; macerate 2 days, distil 6 pints, and add to the distillate (*alcoolat de Garus*), of *syrup of capillaire,* 7½ pints; and colour with *saffron,* q. s.

4. (Soubeiran.) *Socotrine aloes* and *saffron,* of each, 1 oz.; *myrrh, canella alba, cloves,* and *nutmegs,* of each, ½ oz.; *spirit* (sp. gr. ·923), 20 ℔; *orange-flower water,* 16 fl. oz.; macerate as last, distil 10 ℔, and add to the distillate (*alcoolat de Garus*), of *syrup of capillaire,* 12½ ℔; *orange-flower water,* 8 fl. oz.; with *saffron,* q. s. to colour.

5. (Thierry.) *Aloes, myrrh,* and *saffron,* of each, 2 dr.; *nutmeg,* 4 dr.; *canella alba* and *cloves,* of each, 1 oz.; *spirit* (0·864), 13 ℔; draw over 12 ℔ of *alcoolat;* add to the residue of the distillation, *rose water,* 10 ℔; distil 6 ℔, and add as much of this *aromatic water* to the alcoolat as will raise its sp. gr. to 0·890. Then to every 11 ℔ of the above *mixed liquor,* add of *simple syrup,* 15 ℔; *tinctures of vanilla* and *orange peel,* of each, 2½ fl. oz.; *fresh milk* (skimmed), 1 ℔; and *tincture of saffron,* q. s. to colour; digest with agitation for two days, and filter. *Used* as a stomachic, carminative, and stimulant, in doses of a wine-glassful. That prepared without distillation forms an excellent stomachic purge. With the exception of that from the 2d formula, the products may be regarded as agreeable cordial liquors, rather than medicinals. It is much employed on the Continent.

ELIXIR (Gold). Syn. *Elixir d'Or ; E. Aurii,*—Lat. *Prep.* 1. See De La Motte's *Golden Drops.*

2. *Terchloride of gold,* 20 gr.; *rectified spirit,* 6 fl. dr.; *ether,* 3 fl. dr.; dissolve. *Dose.* 5 to 15 drops, taken in distilled water; in gout, scrofula, nervous diseases, cancer indurated glands, secondary syphilis, &c. This last preparation is often confounded with the *gouttes d'or du General De Lamotte;* but the two are evidently distinct articles.

ELIXIR (Haller's). See *Acid Elixir.*

ELIXIR (Hoffman's Visceral). Syn. *Elixir Hoffmanni, E. H. Viscerale,*—Lat. *Prep.* 1. As *Elixir of orange-peel,*—Ph. Bor. 1847.

2. Thin *outside peel of orange* (dried), *myrrh,* and *centaury,* of each 2 dr.; *extracts* of *carduus benedictus, cascarilla,* and *gentian,* of each, 1 dr.; *white wine* (sherry), 1 quart. Aromatic and stomachic. *Dose.* A dessert-spoonful, or more.

ELIXIR (Ipecacuanha). Syn. *Elixir Ipecacuanhæ,*—Lat. *Prep.* (Cadet.) *Powdered ipecacuanha* and *balsam of tolu,* of each, 4 dr.; *flowers of benzoin, opium,* and *saffron,* of each, 2 dr.; *oil of aniseed,* 1 dr.; *camphor,* 40 gr.; *alcohol* (rectified spirit), 1½ pint; digest a week, and filter. *Dose.* 1 to 2 dr., as a stimulant, diaphoretic, expectorant, and stomachic; in chronic coughs, asthmas, and old colds, and in certain forms of deficient appetite, dyspepsia, diarrhœa, &c.

ELIXIR (Jalap). Syn. *Elixir Jalapæ Compositum,* — Lat. *Prep.* From jalap, 4 oz.; *scammony,* 4 dr.; *gamboge,* 2 dr.; *proof spirit,* 1 quart. *Dose.* ½ dr. to 3 dr., as a purgative; especially in worms.

ELIXIR (Lettsom's). *Prep.* (Augustin.) *Oil of aniseed,* 1 dr.; *camphor,* 1½ dr.; *benzoic acid, opium,* and *saffron,* of each

2 dr.; *ipecacuanha* and *balsam of tolu*, of each, 4 dr.; *rectified spirit*, 2 ℔; digest 10 days, and filter. *Dose.* 5 to 15 drops, for a child; ½ to 1 teaspoonful, for an adult; in ordinary coughs, hooping cough, &c.

ELIXIR (Live-long). Syn. *Elixir of Long Life; E. Longæ Vitæ*,—Lat. *Prep.* 1. See *Tincture of Rhubarb and Aloes.*

2. (*Elixir Vitæ Matthioli.*) A mixture of several *aromatics* and *stimulants* made with *rectified spirit.*

ELIXIR (Myrrh). Syn. *Elixir Myrrhæ*, —Lat. See *Tincture of Savine* (Comp.),—Ph. L. 1788.

ELIXIR D'OR. See *Elixir of Gold.*

ELIXIR (Orange-peel). Syn. *Elixir Aurantiorum Compositum*, — Lat. *Prep.* 1. (Ph. Bor. 1847.) *Orange peel*, 6 oz.; *cinnamon*, 2 oz.; *carbonate of potassa*, 1 oz.; *Madeira wine*, 4 ℔; macerate 6 days, express the tincture, and add of *extracts of buckbean, cascarilla, gentian*, and *wormwood*, of each, 1 oz.; dissolve, and after repose for subsidence, decant, and filter. An excellent aromatic bitter and stomachic.

2. (Moscati.) *Orange peel*, 1 oz.; *cascarilla*, ½ oz.; *waters of citron peel* and *wormwood*, and *rectified spirit*, of each, ½ pint; digest a week. Resembles the last. *Dose*, (of either,) a table-spoonful to a wine-glassful.

ELIXIR (Paregoric). Syn. *Elixir Paregoricum*,—Lat. See *Compound Tincture of Camphor.*

ELIXIR (Paregoric, — Scotch). Syn. *Elixir Paregoricum Scoticum*,—Lat. See *Ammoniated Tincture of Opium.*

ELIXIR (Pectoral). Syn. *Elixir Pectorale*,—Lat. *Prep.* (Ph. E. 1745.) *Balsam of tolu*, 2 oz.; *gum benzoin*, 1½ oz.; *saffron*, ½ oz.; *rectified spirit*, 32 fl. oz.; digest in a gentle heat for 4 days, and filter. *Dose.* ½ to 1 teaspoonful. (See *above.*)

ELIXIR (Polychrest). Syn. *Elixir Polychreston*, — Lat. *Prep.* (Ph. E. 1745.) *Guaiacum* (*gum*), 6 oz.; *balsam of Peru*, ½ oz.; *rectified spirit*, 32 fl. oz.; digest as last, strain, and add *oil of sassafras*, 2 fl. dr. Pectoral and anti-rheumatic. *Dose.* 10 to 60 drops, or more.

ELIXIR (Paracelsus'). See *Elixir Proprietatis.*

ELIXIR PROPRIETATIS. Syn. *Paracelsus' Elixir of Propriety; Elixir Proprietatis Paracelsi*,—Lat. *Elixir de Proprieté de Paracelse*,—Fr. An old preparation nearly corresponding to the *compound tincture of aloes* of modern pharmacy, and which is now sold for it. Soubeiran gives the following formula for this preparation:—*tincture of myrrh*, 4 oz.; *tinctures of aloes* and *saffron*, of each, 3 oz. (Trait. Pharm. 1847.)

ELIXIR PROPRIETATIS (cum Acido). *Prep.* 1. The last, slightly acidulated with *oil of vitriol*, and filtered.

2. (Ph. Bor. 1847.) *Aloes* and *myrrh*, of each, 2 oz.; *saffron*, 1 oz.; *spirit* (sp. gr. 0·900), 2℔.; *dilute sulphuric acid* (1 *to* 5), 2 oz.; macerate 4 days, and filter.

ELIXIR PROPRIETATIS (Tartarizatum). Syn. *E. P. Alkalizatum.* From *elixir proprietatis*, alkalized with *salt of tartar*, and filtered. The last three are old preparations, now seldom inquired for in this country except in places remote from London.

ELIXIR (Radcliffe's). *Prep.* 1. From *socotrine aloes*, 6 dr.; *rhubarb*, 1 dr.; *cinnamon* (cassia), *cochineal*, and *zedoary root*, of each, ½ dr.; *syrup of buckthorn*, 2 fl. oz.; *brandy*, 1¼ pint; digest 10 days, and strain.

2. As the last, but substituting *proof spirit*, 1 pint; and *water*, ¼ pint; for the brandy. Aromatic, stomachic, and aperient. *Dose.* 1 to 4 dr.; in similar cases to those in which "*Daffy's Elixir*" is taken.

ELIXIR (Roses). Syn. *Elixir Rosæ*,—Lat. *Prep.* 1. *Eau de rose*, 2 fl. oz.; *spirits of horse-radish* and *scurvy grass*, of each, 1 fl. oz.; *otto of roses*, 3 drops; *camphor* and *cochineal* (both in powder), 12 gr.; *powdered sugar-candy*, ½ oz.; digest, with frequent agitation, for a week, and after repose, decant the clear, and strain through a piece of muslin. *Used* as an elegant application in scurvy of the gums, and also to perfume the breath.

2. (Beasley.) *Cinnamon*, 3 oz.; *ginger*, 2 oz.; *cloves*, 1 dr.; *essence of peppermint*, 1 oz.; *oil of orange peel*, 1 dr.; *otto of roses*, 15 (? 25) drops; *rectified spirit*, 2½ pints; digest 15 days, and filter. *Used* as a tooth cosmetic.

ELIXIR SACRUM. *Tincture of aloes and rhubarb.*

ELIXIR SALUTIS. Syn. *Elixir of Health.* The *compound tincture of senna*, of old pharmacy; *Daffy's elixir.*

ELIXIR (Scammony). Syn. *Elixir Scammonii*,—Lat. *Prep.* (Guibourt.) *Scammony* (pure), 2 dr.; *proof spirit*, 8 fl. oz.; mix in a suitable vessel, apply heat, set the spirit on fire, and add of *sugar*, 4 oz.; when the whole is dissolved (melted down), extinguish the flame, and further add of *syrup of violets*, 2 fl. oz.; mix well, and after sufficient repose, decant the clear portion from the dregs. The *product* should be 12 oz., containing 12 gr. of scammony per oz. *Dose.* 1 to 2 dessert-spoonfuls in milk or aromatized water; or made into an emulsion with aromatics; in worms, &c.

ELIXIR (Squire's). *Prep.* 1. (Original Formula.) *Aurum musivum*, 3 oz.; *opium*, 2 oz.; *camphor*, 1 oz.; *cochineal*, ½ oz.; *sweet fennel*, ¼ oz.; *tincture of serpentary*, 1 pint (old meas.); *spirit of aniseed*, 1 gall. (old meas.); *sugar*, 1℔; dissolved in *water*, 1 pint (old meas.); digest 10 days, and filter.

2. *Powdered opium*, 2 oz.; *ginger, red sanders wood*, and *camphor*, of each, 1 oz.; *oil of aniseed*, ½ oz.; *oil of sweet fennel*, ½ dr.; *tincture of serpentary*, 1 pint; *proof spirit*, 5 pints; *water*, 1 quart; as last. Stimulant, anodyne, diaphoretic, and pectoral. *Dose.* 1 to 2 teaspoonfuls, in chest affections, nervous headaches, &c., in the absence of inflammatory symptoms.

ELIXIR (Stomachic). *Compound tincture of gentian* was formerly so called.

ELIXIR (Stoughton's). *Prep.* 1. *Raisin* (stoned and bruised), 1℔; *gentian root*, ⅜℔; *dried orange peel*, 6 oz.; *serpentary*, ¼℔; *calamus aromaticus*, 1½ oz.; *cardamoms*, ½ oz.; *sugar colouring*, ¼ pint; *brandy* or *proof spirit*, 2 gall.; digest a week, and strain.

2. *Tincture of gentian* (compound), and *brandy* or *proof spirit*, of each, 1 quart; *tincture of serpentary* and *syrup of saffron*, of each, 1 pint; *tinctures of aloes* and *rhubarb*, of each, ¼ pint; *bitter almonds* (bruised), 8 in no.; digest, as before.

3. (Foy.) *Aloes* and *cascarilla*, of each, 1 dr.; *rhubarb*, 4 dr.; *gentian, germander, dried orange peel*, and *wormwood*, of each, 6 dr.; *rectified spirit*, 32 fl. oz.; as before. Stimulant, tonic, and stomachic. *Dose.* 20 drops to a teaspoonful.

ELIXIR (Tonic). Syn. *Elixir Roborans, E. R. Roberti Whyttii.* See *Compound Tincture of Crown Bark*,—Ph. Bor. 1847.

ELIXIC (Tooth). Syn. *Elixir Dentifricum*,—Lat. *Prep.* 1. See *Elixirs* (Antiscorbutic *and* Rose.)

2. (Lefandinière's.) *Guaiacum raspings* and *cloves*, of each, 1 oz.; *pellitory of Spain* and *nutmeg*, of each, 2 dr.; *oil of rosemary*, 20 drops; *bergamotte*, 10 or 12 drops; *brandy*, 1 quart; macerate a fortnight and filter.

3. *Cinnamon, cloves*, and *nutmeg*, of each, 1 dr.; *vanilla*, ½ dr.; *camphor*, 10 gr.; *tincture of pellitory*, 2 fl. oz.; *brandy* or *proof spirit*, ½ pint; digest as before.

ELIXIR (Visceral). Syn. *Elixir Viscerale*,—Lat. See *Boerhaave's* and *Hoffman's Elixirs.*

ELIXIR (Vitriol). Syn. *Elixir Vitrioli, E. V. Aromaticum*,—Lat. The old name for *aromatic sulphuric acid*, (which see.)

ELIXIR (Vitriol,—Mynsicht's). See *Acid Aromatic Tincture.*

ELIXIR (Vitriol,—Scourer's). *Dilute sulphuric acid* (1 to 5). *Used* to scour metals.

ELIXIR (Vitriol,—Sweet). Syn. *Elixir Vitrioli Dulci*,—Lat. See *Aromatic Spirit of Ether.*

ELIXIR (Vitriol,—Virgani's). *Prep.* From *spirit of sulphuric ether*, 2℔; *aromatic tincture*, 3℔.

ELIXIR (Woroneje). *Capsicum*, 1 oz.; *nitre*, ½ oz.; *sal ammoniac*, 2 dr.; *nitro-hydrochloric acid*, 2 fl. dr.; *vinegar*, 1½ pint; *native white* or *rose naphtha*, or *petroleum*, 1½ fl. dr.; *olive oil*, 1 fl. oz.; *oil of peppermint* (Mitcham), 15 fl. oz.; *strongest rectified spirit*, 6 quarts; digest 12 days, with constant agitation, and filter. *Dose.* 2 teaspoonfuls, every 15 minutes; in cholera, diarrhœa, &c.

ELLAGIC ACID. When an *aqueous infusion of nut galls* is left for some time exposed to the atmosphere, the *tannic acid* gradually disappears, and is replaced by *gallic acid*, and an *insoluble gray powder* to which the term *ellagic acid* was applied by Chevreul. It is soluble in alkalies, forming salts, and is precipitated by acids.

ELM. Syn. *Ulmi Cortex*; *Ulmus*,—Ph. L. "The interior bark" of the "*ulmus campestris*" (Linn.),—Ph. L., or *common small-leaved elm.* This substance is demulcent, diaphoretic, and diuretic, and slightly febrifuge, astringent, and tonic. It has been employed in agues, and as a substitute for sarsaparilla in cutaneous eruptions, but is now little used. The *leaves* of the elm tree are reported to be vulnerary. See *Decoctions* and *Ulmine.*

ELUTRIATION. Cleansing by washing. The term is commonly applied to the operation of washing insoluble powders with water, to separate them from foreign matter, or the coarser portion. It is usually performed by grinding or triturating the mass with a *little water*, until reduced to a very fine powder, and this paste is suddenly diffused through a *large quantity of water*, contained in a deep vessel, from which, after the subsidence of the *grosser portion*, the liquid is poured into another vessel, and allowed to deposit the *fine powder* it still holds in suspension. When this has taken place, the clear supernatant liquor is decanted, and the sediment drained and dried. The coarse sediment deposited in the first vessel is now submitted to a fresh grinding and diffusion through water, and the entire operation is repeated, until the whole of the pulverizable portion is "*washed over.*" The proper length of time for the liquid to remain in the first vessel, depends solely on the density of the powder, and the degree of fineness required in the product; heavy powders subsiding almost immediately, while light ones often take several minutes to deposit the coarser portion. Sometimes three or more vessels are employed, and the muddy liquor, after remaining a short time in the *first*, is poured into the *next one*, and this, in a short time longer, into the *third*, and so on, until the last vessel is filled, by which means, powders of different degrees of fineness are obtained; that deposited in the last vessel being in the minutest state of division. The *elutriated paste* or *moist powder*, is then drained, and dried. On the *small scale*, the trituration is performed with a stone and muller, or in a mortar; on the *large scale*, in a mill, driven by either horse or steam power. *Antimony*, *chalk*, *bistre*, and other *pigments*, as well as various other substances *insoluble* in, or *unacted on* by water, are commonly obtained in the state of an inpalpable powder by *elutriation*, or "*washing over*," as it is called by amateurs and operatives.

ELYDORIC PAINTING. A method of painting invented by M. Vincent, of Montpetit, in which the pigments are mixed up with an emulsion of *oil* and *water*. It is said to add the fresh appearance of water colours, and the finish of miniature painting, to the mellowness of oil colours.

EMBALMING. Syn. *Mummification*. The preservation of the dead bodies of animals. The Egyptians used for this purpose various bituminous and balsamic substances, together with salines, and some of the materials used in tanning. See *Mummy* and *Putrefaction*.

EMBOSSING. The formation of ornamental figures in relief on *cloth*, *leather*, *paper*, and *wood*, has now been brought to such perfection, as to place this species of decoration within the reach of almost every class of society. *Embossed cloth* and *paper* are now employed by the bookbinder to cover even the low-priced volumes that pass through his hands; whilst the *embossed leather* that encloses the album or ornaments our furniture, frequently bears the richest patterns of the arabesque or moresque. *Cloth* and *paper* are usually embossed by machinery; *leather* and *wood*, more frequently by hand labour; some interesting examples of which will be noticed under those heads.

EMBROCATION. Syn. *Embrocatio*,—Lat. A fluid medicine for external and local use. Embrocations do not differ, materially, from liniments and lotions, and are applied in the same manner. (See those preparations, and below.)

EMBROCATION (Guestonian). Syn. *Embrocatio Terebinthinæ cum Acido*,—Lat. *Prep.* (Dr. Paris.) *Oil of turpentine* and *olive oil*, of each, 1½ oz.; *dilute sulphuric acid*, 3 fl. dr.; agitate together until mixed. *Used* in rheumatism, &c.

EMBROCATION (Hawkin's). See *Ward's Essence for the Headache.*

EMBROCATION (Lynch's). *Olive oil* (coloured with *alkanet root*), 5 fl. oz.; *oils of amber*, *rosemary*, and *turpentine*, of each, 1 dr. In bruises, rheumatism, &c.

EMBROCATION (Roche's). *Prep.* 1. (Dr. Paris.) *Olive oil*, mixed with half its weight of the *oils of cloves* and *amber*.

2. *Olive oil*, 2 oz.; *oil of amber*, 1 oz.; *oils of cloves* and *lemons*, of each, 1 dr. For hooping cough.

EMBROCATION (Ward's). See *Essences.*

EMBROIDERY. *Gold* and *silver* fancy work of this description may be cleaned with a little *spirit of wine*, either alone, or diluted with an equal weight of *water*. *Gin* is frequently used for the same purpose. The common practice of using *alkaline* or *acid liquors* is very injurious, and frequently destroys the beauty of the articles instead of cleaning them.

EMERALD. This beautiful gem ranks next to the diamond in value. A fine emerald weighing 4 or 5 gr. is worth as many pounds; one of 10 gr., about 2*l.* per gr.; one of 15 gr., 3*l.* to 4*l.* per gr.; and so on in proportion to the increase in size. One of 24 gr., if of pure water, is worth about 100*l.* The emerald consists chiefly of *silica* and *alumina*, and derives its colour from the presence of about 3$\frac{0}{0}$ of *oxide of chromium.* The finest emeralds are imported from Peru. See *Gems* and *Pastes.*

EMERALD GREEN. See *Green Pigments.*

EMERY is an impure, amorphous, compact, and opaque variety of corundrum, and consists chiefly of indurated alumina. Its hardness is so great, that it scratches and wears down nearly all minerals except the diamond; hence the use of its powder for cutting and polishing glass and various other hard substances. For *commercial purposes* the lumps of emery, as taken from the mine, are broken into pieces about the size of a hen's egg, which are then crushed under "stampers," similar to those used for pounding metallic ores. The coarse powder is then sifted through sieves covered with wire-cloth of different degrees of fineness, by which it is sorted into different "sizes." In this state it forms the emery of the shops, or *flour emery*. For *delicate purposes* it is afterwards prepared by elutriation.

Emery cakes are formed by melting *emery flour* with a little *bees' wax*, and after thorough admixture, forming it into solid lumps of suitable sizes. *Used* to dress the edges of buff and glaze wheels.

Emery cloth is prepared by brushing the surface of *thin cotton cloth* over with *liquid glue*, and sifting the *emery powder* over the surface while still warm.

Emery paper is made in the same way as *emery cloth*. They are used either with or without oil, in the same way as *glass paper*.

Emery sticks. These are made of *pieces of wood* in the same way, and are used for the same purposes as *emery paper*.

Emery stones are formed of *emery*, of the requisite coarseness, mixed with about half its weight of good *Stourbridge loam*, and *water*, q. s. to make a stiff paste, which is forced into metallic moulds by a powerful press. The pieces, when thoroughly dry, are exposed in a muffle for a short time to a temperature just under a full white heat. In this way "*discs*" and "*laps*" are generally made. For "*wheels*," only $\frac{1}{4}$th of loam is used. *Another method*, applicable for *cutting-stones* generally, is to press the *flour emery*, previously moistened with water, into moulds, with strong pressure, as before, without any other addition, and then to fire it at nearly a full white heat.

EMETICS. Syn. *Vomits, Anacathartics; Anacathartica, Emetica, Vomitoria*,—Lat. Medicines which induce vomiting. The *principal emetics* are *ipecacuanha* and *tartarized antimony*, and *their preparations*; and the *sulphates of zinc* and *copper*. Of these the *first* is commonly employed either in substance, or infused in wine, (*ipecacuanha wine*,) when it is merely wished to evacuate the contents of the stomach, when that viscus is in a disordered state, or overloaded with food; and is the one most adapted, in ordinary cases, for children and females. *Emetic tartar* (dissolved in water) and *antimonial wine*, either *alone*, or combined with *ipecacuanha*, are preferable at the commencement of fevers and other inflammatory disorders; in consequence of the nausea, relaxation, and depression of the muscular power and circulation which commonly follow their use. When POISON HAS BEEN TAKEN, *sulphate of zinc* is generally preferred as an emetic, on account of the promptness and completeness of its action, and its effects ceasing as soon as it is ejected from the stomach. *Sulphate of copper* is employed in the same cases as sulphate of zinc, but its action is more violent and disagreeable, whilst its intense metallic taste is a great objection to its use. 25 to 30 gr. of either of the above *sulphates*, are dissolved in 3 or 4 fl. oz. of *warm water*, and a *fourth* of the solution is given every ten minutes, until copious vomiting ensues. In the absence of other substances, when an immediate emetic is required, a *teaspoonful* of *flour of mustard* (an article always at hand) stirred up with half a pint of *warm water*, and drank at a draught, will generally act easily and effectively, and relieve the stomach before other remedies can be obtained and applied.

The *operation* of *emetics* is powerfully promoted by drinking *copiously* of diluents, especially of *warm* or *tepid water*. The latter, in fact, is itself an emetic, when taken in quantity. Its use will also prevent that dreadful straining and retching, which make emetics so much dreaded by the nervous and delicate.

The timely administration of an emetic at the commencement of *fevers* and other *inflammatory affections*, will frequently cause copious diaphoresis, and produce a cure, or at least greatly mitigate the severity of the symptoms. *Dropsies* have also been cured by vomiting; and *swelled testicle*, *bubo*, and other *glandular swellings*, have occasionally been dispersed by the action of emetics. *Visceral obstructions*, in both sexes, have also yielded to the same treatment. Small and repeated doses of emetics are frequently administered with advantage, to produce *nausea*, in many diseases of the *lungs* and *stomach*. Certain *chronic* and *obstinate diseases*, as *rheumatism* and *asthma*, are sometimes relieved by emetics, when every other line of treatment has failed.

Emetics should be *avoided* in *plethoric habits*, in *hernia*, *pregnancy*, and whenever visceral inflammation is suspected. They should also be given with great caution to young children and females, and to the nervous and delicate. In such cases, *wine* or *powder of ipecacuanha* should alone be employed.

EMETIC CUPS. Syn. *Antimonial Cups; Pocula Emetica, Calices Vomitorii*,—Lat. Small cups made of *metallic antimony*. Wine left in them for 10 or 12 hours becomes emetic.

EMETIC TARTAR. See *Antimony* (Potassio-tartrate).

EMETINE. Syn. *Emetin; Emetina,*—Lat. *La Matière Vomative,*—Fr. A peculiar alkaloid forming the active principle of the root of *cephaelis ipecacuanha.* It was discovered by Pelletier and Magendie in 1817.

Prep. 1. (Medicinal.)—*a. Ipecacuanha* (in coarse powder) is digested *first* in *ether*, and then in *rectified spirit* for 3 or 4 days; the *alcoholic tincture* is next expressed and evaporated (distilled) to dryness; the residuum is dissolved in *distilled water*, and the solution precipitated with *acetate of lead;* the precipitate is then diffused through *distilled water*, in a tall glass vessel, and *sulphuretted hydrogen* is passed through it, to throw down the lead; after which the liquor is decanted, filtered, evaporated to the consistence of a thick syrup, and spread in a thin layer on warm plates of glass, and allowed to dry in a current of warm air, or by a gentle heat in a stove. The maceration in ether is frequently omitted.

b. Ipecacuanha, 1 part; *rectified spirit* (0·835), 7 parts; make a tincture, distil off the spirit, dissolve in *cold distilled water,* 5 parts; filter the solution, and evaporate, &c., as before. Inferior to the last.

c. (P. Cod.) As the last, nearly.

Obs. Medicinal or impure emetine is brownish red, deliquescent, and emetic in *doses* of $\frac{1}{4}$ to $\frac{1}{2}$ gr.

2. (Pure.)—*a. Ipecacuanha* (in coarse powder), 1 part, is digested for 24 hours in *distilled water,* 10 parts; together with *calcined magnesia,* added in slight excess; the deposit is then thrown on a filter, washed carefully with *very cold water,* and dried; it is next dissolved in *rectified spirit* and neutralized with *dilute sulphuric acid;* the filtered solution is decoloured with *animal charcoal,* again filtered, and again precipitated by digestion with *magnesia;* the last deposit forms a colourless solution with *rectified spirit,* which, by gentle evaporation, gives up its emetine as a yellowish-white pulverulent mass, which may be rendered perfectly white by redissolving it in alcohol, &c., as before. The process is rendered easier by first digesting the *powdered ipecacuanha* in *ether.*

b. (P. Cod.) *Alcoholic extract of ipecacuanha,* 1 part; *water,* 10 parts; dissolve, filter, add *calcined magnesia,* 1 part; evaporate to dryness, wash the product on a filter with *very cold water,* 5 parts; dry it again, and dissolve it in *boiling alcohol;* evaporate the filtered tincture to dryness, redissolve the residuum in a little *water,* acidulate (slightly) with *dilute sulphuric acid,* decolour with *animal charcoal,* filter, precipitate with *liquor of ammonia,* and dry the precipitate by a gentle heat.

c. (Ph. Suec., 1845.) *Powdered ipecacuanha,* 1 part; *water acidulated with sulphuric acid,* 6 parts; digest, filter, add *lime,* 1 part, and evaporate to dryness over a water-bath; the residuum is then exhausted with boiling *rectified spirit,* and otherwise treated as in the last formula.

Prop., &c. Pure emetine is white, pulverulent, inodorous, and bitter; fusible at 122° Fahr.; very soluble in alcohol and boiling water, but only slightly so in ether, oils, and cold water. It restores the blue colour of reddened litmus, and partially neutralizes the acids, forming scarcely crystallizable salts. It is reddened by *nitric acid,* and this red colour is deepened by ammonia. *Tincture of iodine* produces a reddish precipitate in an alcoholic solution of emetine. With *tincture of galls* this solution behaves like morphia; but, unlike the last substance, the *salts of iron* produce no change of colour in it. These reactions, combined with its emetic properties, are sufficient for its identification. *Dose.* White and pure emetine is emetic in doses of $\frac{1}{20}$ to $\frac{1}{16}$ gr. The large doses ordered in certain recent pharmaceutical compilations, evidently in error of the difference between the strengths of *pure* and *impure,* or *medicinal* emetine, have, in several cases which have been reported on, produced very serious consequences.

EMETINE INDIGENE. See *Violine.*

EMMENAGOGUES. Syn. *Emmenagogæ,*—Lat. Substances which excite or promote the catamenia. There are, probably, few remedies which exert this specific power on the uterus, the majority of repeated emmenagogues acting rather by their influence on the system generally, or on parts contiguous to the uterus, than in the uterus itself. Among the substances usually arranged under this class, are—*aloes, black hellebore, birthwort, borax, cubebs, ergot, gamboge, gin, iodide of potassium, iodine, madder, mercurials,* the *peppers, rue, savine, stimulants* (generally), *stimulating diuretics, stinking goose-foot, stinking orache, wine, &c.*

Of the above, *ergot* and *madder* are the only articles which exercise a direct power on the uterus, and that rather in increasing its expulsive energy than in promoting the menstrual function, though they are advantageously employed for the latter purpose. Several of the other substances named, are drastic purgatives, or possess cerebro-spinal properties, or local powers of irritation, by which they increase the pelvic circulation, or produce excitement in the neighbouring parts, in many cases of a dangerous and irreparable character. Hence many writers on pharmacology deny the existence of emmenagogues.

To ensure the successful administration of this class of medicines, the system must be previously prepared for their use by invigorating it, if there is either relaxation or debility; and an opposite course should be pursued when there is an undue degree of arterial action. In the majority of cases, the restoration of the discharge is rather attributable to a proper regulation of the system than to any specific power in the medicine administered.

EMOLLIENTS. Syn. *Emollientia*,—Lat. These are demulcents. As commonly understood it applies to demulcents of an oleaginous, saponaceous, or emulsive character, applied to surfaces (generally external) to soften and relax their fibres.

EMULSIN. The vegetable albumen of almonds. It is white, soluble in cold water, and coagulated by heat and alcohol. Its most remarkable property is its action on amygdalin, by which the volatile oil of almonds and hydrocyanic acid, with other products, are formed.

EMULSION. Syn. *Emulsio*,—Lat. A milky fluid, formed by the mechanical admixture of oil and water, by means of some other substance that possesses the power of combining with both. The emulsions of the London Pharmacopœia are now included in the class *Misturæ.*

In the *preparation of emulsions*, the oily or resinous ingredients are usually suspended by means of *mucilage of gum arabic*, *almonds*, or *yelk of egg.* 1 dr. of the *first*, made with equal parts of gum and water; 1 oz. of the *second* (usually 26 in number); and one in no. of the *last*, will form 2 dr. of any oil into an emulsion with about 1 oz. of water, gradually added. In some cases, instead of the above substances, a little *liquor of potassa* is employed, by which a saponaceous emulsion is formed. In all cases, the *mucilage* or *other viscid substance* should be put into the mortar before anything else. The *oil* or resinous matter may then be very gradually rubbed in, taking care not to add it more quickly than it can be subdued by the pestle; and if, during this part of the manipulation, the mixture should begin to assume a breaking or curdling appearance at the edges, a few drops of water must be immediately incorporated with it, before adding the remainder of the oil. From the want of this precaution, it is common for an emulsion suddenly to lose its tenacious consistence in the mortar, and it is then in vain to endeavour to restore it. After the oil is *thoroughly* incorporated, some care is requisite to avoid separating it again by too hasty an effusion of the water or other fluid of the mixture. If any alcoholic or acid liquid is to be added, it must be at the very end of the process. Indeed, the addition of an acid liquid, even a slightly acescent syrup, will often entirely destroy an emulsion. Mixtures of copaiba are frequently spoiled by the addition of spirit of nitric ether; a misfortune which might be avoided by first diluting it with one or two parts of water.

An excellent method of preparing *emulsions* of *resins* and *gum-resins*, is to put the article into a marble or wedgewood mortar, and to pour over it about 4 times its weight of *rectified spirit*, which is then to be ignited, and the mixture triturated until an equal consistence is obtained. The liquid is then to be added gradually, and the whole patiently triturated or shaken until cold. Yelk of egg or mucilage may be added to the fluid resin or gum-resin, if desired, as in the common method, but an excellent emulsion may be made without them.

The presence of soluble salts in an emulsion is apt to occasion the separation of the oleaginous portion. Spirit produces the same effect in those which are made with yelk or mucilage; and acids in those made with an alkali. The addition of these substances to emulsions should be therefore avoided as much as possible. *Emulsions of wax*, *spermaceti*, *oil of turpentine*, and *balsam of copaiba*, are the most readily and completely formed with yelk of egg. *Volatile oils* are more readily made into emulsions if mixed with an equal volume of some simple fixed oil, before proceeding to operate on them. *Scammony* is generally formed into an emulsion with milk; and *resin of jalap*, with almonds and water.

The following formulæ, for certain emulsions, are merely given here for examples. Various others will be found under *Mixtures*, *Lotions*, *Washes*, *&c.*

EMULSION (Almonds). Syn. *Milk of Almonds, Almond Mixture; Emulsio Amygdalæ, Mistura do.*,—Lat. *Prep.* 1. *Blanched almonds*, 1 *oz.;* beat them to a smooth paste, add, gradually, *water*, ½ pint; and when the whole is thoroughly incorporated, strain through a piece of gauze.

2. As the last, adding *sugar*, 1 *oz.;* or *syrup* (either simple or flavoured), 1½ fl. oz.

EMULSION (Assafœtida). Syn. *Emulsio Assafœtidæ, Mistura do.*,—Lat. *Prep.* (Duclow.) *Assafœtida*, 1 oz.; *powdered gum*, 2 oz.; *oil of almonds*, 3½ fl. oz.; *water*, 6 fl. oz. Antispasmodic. *Dose.* 1 or 2 table-spoonfuls; in hysterical affections, &c.

EMULSION (Camphor). Syn. *Emulsio Camphoræ, E. Camphorata; Mistura Camphoræ*,—Ph. E. *Prep.* 1. (Ph. Castr. Ruth., 1840.) *Camphor*, ½ dr.; triturate with *milk*, ½ fl. oz., gradually added; then further add of *water*, 7½ fl. oz.

2. (Ph. E.) *Camphor*, 20 gr.; *lump sugar*, ½ oz.; triturate together, and add of *blanched almonds*, ½ oz.; again triturate, then gradually add of *water*, 1 pint. Stimulant, antispasmodic, and diaphoretic. *Dose.* 1 fl. oz. to 2 fl. oz.

EMULSION. (Capivi). Syn. *Emulsio Copaibæ, Mistura C.*,—Lat. *Prep.* 1. *Balsam of copaiba* and *syrup of orange peel*, of each, 2 oz.; *yelks of* 5 *eggs; milk*, 14 fl. oz.

2. (Beral.) *Copaiba* and *mucilage*, of each, 2 oz.; *water*, 12 fl. oz. *Dose.* ½ oz. to 1 oz.; 2 or 3 times a day where the use of copaiba is indicated.

EMULSION (Castor Oil). Syn. *Emulsio Olei Ricini, Mistura O. R.*,—Lat. *Prep.* 1. *Castor oil*, 1 oz.; *thick mucilage*, 1½ oz.; *syrup of orange peel*, 1 fl. oz.; *water*, 6 fl. oz.

2. As the last, but using *milk* instead of water. *Dose.* One third; as an aperient for females who object to taking the unprepared oil.

EMULSION (Gum). Syn. *Emulsio Acaciæ; Mistura Acaciæ*,—Ph. E. *Prep.* From *sweet almonds* (blanched), 10 dr.; *white sugar*, 5 dr.; *mucilage*, 3 fl. oz.; *water*, 1 quart. Demulcent. In coughs, &c., ad libitum.

EMULSION (Oil of Almonds). Syn. *Emulsio Olei Amygdalæ*,—Lat. *Prep.* From *oil of almonds*, 3 dr.; *thick mucilage* and *simple syrup*, of each, 5 dr.; *rose water*, 1 fl. oz.; *distilled water*, 3 or 4 fl. oz. An elegant and efficient substitute for almond milk.

EMULSION (Peruvian Balsam). Syn. *Emulsio Balsamica, E. Balsami Peruviani*, —Lat. *Prep.* 1. As *emulsion of copaiba.*

2. (Hosp. F.) *Balsam of Peru*, ½ oz.; *oil of almonds*, 6 dr.; *powdered gum*, 1 oz.; triturate together, and add, gradually, *rose water*, 4 fl. oz. *Dose.* 1 or 2 table-spoonfuls; in old asthmas, chronic coughs, winter coughs, &c.

EMULSION (Scammony). Syn. *Emulsio Scammonii; Mistura S.*, — Ph. E. *Prep.* 1. (Ph. E.) *Resin of scammony*, 7 gr.; *new milk*, 3 fl. oz. For a *dose.*

2 (Planche.) *Aleppo scammony*, 7 gr.; *sugar*, 2 dr.; *new milk*, 3 fl. oz.; *cherry-laurel water*, 5 or 6 drops. For a *dose.* Purgative; in torpor of the intestines, dropsy, worms, &c. The formula of the Paris Codex is similar.

EMULSION (Spermaceti). Syn. *Emulsio Cetacei, Mistura C.*,—Lat. *Prep.* As *emulsion of wax.* Demulcent.

EMULSION (Turpentine). Syn. *Emulsio Terebinthinæ, Mistura T.*,—Lat. *Prep.* 1. *Chio turpentine*, 2 dr.; *white sugar*, 1 oz.; *yelk of* 1 *egg; milk of almonds*, 4 fl. oz. In gleets. *Dose.* 2 table-spoonfuls, 3 or 4 times a day.

2. (Clossius.) *Venice turpentine*, 1½ dr.; *yelk of* 1 *egg; peppermint water*, 4½ fl. oz.

EMULSION (Oil of Turpentine). Syn. *Emulsio Olei Terebinthinæ, Mistura O. T.*, Lat. *Prep.* (Carmichael.) *Rectified oil of turpentine*, 1 fl. oz.; *yelk of* 2 *eggs; emulsion of almonds*, 4 fl. oz.; *syrup of orange peel*, 2 fl. oz.; *spirit of lavender*, 4 fl. dr.; *oil of cinnamon*, 5 or 6 drops. *Dose.* 1 fl. oz., twice or thrice a day; in nephritic pains, and that variety of ophthalmia termed *iriditis.*

EMULSION (Wax). Syn. *Emulsio Ceræ, E. Ceræ Albæ, Mistura C., Lac C.*,—Lat. *Prep.* (Guibourt.) *White wax*, 1 oz.; *powdered gum*, 1½ dr.; *water*, 24 fl. oz.; *simple syrup*, 4 fl. oz.; put the syrup and gum into a warm mortar, add the wax, and triturate with a warm pestle until united; then add the water (*warm*) gradually, and continue the agitation till the whole is quite cold. Demulcent. Ad libitum.

ENAMEL. A species of vitreous varnish, coloured with metallic oxides, applied in a thin stratum to brightly polished metallic surfaces (*copper* or *gold*), on which it is fused by the flame of a lamp urged by the blowpipe, or by the heat of a small furnace.

The basis of all enamels is a highly transparent and fusible glass, (called "*Frit*," "*Flux*," or "*Paste*,") which readily receives a colour on the addition of metallic oxides. It may be made by one or other of the following formulæ:—

Prep. 1. *Red lead*, 16 parts; *calcined borax*, 3 parts; *powdered flint glass*, 12 parts; *powdered flints*, 4 parts; fuse in a Hessian crucible for 12 hours, then pour it out into water, and reduce it to a powder in a biscuit-ware mortar.

2. *Tin*, 3 parts; *lead*, 10 parts; mix, calcine in an iron pot at a dull cherry-red heat, and scrape off the oxide as it forms, observing to obtain it quite free from undecomposed metal; then reduce it to fine powder by grinding and elutriation. In this state it is known among enamellers as "*Flux*" or "*Calcine.*" 4 parts of this *calcine* are next mixed with an equal weight of *pure sand* or *powdered flints*, and

1 part of *sea-salt*, or other alkaline matter; the mixture is then partially fused in a Hessian crucible, by which it undergoes semi-vitrification.

3. (Chaptal.) *Lead* and *tin*, equal parts; calcine as above, and take of the *mixed oxides* or *calcine* and *ground flints*, of each 1 part; *pure carbonate of potash*, 2 parts; and proceed as before.

4. (Wynn.) *Flint glass*, 3 *oz.*; *red lead*, 1 *oz.*; as last.

5. (Wynn.) *Red lead*, 18 parts; *borax* (not calcined), 11 parts; *flint glass*, 16 parts; as last.

6. (Wynn.) *Powdered flints*, 10 parts; *nitre* and *white arsenic*, of each, 1 part; as last.

Obs. The precise qualities of the products of the above processes depend greatly upon the duration and degree of heat employed. By increasing the quantity of *sand*, *glass*, or *flux*, the enamel is rendered more fusible, and the opacity and whiteness is increased by the addition of *oxide of tin.* The use of borax should be avoided, or it should be used sparingly, as it is apt to make the enamel effloresce and lose colour.

ENAMEL (Black). *Prep.* 1. *Calcined iron* (protoxide), 12 parts; *oxide of cobalt*, 1 part; mix, add an equal weight of white flux, and fuse, as before.

2. (Clouet.) *Pure clay*, 3 parts; *protoxide of iron*, 1 part. A fine black.

3. *Peroxide of manganese*, 3 parts; *zaffre*, 1 part; mix, and add it, as required, to white flux.

ENAMEL (Blue). *Prep.* 1. *White frit* or *flux*, coloured with *oxide of cobalt.*

2. *Sand*, *red lead*, and *nitre*, of each, 10 parts; *flint glass* or *ground flints*, 20 parts; *oxide of cobalt*, 1 part, more or less; depending on the desired depth of colour.

ENAMEL (Brown). *Prep.* 1. *Manganese*, 5 parts; *red lead*, 16 parts; *flint powder*, 8 parts; as before.

2. (Wynn.) *Manganese*, 9 parts; *red lead*, 34 parts; *flint powder*, 16 parts.

3. *Red lead* and *calcined iron*, of each, 1 part; *antimony*, *litharge*, and *sand*, of each, 2 parts. To be added in any required proportion to white frit, according to the colour desired. A little *oxide of cobalt* or *zaffre* is frequently added to alter the shade.

ENAMEL (Green). *Prep.* 1. *Flux* or *frit*, 2 *lb.*; *black oxide of copper*, 1 *oz.*; as before.

2. As the last, but adding *red oxide of iron*, ½ dr. Less decisive.

3. *Copper dust* and *litharge*, of each, 2 *oz.*; *nitre*, 1 *oz.*; *sand*, 4 *oz.*; *flux* or *frit*, q. s.

4. From *transparent frit*, any quantity; *oxide of chromium*, q. s. to colour. Colour superb; it will stand a great heat; in common hands, however, it frequently turns on the dead-leaf tinge.

5. *Transparent flux*, 5 *oz.*; *black oxide of copper*, 30 to 40 gr.; *oxide of chrome*, 2 gr. Resembles the emerald.

6. From *blue* and *yellow enamel* mixed in the required proportions.

ENAMEL (Olive). *Prep. Blue enamel*, 2 parts; *black* and *yellow do.*, of each, 1 part. See *Brown Enamel.*

ENAMEL (Orange). *Prep.* 1. *Red lead*, 12 parts; *red sulphate of iron* and *oxide of antimony*, of each, 1 part; *flint powder*, 3 parts; calcine together, powder, and melt with *flux*, 50 parts.

2. (Wynn.) *Red lead*, 12 parts; *oxide of antimony*, 4 parts; *flint powder*, 3 parts; *red sulphate of iron*, 1 part; calcine, then add *flux*, 5 parts, to every 2 parts of *this mixture.*

ENAMEL (Purple). *Prep.* 1. *Flux* or *frit*, coloured with *oxide of gold*, *purple precipitate of cassius*, or *peroxide of manganese.*

2. *Sulphur*, *nitre*, *green vitriol*, *antimony*, and *oxide of tin*, of each, 1 *lb.*; *red lead*, 60 *lb.*; mix, fuse, cool, powder, and add *rose copper* (red oxide), 19 *oz.*; *zaffre*, 1 *oz.*; *crocus martis*, 1½ *oz.*; *borax*, 3 *oz.*; and of a *compound formed of gold, silver, and mercury*, 1 *lb.*; fuse, stirring the melted mass with a copper rod all the time, then place it in crucibles, and submit them to the action of a reverberatory furnace for 24 hours. This is said to be the purple enamel used in the mosaic pictures in St. Peter's at Rome.

ENAMEL (Red). *Prep.* 1. *Paste* or *flux* coloured with the *red oxide* or *protoxide of copper.* Should the colour pass into the green or brown, from the partial peroxidizement of the copper, from the heat being raised too high, the red colour may be restored by the addition of any carbonaceous matter, as tallow, or charcoal.

2. By tinging the *glass* or *flux* with the *oxide* or *salts of gold*, or with the *purple precipitate of cassius.* These substances produce shades of red, inclining to crimson or purple of the most exquisite hue. The enamel often comes from the fire quite colourless, and afterwards receives its rich hue at the lamp.

3. (Wynn.) *Sulphate of iron* (calcined dark), 1 part; a *mixture of* 6 *parts of flux* (No. 5) *and* 1 *of colcothar*, 3 parts. Dark red.

4. (Wynn.) *Red sulphate of iron*, 2 parts; *flux* (No. 1), 6 parts; *white lead*, 3 parts. Light red.

ENAMEL (Rose-coloured). *Prep. Purple enamel* (or its elements), 3 parts; *flux*, 90 parts; mix, and add *silver leaf* or *oxide of silver*, 1 part, or less.

ENAMEL (Transparent). See *Frit* or *Flux* (above).

ENAMEL (Violet). *Prep.* 1. *Purple enamel*, 2 parts; *red do.* (No. 2), 3 parts; *frit*, 6 parts.

2. *Saline* or *alkaline frit* or *flux*, any quantity; *peroxide of manganese*, q.s. to colour. As the tint depends on the metal being at the maximum of oxidation, contact with oily or carbonaceous substances should be particularly avoided.

ENAMEL (White). *Prep.* 1. *Calcine* (from 2 parts of *tin* and 1 part of *lead*), 1 part; fine *crystal glass* or *frit*, 2 parts; *manganese*, a few grains; powder, mix, melt, and pour the fused mass into clean water; again powder, and fuse, and repeat the whole process 3 or 4 times, avoiding contamination with smoke, dirt, or oxide of iron. A fine dead white.

2. Washed *diaphoretic antimony*, 1 part; *fine glass* (free from lead), 3 parts; mix, and proceed as before. Very fine.

3. *Lead*, 30 parts; *tin*, 33 parts; calcine as before, then fuse 50 parts of this *calcine* with an equal weight of *flints*, in powder, and 100 parts of *salt of tartar*. A fine dead white enamel.

Obs. For white enamel, the articles must be perfectly free from foreign admixture, as this would impart a colour. When well managed, either of the above forms will produce a paste that will rival the *opal*.

ENAMEL (Yellow). Superior yellow enamels are less easily produced than those of most other colours; they require very little flux, and that mostly of a metallic nature. The following come highly recommended by experienced parties:—

Prep. 1. From *frit* or *flux*, fused with *oxide of lead*, and a little *red oxide of iron*.

2. *Lead*, *tin ashes*, *litharge*, *antimony*, and *sand*, of each, 1 *oz.*; *nitre*, 4 *oz.*; mix, fuse, and powder; and add the product to *flux* or *frit*, q.s.

3. *White oxide of antimony*, *alum*, and *sal ammoniac*, of each, 1 part; pure *carbonate of lead*, 1 to 3 parts, or q.s. (all in powder); mix, and expose them to a heat sufficiently high to decompose the sal ammoniac. *Used* as the last. Very bright coloured.

4. (Wynn.) *Red lead*, 8 *oz.*; *oxide of antimony*, and *tin*, calcined together, of each, 1 *oz.*; mix, and add of *flux* (No. 5), 15 *oz.*; mix well and fuse.

5. Pure *oxide of silver* added to the *metallic fluxes*. The salts of silver are also used, but are more difficult to manage. If a thin film of oxide of silver be spread over the surface of the enamel to be coloured, exposed to a moderate heat, then withdrawn, and the film of reduced silver on the surface removed, the part under will be found tinged of a fine yellow. (Clouet.)

ENAMELLING. See *Metals*, *Leather*, *Wood*, *&c.*

ENCAUSTIC. See *Painting* (Encaustic).

ENEMA. Syn. *Clyster*, often corr. into *Glyster; Lavement.* A medicine usually liquid (*sometimes* gaseous) thrown into the rectum or lower bowels.

Clysters usually *consist* of some *weak glutinous* or *mucilaginous fluid*, to which the active ingredients are added; or a *decoction* or *infusion* is made of the medicaments, which is then used, either alone, or after the addition of a little *gum*, *starch*, or *sugar*. The proper vehicle for *astringent vegetable matter*, *metallic salts*, and the *mineral acids*, is pure water. *Oleaginous* and *resinous substances* are made into *emulsions* before being employed for enemas. In all cases the fluid is administered warm. The *quantity of fluid forming a clyster*, for an ADULT, may vary from ½ to ¾ pint; that for an INFANT within *a month old*, should be about 1 *fl. oz.*; for a CHILD of *one year*, about 2½ *fl. oz.*; from *one* to *seven years*, from 3 or 4 *fl. oz.*; and from *seven* to *twelve* or *fourteen*, 6 or 7 *fl. oz.*; after that age to puberty, ½ pint may be employed.

The *quantity* or *dose* of the *active ingredients* in a clyster, should be 4 or 5 times as great as that of the same medicines when taken by the mouth; as it is generally regarded that the susceptibility of the rectum is only ⅕th that of the stomach, and that to exert a like absorbent action, it occupies 5 times as long as the latter viscus. The dose and the interval between its repetition, should, therefore, be proportionately increased. *Narcotics*, as *opium*, *tobacco*, *&c.*, should, however, be given in only *twice* or *thrice* the quantity that would be exhibited in the usual manner.

Enemata are *usually administered* by means of a *syringe*, *bladder*, or *elastic bag*, furnished with a *rectum tube;* but many ingenious and elegant pieces of mechanism, adapted for self-administration, are made by the instrument makers. Among the latter, none are more convenient, effective, and durable, than those sold by Messrs. Dietrichsen and Hannay, of 63, Oxford street. Great care should be taken to avoid injuring the coats of the rectum by the use of a rough or improperly shaped pipe, or one that is too long. The extremity of the pipe or tube should also be *perfectly smooth* and *well rounded*, (rather *spherical* than *pointed*,) and in using it *no force* should be employed. A neglect of this point often produces very serious consequences, especially in young children.

Tobacco smoke may be *administered* by means of a *double pair of bellows*, supplied with air from a *small funnel* under which the herb is burning,—and *gaseous matter*, by connecting the rectum tube with a small *gasometer*, exerting a trifling pressure on the *confined gas*.

The *number of substances employed* in the *preparation of enemata* is very great. The following are some of them, arranged according to their effects:—

1. (Anodyne and Narcotic.) *Opium*, *henbane*, *&c.*, are employed to allay spasms of the bowels, stomach, uterus, bladder, &c.

2. (Aperient or Cathartic.) *Aloes*, *colocynth*, *senna*, various *purging salts*, *gruel*, *decoction of marshmallows*, *decoction of linseed*, *warm water*, *&c.*, are commonly employed to promote the peristaltic action of the bowels, or to destroy worms.

3. (Demulcent and Emollient.) *Decoction of starch*, *gum*, *isinglass*, *glue*, *&c.*, either *alone* or *combined* with *opium*, are used to protect the coats of the intestines, and to allay irritation; and also to restrain diarrhœa, especially when combined with *astringents*, as *logwood*, *catechu*, or *oak bark*.

4. (Nutrient.) *Animal jelly*, *soups*, *broths*, *milk*, *&c.*, are frequently used as injections to convey nourishment to the body.

5. (Sedative.) *Tobacco infusion* or *smoke*, and *tartar emetic* (in solution), are employed to relax the powers of the body, to remove spasms, depress the circulation, and to produce syncope.

Enemata or *clysters* are now very frequently employed in our large towns, especially among the higher classes; but a great prejudice exists among many persons against their use, arising from a fastidious and mistaken delicacy. The introduction of improved apparatus of late years, (see *above*,) by which the administration of these remedies is attended with much less difficulty and exposure than formerly, has removed much of the repugnance which previously existed.

Clysters are invaluable when it is necessary to evacuate the bowels as speedily as possible, and when the stomach will not bear the administration of a purgative by the mouth, as well as in cases requiring a direct medication of the lower bowels, as in *dysentery*, *colic*, *&c.* As a mere *laxative*, an injection of *tepid water*, *milk-and-water*, or *water gruel*, will generally be found sufficient. By the addition of 1 or 2 table-spoonfuls of *common salt*, *epsom salts*, *salad oil*, or *molasses*, to this *laxative enema*, it will form an excellent *purgative* one, which will, in most cases, induce a full discharge. In all cases, the patient should be directed to retain the injection for as long a time as possible, and not to attempt to empty his bowels immediately after the reception of the medicine. "In *irritation* of the *bladder*, *rectum*, or *uterus*, an *anodyne injection* or *enema* often affords much relief. In *diseases of the lower bowels*, clysters are also of almost indispensable utility, as also in the *dislodgment of ascarides* seated in the rectum; nor are they less beneficial in those cases of *sudden sinking of the powers of life* where deglutition is impossible, and yet a prompt stimulating impression is requisite to save the patient; under such circumstances, clysters of some of the diffusible stimuli have proved of the greatest benefit."

The injection of *large* quantities of liquid matter into the bowels, as well as the *constant* use of clysters (even of warm water only), is deemed by the highest medical authorities to be injurious, and, occasionally, dangerous. The practice should not, therefore, be allowed to grow into a habit. The bowels continually accustomed to a stimulant, cease to act without one. The same remarks apply to aperients taken by the mouth.

The following formulæ embrace the whole of the enemas (*enemata*) of the British Pharmacopœias, as well as a few others in common use:—

ENEMA (Albumen). Syn. *Enema Albuminis*,—Lat. *Prep.* (Ricord.) *Infusion of linseed*, 12 oz.; *whites of* 2 *or* 3 *eggs;* mix. In chronic diarrhœa, and as a nutrient clyster in debility from stomach diseases. The reason for rejecting the *yelks* of the eggs is not very obvious, as the preparation is much more effective with them.

ENEMA (Aloes). Syn. *Enema Aloës*,—Ph. L. *Prep.* From *aloes*, 2 scrup.; *carbonate of potassa*, 15 gr.; *decoction of barley* (barley water), ½ pint. In ascarides, atonic amenorrhœa, &c. It should not be employed when irritability of the rectum, bladder, or genitals exists; nor in piles, or when there is a tendency to prolapsus ani or prolapsus uteri.

ENEMA (Anodyne). See *Enema of Opium.*

ENEMA (Antispasmodic). Syn. *Enema*

Antispasmodicum,—Lat. *Prep.* From *tincture of assafœtida,* 3 fl. dr.; *laudanum,* 30 to 60 drops; *water gruel* or *barley water,* ½ pint. In spasmodic affections of the bowels. (See *below.*)

ENEMA (Assafœtida). Syn. *Fetid Clyster, Antispasmodic do.; Enema Assafœtidæ,*—Ph. L. *E. Fœtidum,*—Ph. E. & D. *Prep.* 1. (Ph. L.) *Assafœtida,* 1 dr.; *decoction of barley* (hot), ½ pint; rub together until mixed.

2. (Ph. E.) To *carthartic enema* (Ph. E.), add of *tincture of assafœtida,* 2 fl. dr.

3. (Ph. D.) *Warm water,* 12 fl. oz; *tincture of assafœtida,* 2 fl. dr.

4. (St. B. Hosp.) *Assafœtida,* 2 dr.; *yelk of an egg; barley water,* 7 fl. oz. Stimulant, antispasmodic, and carminative. An excellent remedy in hysteria, flatulent colic, hooping-cough, infantile convulsions, worms in the lower bowels, &c. See *Hooping-cough Enema.*

ENEMA (Astringent). Syn. *Enema Astringens,*—Lat. *Prep.* 1. *Tincture of catechu,* 1 fl. oz.; *barley water,* 9 fl. oz.

2. *Extract of rhatany,* 2 dr.; *syrup,* or *made starch,* 2 oz.; *water,* 7 fl. oz.

3. *Decoction of galls, oak-bark, pomegranate,* or other like astringent substance, 3 or 4 fl. oz.; *water* or *barley water,* 6 or 7 fl. oz.

4. (Hosp. F.) *Electuary of catechu,* 2 dr.; *water* and *lime water,* of each, 4½ fl. oz. In diarrhœa, &c., arising from a relaxed condition of the coats of the lower bowels; and in fissures of the anus, &c.

ENEMA (Camphor). Syn. *Enema Camphoræ,*—Lat. *Prep.* 1. *Camphor liniment,* 4 fl. dr.; *yelks of 2 eggs; water gruel,* 7 fl. oz.

2. *Camphor,* 1 dr.; *rectified spirit,* 2 dr.; triturate till dissolved, then add, gradually, of *simple syrup,* 1 oz.; when thoroughly incorporated, further add of *thin gruel,* 7 fl. oz. Anodyne, antispasmodic, and diuretic. In difficult or obstructed micturition.

ENEMA (Castor Oil). Syn. *Enema Olei Ricini,*—Lat. *Prep.* 1. (Hosp. F.) *Castor oil* and *mucilage,* of each, 1 oz.; *gruel,* ½ pint.

2. *Castor oil,* 1 oz.; *liquor potassa,* 2 fl. dr.; triturate, and add of *honey,* 1 oz.; when mixed, further add of *hot gruel,* ½ pint; and agitate until cool enough to be administered.

ENEMA (Cathartic). Syn. *Purgative Clyster; Enema Catharticum,*—Ph. E. & D. *E. Laxativum, E. Purgativum,*—Lat. These have been already alluded to. By increasing the quantity of the active ingredients, a mild laxative or aperient clyster is converted into an active purgative or cathartic one.

Prep. 1. (Ph. E.) *Senna,* ½ oz.; *boiling water,* 16 fl. oz.; infuse an hour, then add of *Epsom salts,* ½ oz.; *sugar,* 1 oz.; when dissolved, further add of *olive oil,* 1 oz.; and mix them by agitation.

2. (Ph. D.) *Epsom salts,* 1 oz.; *olive oil,* 1 fl. oz.; *mucilage of barley,* 16 fl. oz.

3. (Ph. D. 1826.) *Manna,* 1 oz.; *compound decoction of chamomile,* ½ pint; dissolve, and add of *olive oil,* 1 oz.; *Epsom salts,* ½ oz.

4. *Compound decoction of mallows,* ½ pint; *Epsom salts,* ¾ oz.; *sweet oil,* 2 fl. oz.; mix, as above.

Obs. The above are employed in all ordinary cases where the use of an immediate cathartic is indicated. (See *below.*)

ENEMA (Chloride of Lime). Syn. *Enema Chloridi Calcis, E. Antiputrescens,*—Lat. *Prep.* 1. *Chloride of lime,* 10 gr.; *tepid water,* 1 fl. oz.; triturate, then add of *barley water,* or *plain tepid water,* 7 fl. oz.

2. (Pereira.) *Chloride of lime,* 10 to 15 gr., added to a *common enema.* As a *deodorizer,* when the alvine evacuations are unusually fetid.

ENEMA (for Colic). Syn. *Enema Anticolicum,*—Lat. *Prep.* From *oil of cajeput* or *peppermint,* 15 drops; dissolved in *sweet spirit of nitre,* 60 drops; *laudanum,* 35 drops; *infusion of chamomile,* ½ pint.

ENEMA (Colocynth). Syn. *Enema Colocynthidis,*—Ph. L. *Prep.* 1. (Ph. L.) *Extract of colocynth,* ½ dr.; *soft soap,* 1 oz.; triturate, and add of *water,* 1 pint.

2. (Ph. L. 1836.) As the last, but using *compound extract of colocynth.*

3. (Guy's Hosp.) *Colocynth pulp,* 1 dr.; *water,* ¾ pint; boil so as to strain ½ pint; and add of *common salt,* ½ oz.; *syrup of buckthorn,* 1 fl. oz. An efficient enema in colic and obstinate constipation, in the absence of spasms and inflammatory symptoms.

ENEMA (Common). Syn. *Enema Commune,*—Lat. *Gruel* or *barley water,* either with or without the addition of a little *common salt* or *oil,* are generally so called. The *first* are simply laxative; the *latter,* purgative. Decoction of mallows, linseed tea, or water gruel, are also commonly used as the vehicle.

Prep. 1. (St. B. Hosp.) *Barley water,* 1 pint; *common salt,* 1 oz.; dissolve.

2. (Guy's Hosp.) *Water gruel,* 10 to 15 fl. oz.; *common salt,* 1 oz.

3. (U. C. Hosp.) *Water gruel,* 8 to 12 fl. oz.; *salt,* 1 oz.; *linseed oil,* 2 fl. oz.

ENEMA (Copaiba). Syn. *Enema Copaibæ*,—Lat. *Prep.* 1. From *balsam of copaiba*, 2 dr.; *liquor opii sedativus*, 15 drops; *yelk of egg*, q. s.; *barley water*, 7½ fl. oz.

2. (Collier.) To the last add of *extract of opium*, 1 gr.; *oil of turpentine*, 4 fl. dr.

3. (Velpeau.) *Copaiba*, 2 dr.; *laudanum*, 20 drops; *yelk of* 1 *egg; water gruel*, 8 fl. oz. In ascarides, gonorrhœa, and some affections of the lower bowels and bladder, when the stomach rejects the balsam.

ENEMA (Domestic). Syn. *Enema Domesticum*,—Lat. This name has been applied to an enema of *warm water*, either with or without the addition of a little *sugar*, *honey*, or *milk*. The effect is laxative.

ENEMA (Emollient). Syn. *Enema Emolliens*, *E. Demulcens*,—Lat. *Prep.* From *decoction of linseed*, *barley*, or *starch*, 1 pint; *linseed* or *olive oil*, 1 oz. Soothing and laxative; in excoriations of the lower bowels. 20 to 40 drops of *laudanum* may be added when there is much pain or looseness.

ENEMA (Febrifuge). Syn. *Enema Febrifugum*,—Lat. *Prep.* 1. (Collier.) *Water gruel*, 12 fl. oz.; *sugar*, 1 fl. oz. In low fevers.

2. (Brande.) *Vinegar*, 2 fl. oz.; *infusion of chamomile*, 5 or 6 fl. oz. In typhus.

ENEMA (Fetid). See *Enema* (Assafœtida).

ENEMA (for Hooping Cough). Syn. *Enema Pertussiculare*,—Lat. *Prep.* 1. See *Assafœtida Enema.*

2. (M. Reiken). *Prep. Assafœtida*, 8 gr.; *yelk of* 1 *egg; water*, ½ pint.

Obs. This quantity is sufficient for 10 or 12 clysters for children *under* 1 *year;* 5 or 6 for those *under* 3 *years;* and 2 or 3 for those *under* 7. Two clysters are prescribed daily in hooping-cough. According to M. Reiken this is more successful in removing hooping-cough than any other remedy. To ensure success it should not be administered until the feverish symptoms have passed. M. Reiken sometimes uses an ointment of assafœtida as well as the clyster.

ENEMA (Laxative). See *Enemas* (Cathartic).

ENEMA (Lead). Syn. *Enema Plumbi*,—Lat. *Prep.* (Dr. Newbold.) *Acetate of lead*, 6 gr.; *tepid distilled water*, 6 fl. oz. In strangulated hernia; repeated in 2 or 3 hours.

ENEMA (Nutrient). Syn. *Feeding Clyster; Enema Nutriens*,—Lat. *Prep.* 1. *Strong beef tea*, 12 fl. oz.; thickened a little with *arrow-root* or *hartshorn shavings.*

2. (M. Nasse.) *Strong meat soup*, ¾ pint; *dilute hydrochloric acid*, ½ fl. dr.

3. *Yelks of* 2 *eggs; brown sugar* and *salad oil*, of each, 1 oz.; *mutton broth*, 12 fl. oz. To nourish the body, when aliments cannot be taken or retained by the stomach.

ENEMA (Oily). See *Enema* (Emollient).

ENEMA (Opium). Syn. *Enema Opiatum; E. Opii*, — Ph. L. *E. Opii* vel *Anodynum*,—Ph. E. *Prep.* 1. (Ph. L.) *Decoction of starch*, 4 fl. oz.; *tincture of opium*, 30 drops.

2. (Ph. E.) *Starch*, ½ dr.; *water* (boiling), 2 fl. oz.; mix, and when cool enough add of *tincture of opium*, ½ to 1 fl. dr.

3. (Ph. D. 1826.) *Laudanum*, 1 dr.; *warm water*, 6 fl. oz.

Obs. The above are the orders of the Colleges, but in practice the quantity of laudanum is frequently doubled; this should, however, be done with great care. Opium clysters are used in dysentery, colic, cholera, and various painful affections of the intestines, bladder, &c. The bowels should be emptied before their administration, and in inflammatory complaints they should not be used for the first 48 hours. Clysters containing opium, even in small quantities, are dangerous remedies for young children; yet there are cases in which they sometimes succeed when every other remedy has failed. This is particularly so in the low chronic diarrhœa of infancy and early childhood. A case of this kind occurred in the family of the writer. The family medical attendant, as well as the physician he consulted, abandoned the little sufferer to apparently inevitable death, as beyond the reach of further assistance. A small opium clyster was given, and the child recovered.

ENEMA (Ox-gall). Syn. *Enema Fellis*, *E. F. Bovis*,—Lat. *Prep.* (Dr. Allnatt.) *Fresh ox-gall*, 2 fl. oz.; *water gruel*, 8 fl. oz.

2. (Dr. Clay.) *Ox-gall*, 2 fl. oz.; *water*, 4 or 5 fl. oz. To soften indurated fæces, and in costiveness arising from deficiency of bile.

ENEMA (Poppies). Syn. *Enema Papaveris*,—Lat. *Prep.* 1. *Decoction of poppies.*

2. *Poppy-heads* (with the seeds), 5 dr.; *water*, ¾ pint; boil to 12 fl. oz., and strain. Anodyne; as a substitute for *opium clyster.*

ENEMA (Purgative). See *Laxative Enema.*

ENEMA (Simple). *Barley water*, *rice water*, *thin made-starch*, and *decoction of mallows*, are frequently so called, from being used either for simple laxative enemas, or as the vehicle for more active substances.

ENEMA (Soap). Syn. *Enema Saponis,*—Lat. *Prep.* (St. B. Hosp.) *Soft soap,* 6 dr.; *hot water,* 1 pint; dissolve. To soften indurated fæces, &c.; and as a detergent in certain ulcerations of the rectum.

ENEMA (Starch). Syn. *Enema Amyli,*—Lat. See *Simple Enema.*

ENEMA (Stimulant). Syn. *Enema Stimulans,*—Lat. The ordinary *cathartic clysters* are often so called. The following belong to a different class:—

Prep. 1. *Tincture of capsicum,* 1 fl. oz.; *barley water* or *thin arrow-root,* ½ pint; mix. In cholera, especially the cold stages.

2. To the last add of *ether,* 2 fl. dr.; *laudanum,* 30 drops.

3. *Decoction of poppies,* ½ pint; *tincture of capsicum,* 3 fl. dr.; *oil of nutmeg,* 10 drops. In diarrhœa.

ENEMA (Tobacco). Syn. *Enema Tabaci,*—Ph. L. E. & D. *Infusum Tabaci,*—Ph. D. 1826. *Prep.* 1. (Ph. L.) *Tobacco,* 1 scrup.; *boiling water,* ½ pint; macerate for 1½ hour, and strain.

2. (Ph. E.) *Tobacco,* 15 to 30 gr.; *boiling water,* 8 fl. oz.; as last.

3. (Ph. D.) *Tobacco,* 1 scrup.; *boiling water,* 8 fl. oz.

4. (Ph. L. 1836.) *Tobacco,* 1 dr.; *boiling water,* 1 pint.

Obs. Tobacco clyster is used in strangulated hernia, obstinate constipation, retention of urine, &c. It is violently depressing and relaxing; producing fainting, and even death, when improperly or injudiciously administered. "It is not to be forgotten that 2 dr., 1 dr., and *even* ½ dr. *of tobacco infused in water,* have proved *fatal.*" "The cautious practitioner, therefore, will not use more than 15 or 20 gr." (Pereira.) *Three* parts of *Virginia tobacco* are equal to *seven* parts of any other kind. (Davy.)

ENEMA (Turpentine). Syn. *Turpentine Clyster; Enema Terebinthinæ,*—Ph. L. *E. Olei T.,*—Lat. *Prep.* 1. (Ph. L.) *Oil of turpentine,* 1 fl. oz.; *yelk of* 1 *egg;* triturate together, then add of *decoction of barley,* 19 fl. oz.

2. (Ph. E.) As the last, but using *simple water* instead of barley water.

3. (Ph. D.) *Oil of turpentine,* 1 fl. oz.; *mucilage of barley,* 16 fl. oz.

4. (Ph. D. 1826.) *Common turpentine,* ½ oz.; *yelk of* 1 *egg; water* (at 90° to 100° Fahr.), ½ pint; for an emulsion.

5. (Dr. Neligan.) *Oil of turpentine,* ½ fl. oz.; *syrup of garlic,* 1 fl. oz.; *barley water,* 6 or 7 fl. oz. In ascarides, and as an antispasmodic and purgative in colic, obstinate constipation, calculus, peritonitis, tympanitis (*drum-belly*), &c.

ENEMA (Vermifuge). Syn. *Enema Anthelminticum, E. Vermifugum,* — Lat. *Prep.* 1. *Castor oil,* 1 oz.; *mucilage,* ¾ oz.; *decoction of the root of male fern,* 7 fl. oz. In worms; especially tape-worm.

2. (Collier.) *Oil of turpentine,* 1 fl. oz.; *olive oil* (warm), ½ pint. In ascarides.

3. (Dr. Darwall.) *Tincture of sesquichloride of iron,* 1 dr.; *water,* 7 or 8 fl. oz. In ascarides, especially when occurring in childhood; the quantity used being proportionately lessened. See *Enemas* of *Aloes, Assafœtida, Turpentine, &c.*

ENEMA (Wine). Syn. *Enema Vinosum,*—Lat. *Prep.* From *sherry wine* and *hot water,* of each, 7 fl. oz. In suspended animation. Sometimes a wine-glassful of brandy is added.

ENGRAVING. The mechanical operations of the engraver do not come within the province of this work. Several of the materials which he employs in his trade will, however, be found noticed under their respective heads. See *Varnishes, Wax, Etching, &c.,* (and below.)

ENGRAVINGS (Cast). These are simply stereotypes taken from any kind of engraving, chiefly those on wood, which are then used instead of the original itself. The plan is particularly applicable to engravings which meet with a ready sale, and of which a large number is required. As soon as one cast is worn out, another may be taken, so that not only will every impression be a proof, but the whole expense of retouching will be avoided.

ENGRAVINGS (Reproduction of). The mode by which the *penny postage stamp* plates are multiplied is as follows:—240 "queen's heads" or stamps (a pound's worth) were engraved on one steel plate. This plate was then hardened, and an impression of it taken on a softened steel roller. This roller in its turn was also hardened, and softened steel plates being passed under it, an impression precisely like that of the *original plate* was produced on each of them. These plates were then hardened and employed for printing the penny postage stamps for sale. They last a long time; and when thy are worn out, they are destroyed, and their place is supplied by fresh ones, which are from the cylinder before referred to, which continues ready to supply any number that may be required. Even if it were worn out, other cylinders might be produced from one or more of the plates which have received its impression, or the original plate might again be had recourse to. Thus, although only one plate has been engraved, upwards of 10,000 fac similes of it have been produced, from which have been printed the many millions of stamps which have been used since the introduction of the penny postage. Bank-note plates are reproduced in the same manner.

Professor Calvert thus describes an easy means of REPRODUCING *prints, engravings, writings,* &c., on *paper*, as well as fac similes of them on *plates* of *copper, steel,* and *silver*, which has been very recently discovered. A *piece of paper* is dipped in a *weak solution of starch*, and left to dry. It is then moistened with *dilute sulphuric acid.* The engraving to be copied is now put over the *vapour of iodine*, and left there for the space of about five minutes, by which time the iodine will have fixed itself on every part that is black. The prepared engraving is next applied to the sheet of paper, and the two are pressed together for a minute or two, when the engraving is transferred. To *engrave the design* on *copper* or *silver*, the engraving, after being exposed to the iodine fumes, is laid on the metallic plate, and the two are pressed as before; after which, if it is *copper*, it is exposed to the fumes of *hartshorn* or *ammonia*, washed, and dried; but if it is *silver*, it is treated as a daguerreotype plate, holding it over the *vapour of mercury*, and the engraving is produced. A more simple means still is to put the engraving over the *fumes of orpiment* for a few seconds, and then to place it on a *plate of copper*, and press it, when the engraving sinks into the plate. The practical value of these statements remain to be decided.

ENTERITIS. See *Inflammation of the Bowels.*

ENTOMOLINE. The same as *chitine.*

ENTOZOA. *Parasitic animals* which infest the bodies of other animals. See *Invermination* and *Worms.*

ENURESIS. See *Urine.*

EPHIALTES. See *Nightmare.*

EPIDEMIC. An *epidemic disease* (*epidemic; epidemy;*) is one which seizes a number of people at the same time and in the same place, but which is not dependent on any local cause. When a disease is peculiar to a people or nation, and appears to depend on local causes, it is said to be *endemic* or *enchorial.* Thus *Asiatic cholera* may be taken as an example of the first, and the *agues* of low countries, and the *goitre* of the Alps, as examples of the other.

EPILEPSY. Syn. *Falling Sickness; Epilepsia, Morbus Caducus,*—Lat. The popular name of this disease arises from the patient, when attacked by it, suddenly falling to the ground. The other leading symptoms consist of convulsions, stupor, and, generally, frothing at the mouth. It comes on by fits, which after a time go off, leaving a certain amount of lassitude and drowsiness behind. Sometimes certain peculiar symptoms precede the attack. Among these, a sensation of coldness or of a current of cold air from the extremities of the body towards the head (*aura epileptica*), palpitation, flatulency, stupor, and an indescribable cloud or depression, are the most common. The occurrence of these symptoms are not, however, uniform, even in the same patient; but it generally happens that the party falls down suddenly, and without the slightest warning.

Epilepsy is often *symptomatic* of *other affections*, as excessive irritation of the primæ viæ from worms, indigestible or noxious food, or poison; or it depends on local injuries, particularly those of the head, accompanied with lodgements of water on the brain, tumours, pressure, &c. Violent affections of the nervous system, sudden frights or fits of passion, violent mental emotions, the sudden suppression of old evacuations, and in childhood, difficult teething, are also common causes of sympathetic epilepsy. Occasionally it arises from mobility of the sensorium induced by plethora, or by excessive debility. In such cases the *treatment* must be energetically directed to the removal of the exciting cause.

When *epilepsy* occurs as an *idiopathic* or *primary affection*, or cannot be referred to any apparent cause, more especially when the attack commences about the age of puberty, and the fits are frequent, it is generally hereditary, and there is great danger of its terminating either in apoplexy, or lunacy or imbecility.

The *treatment* of *idiopathic epilepsy* is principally directed to the improvement of the general health, and the diminution of nervous irritability by sedatives and tonics. Among the first, *camphor, ether, henbane, hemlock, musk, oil of cajeput, opium,* and *morphia*, and more recently, *hydrocyanic acid,* have been principally relied on. Among the second, *bark, cascarilla, quinine, strychnia, valerian,* the *sulphate of iron, zinc,* and *copper, arsenious acid,* and *nitrate of silver,* have each their zealous advocates. The objection against the last preparation is the danger of its disfiguring the patient by tinging the skin of a permanent dull leaden hue. In cases accompanied with *plethora,* a low diet, daily out-of-door exercise, and the frequent use of aperients, with occasional blistering, cupping, and other depletive measures, are indicated; whilst in those marked by *inanition* and *debility,* an entirely opposite course must be adopted. When the disease is complicated with SYPHILIS, a mild course of *mercury* may be given; and when with SCROFULA, *iodine, iodide of potassium,* or *cod-liver oil,* assisted by sea-bathing, will be proper.

Among *other methods of treatment* may be mentioned the administration of an *active emetic* or *purgative,* twice weekly, in the morning, when the stomach is empty. The *first* has now few supporters; but the *second* is said to be often productive of great benefit.

During a fit of epilepsy the only thing that can be done for the patient is to prevent the sufferer injuring himself, and to loosen every part of his dress that presses on the head, neck, or chest. When *premonitory symptoms* occur, a *brisk emetic,* a large dose of *laudanum and ether,* a *cold plunge* or *shower-bath* (when not contra-indicated), or anything else which gives a sudden shock to the system or raises its tone, frequently prevents the accession of the fit.

Epilepsy *more frequently attacks* children than adults, and boys than girls. "Its returns are (frequently) periodical, and its paroxysms commence more frequently in the night than in the day, being somewhat connected with sleep." It is sometimes counterfeited by street impostors in order to excite the charity of the passers-by.

EPIPASTICS. See *Blisters* and *Vesicants.*

EPITHEM. Syn. *Epithema,*—Lat. Any external liquid medicine for local application; as an embrocation or lotion. Some writers confine the term to those preparations which are intended to be applied by means of a cloth dipped into them. See *Lotions, Liniments, &c.*

EPITHEM (Astringent). Syn. *Epithema Astringens,*—Lat. *Prep.* 1. *Powdered ice,* 7 dr.; *powdered catechu,* 1 dr.; mix.

2. (Brera.) *Powdered bole* and *rhatany,* of each, 1 oz.; *vinegar of roses,* q. s. to form a paste. Both are applied to the nostrils and forehead to stop bleeding at the nose.

EPITHEM (Glycerine). Syn. *Epithema Glycerinæ,* — Lat. *Prep.* (Mr. Startin.) *Glycerine,* 1 oz.; *rose water* and *lime water,* of each, 3 or 4 fl. oz.; *powdered gum tragacanth,* q. s. to form a thin mucilage. In scalds, burns, and excoriations.

EPITHEM (Vesicating). Syn. *Epithema Vesicatorium,*—Lat. *Prep.* (Alibert.) *Rye* or *barley meal,* made into a paste with *vinegar,* and 30 to 40 gr. or more of *powdered Spanish flies* sprinkled over the surface.

2. (Ph. L. 1746.) *Spanish flies* (in fine powder) and *wheat flour,* equal parts, made into a paste with *vinegar,* q. s. As a blister.

EPITHEM (Volatile). Syn. *Epithema Volatile, E. Ammoniæ,*—Lat. *Prep.* (Ph. L. 1764.) *Common turpentine* and *water of ammonia,* equal parts. An excellent counter-irritant; either with or without the addition of a little *olive oil.*

EQUISETIC ACID. An acid compound obtained by Braconnot from the herb *equisetum fluviatile* (Linn.) or *great water horse-tail,* in which it exists in combination with magnesia. See *Aconitic* and *Pyrocitric Acid.*

EQUIVALENTS (Chemical). Syn. *Atomic Weights, Combining do., Combining Numbers, &c.* The definite proportion in which chemical substances combine with each other, forming new compounds, referred to some common standard of unity. *Hydrogen,* from it being the substance which combines with others in the smallest relative weights or proportions, is generally taken for this standard of unity by British chemists. By assuming the equivalent of hydrogen as 1, the equivalents of all other bodies may be represented by certain multiples of this unit, which, for all practical purposes, may be expressed with sufficient accuracy in whole numbers. On the Continent the equivalents of *oxygen* (= to 8 on the common scale) is taken at 100, and is assumed as the standard of comparison. On this scale, the equivalent of hydrogen is 12·5.

The *equivalent of a compound body* is equal to the sum of the equivalents of its elements. Thus, *water* is composed of 1 proportion by weight of *hydrogen* ($=1$), and 8 proportions by weight of *oxygen* ($=8$), and its equivalent is the sum of these quantities ($1+8=9$).

The *equivalents* or *combining weights of bodies* are determined by the rigid and exact analysis of their compounds, as well as by the production of the latter by synthesis. The consideration of the subject belongs, however, to pure chemistry.

Some writers distinguish between the *equivalent weights* and the *atomic weights* of bodies; but in fact, the two are in almost every case the same, and the terms, as far as all practical purposes are concerned, may be regarded as synonymous.

A *knowledge* of the *equivalents of bodies,* both simple and compound, is invaluable to the chemist and manufacturer, as by it alone can we determine with certainty the proper proportions to employ to effect a given object, or to produce a given article; whilst by it we can discover whether our processes are economically conducted, and the greatest possible product obtained from any given weight of materials. See *Affinity*, *Decomposition*, *Formulæ*, and *Symbols*, and the *Table of Equivalents* in the Appendix.

EQUIVALENTS (Volumetrical). Syn. *Equivalent Volumes.* When gases enter into chemical union with each other, the combination invariably takes place either between equal volumes, or between volumes which bear some very simple relation to each other. The same is also the case with the vapours of complex volatile liquids when they unite with the gases or combine among themselves. The proportions, by measure, in which these substances combine, is termed their equivalent volumes.

The *equivalent volume of a gas* or *vapour* (which it is often important to know) is found by *dividing* its *equivalent weight* by its *specific gravity.* Thus—

	Sp. gr.	*Equiv. wt.*	*Equiv. vol.*
Hydrogen .	0·0693	1·0	14·43
Nitrogen .	0·972	14·0	14·37
Oxygen .	1·106	8·0	7·23
			&c. &c.

ERBIUM. According to Prof. Mosander, the substance usually called *yttria* is a mixture of the oxides of three metals—*yttrium*, *erbium*, and *terbium*, which differ in the character of their salts, and in some other important particulars. The first is a powerful base; the others, very weak ones. The latter are separated with extreme difficulty, and possess no practical importance. See *Yttrium.*

EREMACAUSIS. Slow burning; decay. This expression is applied by chemists to the peculiar decomposition which moist organic matter undergoes, when freely exposed to the air, by the oxygen of which it is gradually burned or destroyed, without any sensible elevation of temperature. See *Putrefaction.*

ERGOT. Syn. *Ergot of Rye*, *Spurred Rye*, *Horned do.*, *Cockspur do.*, *Obstetrical do.; Ergota*,—Ph. L. & E. *Secale Cornutum*,—Baldinger. *Clavus Secalis*, *Secalis Mater*, *Secale Maternum*, *&c.*,—Lat. var. "The seed" of "*secale cereale*" (Linn.) or *common rye*, "diseased by a parasitic fungus."—Ph. L.

Ergot of rye deteriorates greatly by age, being subject to the attacks of a description of acarus resembling the cheese mite, but much smaller, which destroys the whole of the internal portion of the grain, leaving nothing but the shell, and a considerable quantity of excrementitious matter. To prevent this, the ergot should be well dried, and then placed in bottles or tin canisters, and closely preserved from the air. The addition of a few cloves, or drops of the oil of cloves, or strong acetic acid, or a little camphor, or camphorated spirit of wine, will preserve this substance for years in close vessels. M. Martin proposes to steep the dry ergot in *strong mucilage*, and then to dry it on a sheet of white iron. This operation he repeats once or oftener, and finally preserves the prepared and thoroughly dried ergot in a well-corked glass flask. ('Jour. de Chimie Med.') The *wholesale druggists* generally keep it in well-covered *tin canisters* or *tin boxes.*

Ergot of rye is much used to restrain uterine hemorrhage, and to accelerate the contraction of the uterus in protracted labour. It is also much used as an emmenagogue. *Dose.* To facilitate labour, 10 to 20 gr., either in powder or made into an infusion; repeated at intervals of 20 or 30 minutes until 3 or 4 scruples have been taken. In other cases (leucorrhœa, hemorrhages, &c.) the *dose* is 5 to 12 gr., three times daily, for a period *not longer* than a week or ten days at a time. See *Decoctions*, *Extracts*, *Infusions*, *Oils*, *Tinctures*, *&c.*

ERGOTINE. Syn. *Ergotina*,—Lat. *Prep.* 1. (Bonjean's.) *Powdered ergot* is exhausted with *cold water*, by displacement, and the resulting solution is heated in a water bath to about 200° Fahr., and filtered; the filtered liquor is then evaporated to the consistence of a syrup, and when cold, is treated with *rectified spirit*, in considerable excess, to precipitate its gummy matter; after repose, the clear portion is decanted, by the heat of a water bath to the consistence of a soft extract. *Prod.* 15%. According to M. Bonjean, this preparation possesses all the "hæmostatic" without any of the "poisonous" qualities of ergot. It has a reddish-brown colour, a bitter taste, and an odour somewhat resembling that of roasted meat. Its aqueous solution is red, limpid, and transparent. *Dose.* 4 to 10 gr., either made into a pill or dissolved in water.

2. (Wigger's.) *Powdered ergot* is first digested in *ether*, to remove the fatty matter, and then in *boiling alcohol;* the alcoholic tincture is evaporated and the

resulting extract treated with *water;* the undissolved portion dissolved in hot *alcohol* and filtered, yields *pure ergotine* by gentle evaporation. *Prod.* 1¼ %. It has a brownish-red colour; is resinous, acrid, bitter, insoluble in water and ether, soluble in alcohol, and poisonous. It evolves a peculiar odour when warmed. Its therapeutical action has not been determined. See *Extracts.*

ERRHINES. Syn. *Errhina,*—Lat. Substances applied to the pituitary membrane of the nose, for the purpose of producing an increased discharge of nasal mucous. When they are given to excite sneezing, they are called *sternutatories* or *ptarmics,* (sternutatoria *vel* ptarmica.) *Asarabacca, euphorbium, several of the labiatæ (*herbæ *vel* flores), *sal ammoniac, powdered sugar, subsulphate of mercury, tobacco,* and *white hellebore,* are the principal substances of this class.

Errhines act as local irritants, and are occasionally employed in chronic affections of the eyes, face, ears, and brain; as in amaurosis, ophthalmia, deafness, weak sight, headache, &c.

According to Dr. Hall "actual sneezing may frequently be prevented, after the inspiration by which it is usually preceded has occurred, by forcibly rubbing the end of the nose." ('Diseases, &c., of Nerv. Syst.')

ERRHINE (Alum). Syn. *Errhinum Aluminis,*—Lat. *Prep.* (Radius.) *Alum* and *Armenian bole,* of each, 1 dr.; *kino,* ½ dr.; *red oxide of iron,* 2 dr.; (all in powder;) mix, and triturate. In bleeding at the nose. A little is snuffed up the nostrils.

ERRHINE (Hæmostatic). Syn. *Errhinum Hæmostaticus,*—Lat. *Prep.* From *powdered catechu,* 1 dr.; *opium,* 5 gr.; *sugar,* 2 dr. As the last.

ERUCINE. A yellowish-white substance, discovered by Simon in white mustard (*sinapis alba*). It is soluble in ether and essential oils, and in boiling alcohol.

ERUPTIONS (of the skin). For brevity and convenience these may be divided into 5 classes:—

Animalcular eruptions; due to the presence of minute animalcules (*acari*), which burrow and breed in the scarf-skin, and occasion much local irritation. See *Itch.*

Papular Eruptions; Dry Pimples. In these the surface is raised into little elevations or *pimples,* which sometimes show themselves on the surface, and at others are only appreciable by the touch. They are usually accompanied with a greater or less degree of cutaneous irritation, and troublesome itching, in attempting to relieve which they are frequently converted into disagreeable and painful sores and excoriations, which are often difficult to heal.

Treat. In simple cases, where there is not much disarrangement of the general health, these eruptions commonly yield to the occasional use of *mild saline aperients,* and *warm* or *tepid bathing,* or *frequent ablution* with *warm soap-and-water.* Sea-bathing is also a powerful remedy. Stimulants of all kinds should be avoided, and *ripe fruit* and *vegetables* should form a prominent part of the diet. *Lemonade,* made by squeezing a lemon into a tumbler of water, and sweetening the mixture with a little sugar, is one of the best beverages on these occasions. To relieve the itching, brisk friction with a flesh-brush may be had recourse to, followed by the use of a lotion formed by adding the *juice of a lemon* or *a wine-glassful* of *distilled vinegar,* to ¾ of a pint or a pint of *water,* either with or without the addition of a table-spoonful of *glycerine.* Occasional single pimples, depending on local causes, generally require no particular treatment. See *Lichen, Prurigo, Red Gum,* and *Tooth-rash.*

Pustular Eruptions; Mattery Pimples. These are distinguished by the pimples (*pustules*) containing an opaque yellow fluid or matter (*pus, lymph*). "They are generally developed on a ground of inflamed skin; and the degree of this inflammation of the skin is the basis of their division into two groups, termed technically, *impetigo* and *ecthyma.* The *former* presents the *slighter* degree of inflammation, and, sometimes, there is scarcely any redness of the skin; the *latter* is always accompanied by considerable inflammation and redness." "The little bubbles attain their full size in the course of two or three days, and either dry up *without breaking,* or more frequently burst and then dry, forming a hard crust, which offers considerable variety of colour. being sometimes yellowish, sometimes brownish, and sometimes almost black." The latter form is popularly known as "*crusted tetter.*" In *ecthyma* the pustules "are generally of the size of a split pea, and surrounded at their base by a broad halo of redness. They are usually *separate,* not *clustered* like *impetigo,* scattered over various parts of the body, and followed either by a hard black crust or by a sore."

Treat. The inflammation and pain may be generally alleviated by the application of a lotion formed of *rectified spirit of wine,* 1 part; and *water*, 5 or 6 parts; to which a table-spoonful of *distilled vinegar* is often added. The "crusts" or "scabs," when they become hard or troublesome, may be removed by a *warm fomentation* or an *emollient poultice;* a little *simple cerate* being afterwards applied to allay irritation. When the constitution is full and inflammatory (as it usually is in *impetigo*), a depletive treatment may be adopted; when it is low and debilitated (as it usually is in *ecthyma*), *tonics* and a more liberal diet, with the free use of *lemon juice diluted with water*, as a beverage, should be had recourse to. Sea-bathing is also highly useful. See *Impetigo.*

Scaly Eruptions; Dry Tetter. This is a form of inflammatory condition of the true skin (*derma*), which commonly makes its appearance as a small, dull red, salmon-red, or liver-coloured spot, slightly raised above the level of the surrounding skin, constituting a broad, flat, pimple-like prominence, about the size of a split pea. Upon the surface of this prominence the scarf-skin becomes slightly roughened, and after a little while, a very distinct but circular scale is produced, which increases in thickness by the addition of fresh layers, and after assuming various colours in different varieties of the disease, ultimately separates and falls off, either leaving a permanently bare surface, or being followed by crops of other like scales, which also fall off, and are replaced in rapid succession. This class of eruptions is more obstinate than any of the other varieties, and often defies medical skill. Each particular form generally requires special treatment. In all, however, endeavours should be made to restore the general health of the body in the manner which existing circumstances may indicate. The *red meats*, *ripe fruit*, and *antiscorbutic vegetables*, should form a large portion of the diet; and *sea-bathing*, or *shower*, *sulphuretted*, or *ioduretted baths*, should be taken daily, if possible. Dry friction with a *flesh-brush*, and *daily exercise* to perspiration, are also highly recommended. See *Lepra*, *Pityriasis*, *Psoriasis*, *Tetters*, *&c.*

Vesicular Eruptions; Watery Pimples. These consist of little vesicles or bladders filled with a small quantity of a transparent and colourless liquid. They result from a similar action to that which produces ordinary blisters. "Inflammation is excited in the sensitive skin by an inward or outward cause, and the inflamed vessels pour out the watery part of the blood, and so raise the scarf-skin from off the sensitive layer, in the form of a small dome, which in some situations is conical, in others a segment of a sphere." They present "great variety in point of number and size; some are so minute as to be scarcely discernible without close inspection, whilst others increase to the magnitude of a hen's egg. They are numerous in the inverse ratio of their size; the smaller ones being very abundant, and the larger ones, scanty and few." These distinctions have led to their classification. "The smaller vesicles, which are about the size of a pin's head, and are often clustered together in vast numbers, are known by the term *eczema;* when they are of larger dimensions, being equal in bulk to a small pea, they are termed *herpes;* when of somewhat larger size they are designated *rupia;* and when they assume the bulk of blisters, they are termed *pemphigus.*

Treat. This consists chiefly in the due attention to the general principles of health—*cleanliness*, *exercise*, *food*, and *raiment*, as already pointed out, assisted by such special remedies as the particular case or circumstances may demand. *Antiphlogistics* or *tonics* must be had recourse to, according to the condition of the system, and local irritation allayed by the usual means. Simple cases frequently yield to a dose or two of some saline aperient and a change of diet. See *Eryspielas*, *Herpes*, *Pemphigus*, *Rupia*, *Tetters*, and *Skin.*

ERVALENTA. The *meal of lentils* (ervum lens,—*Linn.*; lens esculenta,—*Monch.*) variously doctored with other substances. In some cases the article sold under the name does not contain a particle of lentil meal.

Prep. 1. (Paris Ervalenta.) *Indian-corn meal* (fine), and *bean flour*, of each, 14 *lb.;* *salt* and *sugar*, of each, 1 *lb.;* mix, and pass the compound through a sieve.

2. (Warton's.) *Lentil powder*, 1 part; *durra* or *Turkey millet flour* (sorghum vulgare), 2 parts. Some parties assert that it contains a large quantity of the flour of Indian corn. See *Revalenta* and *Lentils.*

ERYNGO. Syn. *Eryngium*,—Lat. The *root* of the *eryngo campestre*, a plant common in middle and southern Europe. It is sweet, aromatic, and tonic, and formerly enjoyed much repute in gonorrhœa, suppressed menstruation, and visceral obstructions generally, especially those of the gall-bladder, liver, and uterus. *Candied eryngo* (*eryngium conditum*, *eryngii radix condita*), according to Lindley, "has the credit of being a decided aphrodisiac," and has a considerable sale. *Eryngium aquaticum* (bitter snake-weed) and *E. maritimum* (sea eryngo, sea holly,) furnish the eryngo of the Ph. U. S. See *Candy.*

ERYSIPELAS. Syn. *St. Anthony's Fire, The Rose.* A peculiar form of inflammation which chiefly attacks the skin, and is generally accompanied or followed by an eruption of a very red colour, sometimes vesicular, and by tumefaction. It commonly attacks the head and face, and is at its height from the third to the sixth day, but the duration and progress of the symptoms are variable. From the eighth to the twelfth day the eruption usually scabs or scales off. Sometimes suppuration occurs, especially of the eyelids and scalp, and during the latter stages of the disease there is, in general, a tendency to debility. In many cases erysipelas is attended by typhoid symptoms, and is then a dangerous and often fatal disease.

Treat. Aperients and diaphoretics, assisted by a cooling diet. When the inflammatory symptoms run high, *blistering* and *cupping* are frequently had recourse to. Local irritation may be subdued by *milk-and-water*, or *cooling* or *evaporating lotions*, or by sprinkling *starch, hair-powder*, or *arrow-root*, on the part. The tendency to debility in the latter stages should be combated with *bark, quinine*, or other like *tonics.* When shiverings, sickness, and delirium attend the height of the disorder, *wine, bark, ammonia*, and other *stimulants*, are usually prescribed, and depletion must be avoided. The same treatment is also adopted in the gangrenous forms of the disease, to which doses of *opium* and *calomel* are also commonly added. When suppuration and sloughing of the cellular membrane have taken place, it is usual to make *incisions* to give exit to the discharge, and relieve the tension of the limb. These may be about 1½ inch in length, and from 2 to 4 inches apart, and should be made in the direction of the long dimensions of the limb. Mr. Higginbottom, of Nottingham, applies (freely) *lunar caustic* to the inflamed skin, and also to the healthy skin, to the extent of an inch or more beyond it. The result, in many cases, is a complete change of action in the part, and a resolution of the disease. *Iodine paint* is often successfully used in the same way.

Erysipelas is generally symptomatic of a debilitated or bad constitution. It is also a common sequel of surgical operations in crowded and ill-ventilated hospitals, where it often appears to be contagious. In these cases, cleanliness, ventilation, and change of air, are the only remedies. We need scarcely add, that this disease should never be tampered with, but the best medical advice sought, whenever it can be procured.

ERYTHORETINE. Syn. *Red Resin of Rhubarb.* A yellow or reddish yellow substance forming one of the three resins found by Schlösberger and Dœpping in rhubarb. It is very soluble in alcohol; less so in ether; with ammonia and potassa it forms soluble compounds of a rich purple colour. See *Rhubarb.*

ERYTHRIC ACID. *Prep.* The lichen *roccella tinctoria* (Canary or herb-archel) is boiled with *milk of lime*, and the filtered solution precipitated with *hydrochloric acid;* the dried precipitate is dissolved in *warm alcohol*, and filtered; as the solution cools crystals of *erythric acid* are deposited.

Prop., &c. Feebly acid; colourless; inodorous; scarcely soluble in water; soluble in alcohol and ether; chloride of lime turns its solutions of a blood-red colour.

ERYTHRIC ACID (of Brugnatelli). A red substance obtained by the action of *nitric acid* on *lithic acid.*

ERYTHRINE, *Amarythrine, Erythriline, Pseudo-erythrine*, and *Telerythrine.* Substances obtained by Kane and Heeren from *roccella tinctoria, parmelia roccella, leconara Tartarea, &c.* They are of little practical importance.

ERYTHROGEN. A green tasteless liquid discovered by M. Bizio in the gall-bladder of a person who died of jaundice. Ammonia and nitric acid turned it of a deep purple colour.

ERYTHROLEINE, *Azolitmine, Azoerythrine, Erythroleic Acid, Erythrolitmine*, and *Spaniolitmine.* Substances obtained from *litmus* and *archil* by Kane. They are little known, and have not been applied in the arts.

ERYTHRONIUM. See *Vanadium.*

ERYTHROPROTIDE. A soluble brown extract-like substance, formed along with *protide* and *leucine*, when *albumen, fibrine*, or *caseine*, is boiled in a *solution of caustic potassa* as long as ammoniacal vapours are evolved. The liquid neutralized with *dilute sulphuric acid*, and evaporated to dryness, gives up these substances to *boiling alcohol.*

ERYTRARSINE. A red amorphous powder, frequently produced in the preparation of *chloride of kakodyle.* It is insoluble in water, alcohol, ether, or caustic potassa; and by exposure to the air is converted, chiefly, into arsenious acid.

ESCHAROTICS. Syn. *Escharotica*,—Lat. Substances that destroy the texture of living organic bodies, with the production of an eschar or scab. Escharotics have been divided into two classes—*mechanical* and *chemical.* Among the former are actual cauteries, as a *heated iron, moxas, &c.;* among the latter, are all those substances commonly known as *caustics.* Some writers have subdivided *chemical escharotics* into ERODING ESCHAROTICS; as *blue vitriol, red precipitate, burnt alum, &c.;* and into CAUSTIC ESCHAROTICS; as *lunar caustic, pure potassa, strong sulphuric acid, nitric acid, &c.;* but these distinctions possess little practical value. "In *cauterizing* with a heated iron, this should be at a white heat, as, at this temperature, it occasions less pain to the patient, from its causing an immediate death of the part to which it is applied." "The surrounding surface should be protected by some non-conductor of heat, but not by wet paper or cloth, as the sudden extrication of steam will produce a blistered surface around the burn, and will much increase the pain." (Dr. R. E. Griffith.) See *Caustics, Solutions, &c.*

ESCUBAC. See *Usquebaugh.*

ESCULENTS. Substances used for food. The more important ones are noticed under their respective heads.

ESCULIC ACID. A peculiar acid found by M. Bussy in the bark of the horse-chesnut. It is but little known, and has not been applied to any use.

ESENBECKINE. Syn. *Esenbeckina.* An alkaloid found by Buchner in a febrifugal bark, called *quinquina de piautri,* which he wrongly supposed was produced by the *esenbeckia febrifuga* instead of *exostemma souzanum.* (Guibourt; Lindley.)

ESPRIT. (Fr.) *Spirit.* This term is commonly applied to *alcoholic solutions* of the *essential oils,* and to various *odorous* and *aromatic essences* sold by the perfumers and druggists as articles of the toilet. See *Essences, Spirits, &c.*

ESSENCE. Syn. *Essentia,*—Lat. The active and characteristic portion of a substance, or that on which its most remarkable properties depend. The term has been very loosely applied to various preparations presumed to contain these essential principles or qualities disencumbered of grosser matter. Modern systematic writers generally restrict its application to the volatile oils obtained from vegetable substances by distillation, or to a strong solution of them in alcohol. In *pharmacy* and *perfumery* the word *essence* is applied to *concentrated preparations* that differ vastly from each other. Thus, *concentrated infusions, decoctions, liquors, solutions,* and *tinctures,* are frequently called "*essences*" by those who vend them; but the term "*fluid extracts*" would be more appropriate, if those already mentioned are not deemed sufficiently showy and attractive. We shall here confine ourselves to a brief notice of the principal *compound essences,* or those that undergo some preparation beyond being merely extracted from vegetables by distillation along with water. The latter will be considered under the article *Oils.*

The *concentrated preparations* of the *pharmaceutist,* termed "ESSENCES," are mostly prepared by digesting the *active ingredient* or *ingredients* in *rectified spirit of wine,* either with, or without the addition of a certain portion of *water;* or they are *extemporaneously* formed by dissolving a portion of the *essential oil of such substances* in the *spirit.* In this way are made the *essences of lavender, musk, ginger, &c.* When it is desired only to obtain the *aromatic* and *volatile portion* of the ingredients, the latter are usually digested in the *spirit* for a few days, and then submitted to distillation, when the alcohol comes over loaded with aromatic essential oil, or other volatile matter. In this way are prepared most of the *fragrant essences* of the *perfumer* and *druggist,* when simple solution of the essential oils in alcohol is not resorted to. In *many cases* the active principles of the ingredients, are partly *volatile,* and partly *fixed,* or at least do not *readily* volatilize at the temperature at which alcohol distils over. This is the case, for instance, with the active portion of *ergot* and *Jamaica ginger.* In such cases digestion alone should be adopted. When the *principles of organic substances,* of which it is desired to obtain a concentrated solution, are *resinous* or *oily,* or *little soluble in weak spirit* (which is mostly the case), the strongest *rectified spirit of wine* should alone be employed. In the *preparation of essences without distillation,* the method by *percolation* or *displacement* is preferable to that of simple maceration and expression, when the nature of the ingredients and other circumstances render it applicable, as it is not only more economical, but a more concentrated solution may thereby be obtained. At the same time, however, the reader should remember, that this mode of operating requires much greater experience and skill to ensure success than the former method. This clumsiness of manipulation is the common cause of the failures which are so frequently met with in the preparation of these articles.

The *ingredients* for the *preparation of essences* must undergo the same operations of bruising, powdering, or slicing, as directed under "*Tinctures,*" previous to *digestion* in the spirit, or other menstruum; and the length of time they should be allowed to infuse, when this method alone is adopted, should not be less than ten days; but this time may be advantageously extended to a fortnight, or even longer. During the whole of this period, *frequent agitation* should be employed, and when the ingredients are so bulky as to absorb the whole of the fluid, the vessel which contains them should be securely fastened by a bung or stopper covered with bladder, and inverted every alternate day. By this means, every portion of the ingredients will be equally exposed to the action of the menstruum. In all such cases the method of *displacement*, or *percolation*, is preferable. For the *essences* used as *perfumes* and for *flavouring*, not only must the spirit be *perfectly tasteless* and *scentless*, but it must be also *quite devoid of colour.*

The following formulæ embrace most of the essences met with in the shops. Those not found among them may be readily prepared by applying the general directions given above, or by employing the formula given for the preparation of the essence of some similar substance, merely varying the characteristic ingredient. Thus, were it desired to form an *essence of ambergris* or of *myrrh*, and no formulæ could be found for these preparations, the tyro would consider in what menstruum the active principles of these substances were most soluble. This, he would immediately see by reference to their properties, is *rectified spirit of wine.* He would next have to decide on the proper *strength* of his essence. In this he must be guided either by the strength of the like preparations of other makers, or by his own judgment of what would be useful, novel, or convenient. Suppose he decided that his essence should represent 1–10th of its weight of the solid ingredient. He would then take 2 *oz.* of *ambergris* or *myrrh*, and 20 *oz.* of *rectified spirit*, which he would digest together for 10 days or a fortnight in the manner described above. Had the required preparation been an *essence of senna* (for example), he would probably recollect, or might easily ascertain by reference, that the active properties of senna are soluble in both *water* and *weak spirit.* Then to make an essence 4 times as strong as the *tincture of the pharmacopœia*, 7 *oz.* of *senna*, and 1 pint of *proof spirit*, should be employed, with due digestion, as before. The same applies to other preparations. See *Concentration, Concentrated Decoctions, Infusions, Liquors, Spirits, Tinctures, &c.*

ESSENCE (Aconite). Syn. *Essentia Aconiti,*—Lat. *Tinctura A.,*—Ph. Baden., 1841. *Prep.* From *aconite* (herb, dried and powdered), 8 oz.; *rectified spirit*, 16 oz.; macerate for 4 days at a temperature of 68° Fahr., press and strain; the marc or residuum is again macerated with (a little) spirit, and pressed as before, so that the weight of the mixed tinctures may amount to double that of the herb. *Dose.* 3 to 6 drops. See *Tinctures.*

ESSENCE (Allspice). Syn. *Essence of Pimento; Essentia Pimentæ,*—Lat. *Prep.* From *essential oil of pimento* or *allspice*, 1 *fl. oz.; strongest rectified spirit of wine*, 1 pint; agitate until perfectly united, and the next day decant the clear portion, if there is any sediment. *Used* to make *pimento water*, and by cooks and confectioners as a "flavouring".

ESSENCE (Almonds). Syn. *Essence of Bitter Almonds, Ess. of Peach Kernels, Ess. of Ratafia, Ess. of Noyeau, Quintessence of do., Almond Flavour; Essentia Amygdalæ, Ess. A. Amaræ,*—Lat. *Prep.* 1. From *essential oil of almonds*, as the last.

2. (Pereira.) *Essential oil of almonds*, 1 fl. oz.; *rectified spirit*, 7 fl. oz.

Uses, &c. It is added to *wine, cordials, perfumery, pastry, &c.*, to impart an agreeable nutty flavour or aroma. It is also employed to prepare *cherry-laurel, peach-kernel*, and *bitter almond water.* A large quantity is consumed by the confectioners, and by wine-merchants to "improve" their sherries, and to give Cape wine a sherry flavour. It should be used in very small quantities, as it is very powerful, and, in quantity, *poisonous.* A *few drops* are sufficient for *several pounds of pastry.* The *first* formula is that used in trade. The *second* is sometimes used by the druggists, and is occasionally vended under the name of "*Concentrated Essence of Bitter Almonds,*" *&c.* The directions for purifying the almond oil from *hydrocyanic* before dissolving it in the *spirit* given in more than one book of receipts published since our last edition, are absurd, as in this way the oil loses much of its characteristic odour and flavour, and by keeping gradually becomes nearly destitute of both. See *Essential Oils.*

ESSENCE (Ambergris). Syn. *Essentia Ambræ-Griseæ, E. A. Simplex, Tinctura A. Concentrata,*—Lat. *Prep.* 1. *Ambergris* (cut very small), 5 dr.; *rectified spirit*, 1 pint; place them in a *strong bottle* or *tin can*, secure the mouth very firmly, and expose it to the heat of the sun, or in an equally warm situation for 1 or 2 months, frequently shaking it during the time; lastly decant, and filter through paper.

2. (Guibourt.) *Ambergris,* 1 dr.; *rectified spirit,* 3 oz.; digest 10 or 12 days.

3. (Redwood.) *Ambergris,* 2½ dr.; *rectified spirit,* 1 pint; macerate for 14 days. Chiefly used as an element in other perfumes. The first is the formula employed by the London houses.

ESSENCE (Ambergris). Syn. *Essence of Ambergris and Musk, Concentrated Tincture of do.; Essentia Ambræ-Griseæ* (Odorata), *E. A. et Moschi, E. Regia,*—Lat. *Essence Royale,*—Fr. *Prep.* 1. *Ambergris* (cut small), ¾ *oz.;* 1 or 2 *fresh-emptied musk pods* (or *musk,* 12 gr.); *rectified spirit,* 1 pint; proceed as in No. 1, (*above.*)

2. *Ambergris,* 2½ *oz.*; *bladder musk,* ½ *oz.; spirit of ambrette* (purple sweet sultan), 1 gall.; as last.

3. *Ambergris,* 2½ *oz.*; *bladder musk,* 1 *oz.*; *spirit of ambrette,* 1 gall.; as before. The fragrance of the above, especially of the last two, is very powerful, and is much esteemed.

4. *Ambergris,* ½ *oz.; musk* and *lump sugar,* of each, ¼ *oz.;* triturate together in a Wedgwood-ware mortar, adding *oil of cloves,* 20 drops; *true balsam of Peru,* 30 drops, and enough *essence of jasmine* or *tuberose* to convert it into a *perfectly smooth paste;* then put it into a strong bottle with *rectified spirit,* 1 quart; observing, before adding the whole of the last, to rinse the mortar out well with it, that nothing may be lost; lastly, digest for 6 or 8 weeks, as directed in No. 1, (*above.*)

5. *Ambergris,* 4 dr.; *musk,* 1½ dr.; *sand,* 3 oz.; triturate, then add of *oil of cinnamon,* 1 dr.; *oil of rhodium,* ½ dr.; *essence of roses* and *eau fleurs d'orange,* of each, ¼ pint; *rectified spirit,* 1½ pint; digest as before, (or not less than 14 days,) and decant and filter. The last two are very fine, though inferior to Nos. 2 and 3.

6. To the last (No. 5), add *civet,* 1 dr.; *salt of tartar,* 3 dr.; and an *additional* pint of *rectified spirit.* Inferior to the above, but cheaper.

Obs. Essence of ambergris is used as a perfume, and is added in small quantities to sweet-scented spirits and wines, to improve their flavour and aroma. A *very small quantity* of any one of them added to *lavender water, eau de Cologne, tooth-powder, hair-powder, wash-balls,* or a *hogshead of claret,* communicates a delicious fragrance. See *Ambergris.*

ESSENCE (d'Ambrette). Syn. *Essence of Musk Seed, Spirit of do.; Esprit d'Ambrette,*—Fr. *Prep.* 1. *Musk seed* (ground in a clean pepper-mill), 1¼ *lb.; rectified spirit,* 3 pints; digest for 3 or 4 weeks in a warm place, and filter.

2. *Musk seed,* 4 *lb.; rectified spirit,* 1 gall.; digest 10 days, add *water,* 2 quarts, and distil over 1 gall. Very fine.

ESSENCE (Ammoniacum). Syn. *Concentrated Tincture of Ammoniacum; Essentia Ammoniaci, Tinctura A. Concentrata,* —Lat. *Prep.* 1. *Ammoniacum* (in tears), 1 *lb.*, is bruised in a *very cold* marble mortar with half its weight of *coarse* and *well-washed siliceous sand* or *powdered glass,* and *rectified spirit,* ½ pint, gradually added; the trituration is continued until the whole is reduced to a smooth paste, and is then placed in a wide-mouthed bottle, and *spirit of wine,* 1½ pint, further added; the whole is then digested together for a week with constant agitation, and after sufficient repose to settle, the supernatant transparent liquid is decanted into another bottle for use.

2. *Gum ammoniacum,* 1 *lb.*, is reduced to a cream with *boiling water,* ¾ pint; as soon as the mixture has cooled a little, it is placed in a strong bottle, and *rectified spirit of wine,* 1¼ pint, is cautiously added; the mixture is then *corked down close,* and the whole macerated for a few days; the bottle is next placed in a moderately warm situation that the sediment may subside, after which the clearer portion is poured off through flannel into another bottle.

Obs. This preparation is used as a substitute for the gum in substance, for extemporaneously preparing *emulsion of ammoniacum, mixture of do., &c.* It is represented to possess fully the same amount of medicinal virtue as an equal weight of the solid gum, on which account it has a considerable sale. The product of the first formula, when well managed, is a beautiful pale brownish-coloured transparent tincture; that of the second is milky and less sightly.

ESSENCE (Ammoniacum, — Concentrated). Syn. *Essentia Ammoniaci Concentrata,*—Lat. The preparation sold under this name, and represented as *twice as strong as the gum in substance,* is generally prepared by the *first formula* given above for *Essence of Ammoniacum.* A stronger article may be prepared by a similar process, by using 1 *lb.* of *ammoniacum* to *a pint* of the *strongest rectified spirit.* As, however, a clear liquid at this strength is somewhat difficult to produce, it is very seldom attempted by the druggists; they therefore generally content themselves with sending out the liquid at half the professed strength, leaving the *label* to confer the *additional concentration.* See *Ammoniacum.*

ESSENCE (Anchovies). Syn. *Essentia Clupeæ,*—Lat. *Prep.* 1. *Anchovies,* 1 *lb.*, are "*boned,*" reduced to a pulp in a wedgewood-ware or marble mortar, and passed through a clean hair or brass-wire sieve; meanwhile the bones and other portion that will not pass through the sieve, are boiled with *water,* 1 pint, for 15 minutes, and strained; to the strained liquor, *salt and flour,* of each, 2½ *oz.*, together with the *pulped anchovies,* are added, and the whole simmered for 3 or 4 minutes, when the vessel is removed from the fire, and as soon as the mixture has cooled a little, *strong pickling vinegar,* ¼ pint, is mixed in; it is then bottled, and the corks tied over with bladder, and either "waxed" or "capsuled." *Product,* 3 *lb.* (nearly.)

2. *Anchovies,* 7 *lb.*; *water,* 9 pints; *salt* and *flour,* of each, 1 *lb.* *Product,* 20 *lb.*

3. To the last, add of *Cayenne pepper,* ¼ *oz.;* the *peel of a lemon* (grated), and *mushroom catsup,* 4 *oz.* Very savoury.

4. From *British anchovies* (pickled sprats) or *young pilchards,* along with *herring liquor,* or the *drainings* of *anchovy barrels.*

Use, &c. As a sauce and condiment; when well prepared it has a fine flavour. That of the shops is usually coloured with *Venetian red* or *Armenian bole.* Of all the samples examined by the "Lancet Commissioner," there was not one which was not largely adulterated with one or other of these substances. An *infusion of cochineal,* or a *little annotta,* would form a more appropriate colouring, and would be perfectly harmless. See *Anchovy* and *Sauces.*

ESSENCE (Angelica). Syn. *Essentia Angelicæ,*—Lat. *Prep.* (Van Mons.) *Angelica root* (bruised), 1 part; *rectified spirit,* 8 parts; *water,* 16 parts; digest, and distil over 6 parts. Stomachic, carminative, and alexipharmic. *Dose.* 1 to 2 teaspoonfuls.

ESSENCE (Aniseed). Syn. *Essentia Anisi,*—Lat. *Esprit d'anise,*—Fr. From *oil of aniseed,* as *essence of allspice* or *almonds. Used* to flavour liqueurs, and to make *aniseed water.* See *Spirits.*

ESSENCE (Anodyne). Syn. *Essentia Anodyna,*—Lat. *Prep.* 1. *Hard aqueous extract of opium* (in powder), 1 dr.; *powdered cinnamon,* ½ dr.; *rectified spirit,* 1 fl. oz.; digest a week. *Dose.* 5 to 20 drops.

2. *Extract of henbane* (recent), 5 dr.; *rectified spirit,* 2 fl. oz.; as last. *Dose.* 10 to 30 drops, Narcotic, sedative, and antispasmodic. Both are excellent preparations.

ESSENCE (Antihysteric.) Syn. *Essentia Antihysterica,*—Lat. *Prep.* 1. *Cyanuret of potassium,* 3 gr.; *powdered sugar,* 1 dr.; *rectified spirit* and *eau d'orange,* of each, 4 fl. dr.; agitate together until dissolved. *Dose.* 10 to 20 drops, in pure water; in hysteria, gastrodynia, &c. See *Antihysteric Draught.*

2. (P. Cod.) Resembles *fœtid spirit of ammonia* (which see.)

ESSENCE (Apple). Syn. *Solution of Valerianate of Amyle; Essentia Pomi Odorata,* — Lat. *Prep.* From *apple oil* (valerianate of oxide of amyle), as *essence of almonds. Used* to flavour liqueurs and confectionery.

ESSENCE (Arnica). Syn. *Essentia Arnicæ, E. A. Florum, Tinctura A. F. Concentrata,*—Lat. *Prep.* (Ph. Baden, 1841.) From *arnica flowers,* as *Essence of aconite,* —Ph. Baden. It represents half its weight of herb.

ESSENCE (Aromatic). Syn. *Essentia Aromatica,*—Lat. *Prep.* From *hay saffron,* 1 dr.; and *rectified spirit,* 6 fl. dr.; digested together; to the filtered tincture is added *oil of cinnamon* and *powdered white sugar,* of each, 1 dr.; *ether* (rect.,) 2 fl. dr.; *oil of nutmeg* and *essence of ginger,* of each, ½ dr.; after agitation and a few days' repose, the clear portion is decanted into a stoppered phial. *Dose.* 5 to 15 drops on sugar or in a glass of wine or weak spirit; in cholera, diarrhœa, spasms, &c.

ESSENCE (Bardana,—Hill's). *Prep.* (Dr. Paris.) *Guaiacum resin,* 1 part; *rectified spirit,* 3 parts (? 5 parts).

ESSENCE (Bark). Syn. *Essentia Cinchonæ, E. Corticis C.,*—Lat. *Prep.* 1. *Resinous extract of yellow bark,* 4 dr.; *rectified spirit,* 1½ fl. oz.; *tincture of orange peel,* ½ fl. oz.; *acetic acid* (Ph. L.), 1 fl. dr.; digest a week.

2. *Disulphate of quinine,* ½ dr.; *resinous extract of bark,* 2 dr.; *rectified spirit,* 2 fl. oz.; as before. *Dose.* 12 drops to a tea-spoonful, as a febrifuge and tonic.

ESSENCE (Beef). Syn. *Essence of Red Meats, &c.* *Prep.* 1. From *lean beef* (chopped small), 1 *lb.; water,* ½ pint; place them in a bottle which they will only half fill, and agitate them violently for half an hour; then throw the whole on a sieve, and receive the liquid in a jug; next boil the undissolved portion in *water,* 1 pint, for 20 minutes; strain, mix the decoction with the cold infusion, evaporate the liquid to the consistence of a thin syrup, adding *spice, salt, &c.*, to taste, and pour the essence, whilst *boiling hot*, into bottles, jars, or (still better) tin cans, which must then be at once hermetically corked, sealed, or soldered up, and stowed away in a cold place. In this state it will keep a long time.

2. (Ellis.) Take of *lean beef* (sliced), a sufficient quantity to fill the body of a porter bottle; cork it up loosely, and place it in a pot of cold water, attaching the neck, by means of a string, to the handle of the pot; boil for 1½ to 2 hours, then decant the liquid and skim it. *Spices, salt, wine, brandy, &c.*, may be added as before. Highly nutritious and sustaining.

ESSENCE (Bergamot). See *Oils* (Volatile).

ESSENCE (Bitter). Syn. *Essentia Amara*,—Lat. *Prep.* (Ph. Den.) *Wormwood*, 4 parts; *gentian root*, *bitter orange peel*, and *blessed thistle*, of each, 1 part; *rectified spirit*, 45 parts; digest a week. Tonic and stomachic. *Dose.* ½ dr. to 2 dr.

ESSENCE (Bugs). See *Oxalate of Amyle.*

ESSENCE (Calumba). Syn. *Essentia Calumbæ*,—Lat. See *Infusion of Calumba.*

ESSENCE (Cambrian). See *Essence of Smoke.*

ESSENCE (Camphor). Syn. *Camphor Drops, Liquor of Camphor, Concentrated Essence of do., Concentrated Solution of do., Conc. Camphor Julep; Essentia Camphoræ, Liquor C., Liq. C. Concentratus*,—Lat. *Prep.* 1. *Camphor* (clean), 4½ *oz.; rectified spirit*, 1 gall.; dissolve. This forms the "*Essence of Camphor*" and "*Liquor Camphoræ*" of the wholesale houses. About ½ fl. dr. added to 7½ fl. dr. of *cold distilled water* forms (by agitation) a *transparent aqueous solution of camphor* fully equal in strength to the filtered "*mistura camphoræ*" (camphor julep) of the Ph. L. The above made with *weaker spirit* forms the "*spirit of wine and camphor*" of the shops.

2. *Camphor*, 1 *oz.; rectified spirit*, 10 *oz.* (by weight); dissolve. This forms the "*Concentrated essence of camphor*" of the wholesale druggists. 10 or 12 drops added to 1 *fl. oz.* of *pure cold water*, make a transparent camphor julep, as before. There is a large quantity of these solutions of camphor sold by the London houses, who charge a considerable price for them. They are very convenient for preparing *extemporaneous* camphor julep or camphor mixture in dispensing.

3. (Fordred.) *Tincture of camphor*, 13 fl. dr.; *tincture of myrrh*, ½ fl. dr.; *rectified spirit*, 18½ fl. dr.; mix. 1 fl. dr. added to 4 fl. oz. of *water*, forms camphor julep. It has been proposed to blanch the tincture of myrrh with *animal charcoal*, but this interferes with its proper action.

4. (Homœopathic.) See *Cholera remedies*, Nos. 6 & 7, page 251.

5. (Houlton.) *Spirit of camphor* (Ph. L.), 1 fl. oz.; *proof spirit*, 7 fl. oz. 1 fl. dr. to 3 fl. oz. of *water* forms camphor julep.

6. (Redwood.) *Camphor*, 1 dr.; *rectified spirit*, 2½ oz.; dissolve, and add of *water*, ½ oz.

7. (Swediaur.) *Powdered camphor*, 1 dr.; *water saturated with carbonic acid gas*, 12 fl. oz.; dissolve. 1 part of this solution added to 4 parts of water forms camphor mixture. See *Camphor.*

ESSENCE (Capsicum). See *Essence of Cayenne.*

ESSENCE (Caraway). Syn. *Essentia Carui*,—Lat. *Prep.* From *oil of caraway*, as *Essence of almonds.* Its applications and uses are similar. An inferior kind is prepared by macerating the *seeds* in *proof spirit.*

ESSENCE (Cardamoms). Syn. *Essentia Cardamomi, E. C. Concentrata*,—Lat. *Prep.* From *lesser cardamom seeds* (ground in a pepper mill), 5½ *lb.; rectified spirit of wine*, 1 gall.; digest for a fortnight, press, and filter.

Obs. This preparation is very convenient for flavouring *cordials, pastry, &c.*, and is very powerful. In the *laboratory* it is frequently substituted for *powdered cardamoms* in making *compound extract of colocynth*, and has the advantage of adding no inert matter to the preparation, whilst it imparts the characteristic odour of the seeds in a remarkable degree. When used in this way, it is not added to the *Extract* until it is nearly cold and about to be taken from the pan. The *testæ* or *shells* of the seed should be separated from the *kernels*, as the former are quite inert, and if used occasion a loss of spirit for no purpose.

ESSENCE (Cascarilla). Syn. *Essentia Cascarillæ*,—Lat. *Prep.* 1. *Cascarilla* (bruised), 12 oz.; *proof spirit*, 1 pint; proceed either by digestion or percolation. The product is 8 times the strength of the *infusion of cascarilla*,—Ph. L.

2. See *Infusions* (Concentrated).

ESSENCE (Cassia). Syn. *Essentia Cassiæ*,—Lat. *Prep.* From *oil of cassia*, as *essence of allspice* or *almonds.*

ESSENCE (Cayenne). Syn. *Essence of Cayenne Pepper, Ess. of Capsicum, Concentrated E. of do.; Essentia Capsici, Tinctura Capsici Concentrata*,—Lat. *Prep.*

1. *Capsicum* (recent dried pods, bruised), 3 *lb.; rectified spirit,* 1 gall.; digest 14 days, press, and filter. Some persons prepare it by the method of displacement.

2. *Capsicum,* ¼ *lb.; proof spirit,* 1 pint; digest, as before. Weaker than No. 1.

3. (Kitchener's.) *Cayenne pepper,* 1 *oz.; brandy,* 1 pint; digest, &c., as before.

Obs. The product of the *first formula* is a transparent, dark-coloured liquid having an intensely burning taste. One drop is sufficient to deprive a person of the power of speech for several seconds; and a few drops will impart the rich pungency of cayenne to a large quantity of soup, sauce, or any other article. It forms the "*Essence of cayenne*" and the "*Conc. Ess. of Cayenne Pepper*" of the London houses. It is principally used as a "flavoring," and to make *soluble cayenne pepper;* also in dispensing. It is fully 8 times as strong as the *tinctura capsici,*—Ph. L. The product of the *third formula* is used exclusively for culinary purposes. The pods or fruit of *capsicum annuum* (capsicum, chilly), *c. baccatum* (bird pepper), and *c. fructescens* (Guinea pods, red pepper), are indiscriminately used for this preparation, but the first are those preferred for medicinal purposes; the others have similar properties, but are more pungent and acrimonious; hence the preference given to them in the preparation of Cayenne pepper. See *Peppers.*

ESSENCE (Cedrat). See *Oils* (Volatile).

ESSENCE (Celery). Syn. *Essence of Celery Seed*; *Essentia Apii, Ess. A. Seminis,*—Lat. *Prep.* 1. From *celery seed* (bruised or ground), 4½ *oz.; proof spirit,* 1 pint; digest a fortnight, and strain.

2. (Concentrated.) *Celery seed,* 7 *oz.; rectified spirit,* 1 pint; digest as before. Very fine. Both are used as "flavoring."

ESSENCE (Cephalic). See *Headache Essence.*

ESSENCE (Chamomile). Syn. *Chamomile Drops; Essentia Anthemidis, E. Chamæmeli, E. C. Alba,*—Lat. *Prep.* 1. From *essential oil of chamomile,* as *essence of allspice.* Stomachic and stimulant. *Dose.* 5 to 30 drops; ½ *fl. oz.,* shaken with about 1 *pint* of *pure water,* forms an excellent *extemporaneous chamomile water.*

2. *Gentian root* (sliced or bruised), 1 *lb.; dried orange peel,* ½ *lb.; proof spirit,* 1 gall.; *essential oil of chamomile,* 3½ *fl. oz.;* macerate a week. Slightly coloured. Some persons use ½ *lb.* of *quassia wood,* instead of the gentian and orange peel. Both the above are stomachic and tonic, and are favorite remedies in loss of appetite, dyspepsia, &c. *Dose.* As the last, on sugar, or in a wine-glassful of wine or beer.

ESSENCE (Chiretta). See *Infusions* (Concentrated).

ESSENCE (Cinnamon). Syn. *Essentia Cinnamomi, Spiritus C. Concentratus,*—Lat. *Prep.* 1. From *oil of cinnamon,* as *Essence of Allspice* or *Almonds.*

2. *Cinnamon,* 5 *oz.; rectified spirit,* ¾ pint; *water,* ¼ pint; digest a week, and strain. Inferior to the last. Essence of cassia is commonly sold for it.

ESSENCE (Civet). Syn. *Essentia Zibethi,*—Lat. *Prep.* 1. *Civet* (cut small), 1 *oz.; rectified spirit,* 1 pint; as *Essence of Musk.*

2. Instead of rectified spirit use *spirit of ambrette.* Both are used in perfumery; chiefly in combination with other substances.

ESSENCE (Cloves). Syn. *Essentia Caryophilli,*—Lat. *Prep.* 1. (White). From *oil of cloves,* as *Essence of Allspice.* Used as a "*flavouring.*"

2. (Coloured.) *Cloves* (bruised), 3½ *oz.; proof spirit,* ¾ pint; *water,* ¼ pint; digest a week, and strain. Inferior to the last. It is 8 times as strong as *infusion of cloves,*—Ph. L. Chiefly used in dispensing.

ESSENCE (Coffee). See *Coffee.*

ESSENCE (Cognac). Syn. *Brandy Essence. Prep.* From *brandy oil,* 2 *fl. oz.; rectified spirit,* 18 *fl. oz.* For flavouring malt spirit to imitate brandy. See *Brandy Oil.*

ESSENCE (Cologne). Syn. *Concentrated Eau de Cologne; Essentia Coloniensis, Aqua C. Concentrata,*—Lat. *Prep.* 1. By taking 8 *times the quantity of the ingredients* ordered for *Cologne water,* and using the *strongest rectified spirit.*

2. *Oils of lemon* and *cedrat,* of each, 2 dr.; *oil of rosemary,* 1 dr.; *oil of bergamotte,* 1 *oz.; spirit of neroli,* 2 fl. oz.; *purest rectified spirit,* 5 fl. oz. *Used* as a condensed perfume.

ESSENCE (Coltsfoot,—Ryan's). *Prep.* 1. *Balsam of tolu,* 1 *oz.; rectified spirit* and *compound tincture of benzoin,* of each, 3 *oz.;* dissolve, and in a few days decant the clear portion.

2. (Paris.) Equal parts of *balsam of tolu* and *compound tincture of benzoin,* with double the quantity of *rectified spirit.*

3. *Tincture of tolu,* 5 fl. oz.; *compound tincture of benzoin,* 3 fl. oz.; *powdered sugar* (quite dry), 1 *oz.; hay saffron,* 1 dr.; digest a week, with frequent agitation.

Obs. Pectoral and stimulant. A *quack* remedy for consumption and most other diseases of the lungs, but unless assisted by occasional aperients, and in the absence of fever, it is more likely to *kill* than *cure* in these complaints. The last is the best formula.

ESSENCE (Cubebs). Syn. *Concentrated Essence of Cubebs; Essentia Cubebæ, E. C. Concentrata,* — Lat. *Prep.* 1. *Cubebs* (bruised, *or* preferably ground in a pepper mill), ½ *lb.; rectified spirit,* 1 pint; digest 14 days, press, and filter.

2. (Wholesale.) *Cubebs,* 4¼ *lb.; rectified spirit,* 1 gall. This essence has a very large sale, and if carefully prepared from a good sample of the drug, is a most excellent preparation. Every fl. oz. represents 2½ dr. of cubebs. *Dose.* 1 to 3 dr.

ESSENCE (Cubebs, — Oleo-resinous). *Prep.* (Dublanc.) *Oleo-resinous extract of cubebs,* 1 oz.; *rectified spirit,* 3 oz.; dissolve. A very active and concentrated form of administering cubebs, which must not be confounded with the preceding preparation, which is the one always meant when "Essence of Cubebs" is ordered. *Dose.* ½ dr. to 1 dr.

ESSENCE (Dill). Syn. *Dill Drops; Essentia Anethi,*—Lat. *Prep.* 1. From *oil of dill,* as *Essence of Allspice.*

2. *Oil of dill, extract of dill,* and *salt of tartar,* of each, ½ oz.; *rectified spirit,* 1 pint; digest and strain. Both the above are aromatic and anti-flatulent. The *first* is commonly used as an adjunct to other medicines, especially to purgatives for children. The *second* is a popular tonic and stomachic in the flatulent colic, dyspepsia, &c., of women and children. *Dose.* A few drops, on sugar.

ESSENCE (d'Œillets). *Prep.* From *cinnamon,* 3 *oz.; cloves,* 1¼ *oz.;* (both well bruised); *rectified spirit,* 1 quart; digest for a week. *Oil of cloves* and *spirit of cloves* also bear this name in some places.

ESSENCE (d'Orient). A pearly-looking substance, found at the base of the scales of the blay or bleak, a small fish of the genus cyprinus.

Prep. The *scales* are scraped from the fish into a *tub* containing *water,* and after agitation and repose, the fluid is poured off, and its place supplied with fresh water, and this in its turn, after agitation and repose, is also poured off. This part of the operation is repeated till the "*essence*" and scales are perfectly freed from impurities, when the whole is thrown on a sieve, which retains the latter, but allows the former to flow through. After repose for a short time the essence is obtained as a deposit at the bottom of the vessel.

Obs. Essence d'Orient has a bluish white and pearly aspect, and is employed to cover the interior of glass bubbles and beads, in imitation of pearls and mother of pearl. Its tendency to putrefaction, while in the moist state, may be obviated by the addition of a little *liquor of ammonia.*

ESSENCE (Ergot). See *Liquor of Ergot of Rye.*

ESSENCE (Ergot, — Ethereal). Syn. *Essentia Ergotæ Etherea, E. Secalis Cornuti E.,*—Lat. *Prep.* (Mr. Lever.) *Ergot* (powdered), 2 oz.; *rectified sulphuric ether,* 2 fl. oz.; digest a week, express the tincture, filter, and abandon the liquid to spontaneous evaporation; lastly, dissolve the residuum in *ether,* 1 fl. oz. This is one of a host of foolish, expensive, and troublesome formulæ, published by non-practical men, and which the pharmaceutical chemist is *expected* to adopt to the letter, against his better judgment. The following modification of it, which we have employed, is both simpler and less expensive.

2. *Ergot* (ground), 8 *oz.; ether,* 16 fl. *oz.;* prepare a tincture as before, and by a gentle heat distil off the ether in a retort connected with a well-cooled refrigerator, until 15 *fl. oz.* shall have passed over; continue the evaporation at a reduced heat until the remainder of the ether has passed off; lastly, dissolve the residuum, as soon as cold, in *ether,* 4 *fl. oz.*

Obs. Each fl. oz. represents 2 oz. of ergot. *Dose.* 10 to 30 drops as a parturifacient, taken on sugar; 3 to 5 drops as a hæmostatic and emmenagogue, in hemorrhages, floodings, &c. It possesses all the acrid, narcotic principle of the ergot, but less of the hæmostatic principle than the ordinary essence, whilst it is much more costly.

ESSENCE (Fennel). Syn. *Essence of Sweet Fennel; Essentia Fœniculi,* — Lat. *Prep.* From *oil of fennel* (fœniculum dulce), as *Essence of Allspice.*

ESSENCE (Gentian). See *Infusion of Gentian* (Concentrated).

ESSENCE (Ginger). Syn. *Concentrated Tincture of Ginger, Essentia Zingiberis, Tinctura Z. Concentrata,*—Lat. *Prep.* 1. *Unbleached Jamaica ginger* (bruised), 5 *oz.; rectified spirit,* 1 pint; digest a fortnight, press, and filter.

2. (Oxley's "*Concentrated Essence of Jamaica Ginger.*") The same as the preceding, with the addition of a very small quantity of *essence of cayenne.* The above possess only about 4 times the strength of *tincture of ginger,*—Ph. L., and though vended in the shops as *essence of ginger,* scarcely deserve the name.

3. As No. 1, (next article), but using double the quantity of *spirit.* Very fine.

4. (Kitchener's) *Ginger* (grated), 3 *oz.;*

yellow peel of lemon (fresh), 2 *oz.*; *brandy*, 1½ pint; digest 10 days. For culinary purposes, &c.

ESSENCE (Ginger, — Concentrated). Syn. *Essentia Zingiberis Concentrata*,—Lat. *Prep.* 1. *Jamaica ginger* (best unbleached, in coarse powder,) and *silicious sand*, equal parts, are sprinkled with *rectified spirit of wine*, q. s. to perfectly moisten them, and after 24 hours the mass is placed in a "*percolator*," and after returning the first runnings 2 or 3 times, the receiver is changed, and more *rectified spirit* poured on gradually, and at intervals, as required, until *as much essence* is obtained as there has been *ginger employed.*

Obs. The quality of the product of the above formula is excellent, but the process is somewhat difficult to manage. The mass remaining in the percolator is treated with *fresh spirit* until exhausted, and the tincture so obtained is employed, instead of spirit, for making more essence with fresh ginger. The last portion of spirit in the waste mass may be obtained by adding a little *water. Coarsely powdered charcoal* is frequently used instead of *sand*, in which case the product has less colour; at the same time, however, a little of the flavour is lost.

2. (Wholesale.)—*a.* Best unbleached *Jamaica ginger* (as last), 12 *lb.*; *rectified spirit*, 2½ gall.; are digested together for 14 days, and the expressed and strained tincture reduced by *distillation*, in a steam or water bath, to exactly 1 gall.; it is next cooled and transferred as quickly as possible into stoppered bottles, and the next day filtered.

Obs. The *product* of the last formula is a most beautiful article, of immense strength, and the richest flavour. The assertion made by a recent writer on pharmacy, that "the product is very strong, but has lost some of the flavour of the ginger," is evidently made in ignorance of the preparation. We were the first to introduce and publish this formula, and have employed it for years on the most extensive scale, and can conscientiously assert that, for inexpensiveness, and the quality of the essence produced by it, it is unequalled by any other. The process, though apparently complicated, is, in reality, easily performed. The spirit distilled over, contains none of the fragrant or aromatic principles of the ginger; on the contrary, the little flavour it has received (apparently from a species of ethereal oil) is rather disagreeable than otherwise, and is better got rid of than retained in the essence. This spirit is used with advantage for preparing the common tincture of ginger, and several other articles. The cause of failure when this process is adopted is careless or awkward manipulation. When possible, hydraulic pressure should be employed to express the tincture. 2 *oz.* of *this essence* are regarded as equivalent to 3 *oz.* of the *finest ginger*, being fully twenty times as strong as the *tincture of ginger* of the Ph. L. A single drop, swallowed, will almost produce suffocation.

b. From *ginger* (as last), 24 *lb.; rectified spirit*, 6 gall.; make a tincture, as before, and reduce it by distillation to 1 gall.; then cool as quickly as possible out of contact with the air, and add, of the *strongest rectified spirit of wine*, 1 gall.; lastly, filter if required. Quality resembles, No. 2, *a* (nearly). We are in the habit of applying the method developed in the last two formulæ to the preparation of the essences of several other substances, the active principles of which are not volatile at a low temperature.

ESSENCE (Grape). *Prep.* From *grape oil*, as *Essence of Almonds.* It is used to flavour brandy and wines. See *Oils* (Volatile).

ESSENCE (Guaiacum). Syn. *Fluid Extract of Guaiacum; Essentia Guaiaci, Extractum Guaiaci Fluidum*,—Lat. *Prep.* Recent *guaiacum shavings*, from which the dust has been sifted, 3 cwt., are exhausted by coction in *water*, as in the preparation of an extract, using as *little* of that fluid as is absolutely necessary; the decoction is evaporated to exactly 1¾ gall.; it is next stirred until *cold*, to prevent the deposit of resinous matter, when it is put into a bottle, and *spirit of wine*, 5 pints, is added; the whole is then repeatedly agitated for a week, after which it is allowed to settle for 7 or 8 days, and the clear portion is decanted into another bottle.

Obs. This preparation is frequently substituted for *guaiacum shavings* in the preparation of compound decoction of sarsaparilla. 1 pint of this essence is considered equivalent to 19 *lb.* of *guaiacum* in substance. See *Compound Decoction of Sarsaparilla.*

ESSENCE (for the Handkerchief). See *Essentia Odorata, &c.*

ESSENCE (for the Headache). Syn. *Cephalic Essence, Embrocation of Ammonia, Dr. Hawkin's Embrocation, Ward's do., Ward's Essence for the Headache; Embrocatio Ammoniæ, Linimentum do., Essentia Cephalica*,—Lat. *Prep.* 1. *Oil of lavender* (Mitcham), 1 dr.; *camphor*, 1 *oz.; liquor of ammonia*, 4 *oz.; rectified spirit*, 1 pint. dissolve. Very fragrant and powerful.

2. (Beasley). *Spirit of camphor*, 2 lb; *strong water of ammonia*, 4 oz.; *essence of lemon*, ½ oz.

3. (Redwood.) *Camphor* and *liquor of ammonia*, of each, 2 oz.; *oil of lavender*, 4 dr.; *rectified spirit*, 14 oz. Very fragrant. Stimulant and rubefacient. *Used* as a counter-irritant lotion in local pains, as *headache, earache, colic, &c.* Compound camphor liniment is usually sold for it. See *Liniments.*

ESSENCE (Henbane). Syn. *Essentia Hyoscyami,*—Lat. See *Essence* (Anodyne) No. 2.

ESSENCE (Hop). Syn. *Essentia Lupuli, E. Humuli, Tinctura Lupuli Concentrata,*—Lat. *Prep.* 1. *New hops* (rubbed small), 26½ *oz.; proof spirit,* 1 quart; digest 24 hours, then distil over (quickly) 1 pint, and set the distillate (*spiritus lupuli*) aside in a corked bottle; to the residuum add *water,* 1 pint; boil 15 minutes, cool, express the liquor, strain, and evaporate it as quickly as possible to dryness by the heat of a water-bath, powder the residuum, and add it to the *distilled spirit;* digest a week and filter.

2. *Lupulinic grains* (yellow powder *or* lupulin of the strobiles), 5 *oz.; rectified spirit,* 1 pint; digest 10 days; express, and filter. Both the above are powerfully bitter, and loaded with the aroma of the hop. They are fully 8 times as strong as the *tinctura lupuli* of the Ph. L. A few drops added to a glassful of ale or beer render it agreeably bitter and stomachic.

3. (*Brewer's*). Several preparations under the name of *extract of hops* are prepared by the *brewer's druggist.* They are mostly *semi-fluid extracts of quassia, gentian,* and like powerful bitters. Of three of these articles which we have examined, one (*for pale ale*) consisted of the *mixed extracts of quassia* and *chamomile;* another (for either *ale* or *beer*) was a *preparation of picric acid;* whilst a third ("strongly recommended for *porter,*") consisted of about equal parts of the *extracts of bitter aloes, cocculus Indicus,* and *wormwood.* One of these vile compounds is publicly advertised and "warranted" as being equal to 100 *times its weight in hops* (1 *oz.* to 5½ *lb.*). In any other country than these realms, this impudence and rascality would bring condign punishment on the heads of the offenders. Here, however, poisons are both sold and mixed with our food and beverages with impunity. A sanitary police is quite as necessary as a criminal one.

ESSENCE (Jargonelle Pear). Syn. *Pear Essence, Esprit de Jargonelle, &c. Prep.* From *pear oil* (birnöl; acetate of oxide of amyle;) as *Essence of Almonds.* This is now largely employed to flavour confectionary and liqueurs. See *Acetate of Amyle* and *Oils* (Volatile).

ESSENCE (Jasmine). See *Spirits* and *Oils* (Volatile).

ESSENCE (Jessamine). See *Spirits* and *Oils.*

ESSENCE (Jonquille). See *Spirits* and *Oils.*

ESSENCE (Lavender). Syn. *Essentia Lavandulæ* (Odorata),—Lat. *Prep.* 1. *Oil lavender* (Mitcham), 2 *oz.; rectified spirit* (strongest), 1 pint.

2. As the strongest *Eau de Lavande.* See *Spirits.*

ESSENCE (Lavender, — Red). See *Spirits* and *Tinctures.*

ESSENCE (Lemons). Syn. *Essentia Limonis,*—Lat. *Prep.* 1. See *Oils* (Volatile).

2. (W. Procter.) *Fresh oil of lemons,* 1 fl. oz.; *de-odorized alcohol* (strongest flavorless rectified), 8 fl. oz.; *exterior yellow rind of lemons* (fresh), ½ oz.; digest 48 hours, and filter. *Used* for flavouring mixtures, pastry, &c.

3. From *oil of lemons,* as *Essence of Allspice.* As the last.

ESSENCE (Lemon-peel). Syn. *Essence of Lemon-rind, Quintessence of do.; Essentia Corticis Limonis,*—Lat. *Prep.* 1. *Yellow peel of fresh lemons,* ½ *lb.; spirit of wine,* 1 pint; digest for a week, press, and filter. Very fragrant.

2. *Yellow peel of fresh lemons,* 1 *lb.; boiling water,* ½ gall.; infuse 1 hour, express the liquor, boil down to ½ a pint, cool, and add *oil of lemon,* ¼ *oz.*, dissolved in *spirit of wine,* 1½ pints; mix, and filter. *Used* as the preceding.

ESSENCE (Lovage). Syn. *Essentia Levistici,*—Lat. *Prep.* (Ph. Wurt.) *Lovage-root* (levisticum officinale), 2 oz.; *lovage seeds,* 1 oz.; *rectified spirit,* 10 oz.; digest a week, and filter. Aromatic, stomachic, and diaphoretic. *Dose.* ½ dr. to 1 dr.; in dyspepsia, dropsies, &c.

ESSENCE (Madden's). Concentrated infusion of roses.

ESSENCE (Malt). See *Essentia Bina.*

ESSENCE (Mint). Syn. *Essence of Spearmint; Essentia Menthæ, E. M. Spicatæ, E. M. Viridis,* — Lat. *Prep.* As *Essence of peppermint.*

ESSENCE (Musk). Syn. *Essentia Moschi, Tincture M. Concentrata,*—Lat. *Prep.* 1. *Grain musk,* 2 *oz.*, and *boiling water,* 1 pint, are digested together in a close vessel until cold, when *rectified spirit of* *wine*, 7 pints, is added; the vessel (preferably a *tin bottle*) being corked close, and tied over with bladder, the whole is digested, with frequent agitation, for 2 months, in the sunshine (in summer), or in an equally warm situation in winter. At the end of the time the essence is decanted and filtered.

2. *Grain musk*, ¼ *oz.; rectified spirit of wine*, 2 pints; *essence of ambergris*, 1 fl. oz.; digest as before.

3. *Musk* (from the bladder, rubbed very small), 5 *oz.; civet*, 1 *oz.; essence of ambergris*, 1 pint; *spirit of ambrette*, 1 gall.; as before.

Obs. All the preceding formulæ yield superior essences, but the product of the last is of the *very finest quality*, and such as is seldom sold, except by the most celebrated houses, when it fetches a very high price. It is powerfully and deliciously odorous, and has received the approval of royalty itself, both in these kingdoms and on the continent. The second formula also produces a very fine article, but less choice than that just referred to. The digestion should be long continued, and on no account less than 3 weeks, as otherwise much fragrant matter is left undissolved. The addition of 1 *fl. dr.* of either *liquor of ammonia* or *liquor of potassa* (the first is best) to *each pint* of the *essence*, vastly increases its fragrance. The *essence of musk* of the wholesale London druggists, is generally made by merely digesting the *freshly emptied musk pods* in *rectified spirit*. Sometimes a little (a very little) *grain musk* is added. See *Essence Royale.*

4. (Guibourt.) *Musk*, 1 part; *proof spirit*, 12 parts; digest a fortnight, or longer. *Used* in dispensing, &c.

ESSENCE (Musk-seed). See *Essence d'Ambrette.*

ESSENCE (Mustard). Syn. *Essentia Sinapis*,—Lat. *Prep.* (Whitehead's.) *Black mustard seed* (bruised), and *camphor*, of each, 2 oz.; *oil of rosemary*, 3 dr.; *balsam of tolu*, 1 dr.; *annatto*, ½ dr.; digest a week, and filter.

ESSENCE (Myrtle). Syn. *Essence of Myrtle-blossoms; Essence de Myrte, Esprit de M.*,—Fr. *Prep. Myrtle tops* (in blossom), 2½ *lb.; proof spirit*, 9 pints; digest 3 days, then distil 1 gall. A pleasant perfume. See *Oils* (Volatile).

ESSENCE (Neroli). Syn. *Essence de fleurs d'oranges, Esprit do.*,—Lat. *Prep.* 1. *Neroli*, 3 dr.; *rectified spirit of wine*, 1 pint; mix. A delicious perfume.

2. *Oil of orange*, 2 dr.; *orris root* (bruised), ½ *oz.; ambergris*, 10 gr.; *neroli*, 35 drops; *spirit of wine*, 1 pint; digest 14 days, and filter. Very fragrant, but less "chaste" than the last.

ESSENCE (Nutmeg). Syn. *Essentia Myristicæ, E. M. Moschatæ, E. Nucis, M.*, —Lat. *Prep.* From *essential oil of nutmeg*, as *Essence of Allspice. Used* as a flavouring or zest by cooks, liqueuristes, and confectioners.

ESSENCE (Odontalgic). See *Toothache Essence.*

ESSENCE (Opium). See *Anodyne Essence*, No. 1. *Black drop* and *Rousseau's laudanum* have also been sometimes so called.

ESSENCE (Orange). Syn. *Essentia Aurantii*,—Lat. *Prep.* As *Essence of Lemon.*

ESSENCE (Orange-peel). Syn. *Essentia Corticis Aurantii*,—Lat. *Prep.* 1. (Golden.) *Fresh yellow-rind of orange*, 4 oz.; *rectified spirit* and *water*, of each, ½ pint; digest for a week, press, filter, and add of *sherry wine*, 1 quart. A pleasant liqueur.

2. (Saccharated.) See *Oleo-sacchara.*

ESSENCE (Patchouli). Syn. *Essence de Patchoulie, Esprit de Pouchâ pât*, — Fr. *Prep.* 1. *Indian patchouli* (leaves or foliaceous tops), 2½ *lb.; rectified spirit*, 9 pints; digest for a week; add of *water*, 1 gall.; *oil of lavender* (Mitcham), 3 dr.; *common salt*, 2 *lb.;* agitate well together, distil over (rapidly) 1 gallon, and add of *essence of musk*, 3½ fl. dr. A very fashionable perfume. *Essence of Patchouli* thus prepared has been largely used, both at Court and by the nobility generally.

2. *Patchouli*, 3 *oz.; rectified spirit*, 1 pint; digest a week, press, and filter. A still commoner kind is made with *proof spirit.*

ESSENCE (Pear). See *Essence* (Jargonelle).

ESSENCE (Pennyroyal). Syn. *Essentia Pulegii, E. Menthæ P.*,—Lat. *Prep.* From *pennyroyal* (mentha pulegium), as *Essence of Peppermint.* Stimulant, carminative, and emmenagogue. *Used* in dispensing, especially to make extemporaneous *pennyroyal water.*

ESSENCE (Peppermint). Syn. *Essentia Menthæ Piperitæ*,—Lat. *Prep.* 1. *Oil of peppermint* (Mitcham, recent), 1 *fl. oz.; rectified spirit*, 1 pint; agitate together until mixed. White.

2. To the last add of *herb peppermint, parsley leaves*, or *spinach leaves*, (preferably one of the first two), ½ *oz.*, and digest for a week, or until sufficiently coloured. *Sap green* (10 or 12 gr., rubbed up with a *teaspoonful of hot water*) is also used for the same purpose. A delicate light green.

3. (Ph. U. S.) *Oil of peppermint*, 2 *fl. oz.; rectified spirit*, 16 *fl. oz.*

Obs. Essence of peppermint is not conceived to be good by the ignorant, unless it has a pale-greenish tint, which they take as a proof of its being genuine. The most harmless way of tinging it is that indicated above. A little *green mint* or *parsley* will, indeed, be found to improve the flavour. These additions are quite harmless. The practice of using *cupreous salts*, adopted by some lazy and unprincipled makers, is unpardonable, and admits of no excuse, even a lame one, as not the least advantage, either of convenience, cost, or appearance, results from such a practice, while the colouring matter, though small in quantity, is nevertheless sufficient to impart a noxious quality to the liquid. This fraud may be detected by the addition of liquor of ammonia in excess, which will strike a bluish or greenish-blue colour when copper is present.

Essence of peppermint (like that of most of the other aromatic oils) is cordial, stimulant, and stomachic. A few drops (10 *to* 30) on sugar, or mixed with a little water, or wine, is an excellent remedy in flatulence, colic, nausea, sickness, &c. It is also extensively used as a *flavouring* ingredient by cooks, confectioners, and druggists. A few drops well agitated with half-a-pint of *cold water* form an excellent *extemporaneous* peppermint water.

The formulæ 1 and 2, generally the latter, are those employed by the respectable portion of the London trade. The various published receipts for this and similar essences, ordering the essential oil in a larger proportion than that directed above, are never adopted in practice, and their products (often impossible combinations) exist only in the imaginations of the writers.

ESSENCE (Pimento). See *Essence* (Allspice).

ESSENCE (Pine-apple). From *pine-apple oil* (butyric ether, butyrate of oxide of ethyle), as *Essence of almonds.* It forms a delicious flavouring for liqueurs, confectionery, rum, &c. See *Ether* and *Oils* (volatile.)

ESSENCE (Quassia). Syn. *Essentia Quassiæ*,—Lat. *Prep.* 1. From *quassia* (sliced), 1½ *oz.; proof spirit*, 1 pint; digest 10 days, and filter. ½ fl. dr. added to 7½ fl. dr. of *water*, forms the *infusion of quassia* of the Ph. L. *Dose.* ½ dr., in water or wine, an hour before a meal, as a *stomachic tonic*, in dyspepsia, loss of appetite, &c., particularly when complicated with gout; 1 to 2 dr. three or four times daily, as a febrifuge and antiseptic, in intermittents, putrid fevers, &c.

2. (Brewer's.)—*a.* From *powdered quassia* (sprinkled with a *little rum*) and "*foots*" (coarse moist sugar or sugar bottoms), equal parts, reduced to the consistence of a semifluid extract by the addition of a few spoonfuls of *water.* For ale.

b. From *powdered quassia*, 1 part; *burnt sugar colouring*, 2 parts; well stirred together. For porter and stout. Both are used by fraudulent brewers as substitutes for hops.

ESSENCE (Quinine). Syn. *Essentia Quinæ*,—Lat. *Prep.* From *disulphate of quinine*, 1½ *oz.; rectified spirit*, ½ pint; digest with warmth, gradually dropping in a little *dilute sulphuric acid* (avoiding excess) and employing constant agitation), until the whole is dissolved. 1 fl. dr., added to 7 fl. dr. of *proof spirit*, forms the *tincture of quinine*,—Ph. L. Every fl. dr. contains 8 gr. of disulphate of quinine, or about 10 gr. of the neutral sulphate. If more sulphuric acid is added than is sufficient to dissolve the salt (*i.e.* convert it into a neutral sulphate) the solution is apt to deposit part of it on keeping, owing to the gradual formation of ether, by the action of the excess of acid on the alcohol.

ESSENCE (Ratafia). The same as *essence of almonds.* So called from being used to flavour *ratafias, noyeau*, and other liqueurs.

ESSENCE (Rhubarb). Syn. *Essentia Rhei*, — Lat. *Prep.* From *rhubarb* (in powder) and *silicious sand*, of each, 5 *oz.; proof spirit*, 1 pint; by the method of displacement. Every *fl. oz.* represents the active virtues of 2 *dr.* of rhubarb.

ESSENCE (Rondeletia). *Prep.* 1. *Essence* (oil) *of bergamotte, essence* (oil) *of lemon*, and *oil of cloves*, of each, 1 dr.; *otto of roses*, 10 drops; *rectified spirit*, 1 pint.

2. To the last add of *oil of lavender*, 1 dr.; *neroli*, 15 drops. A very fashionable and agreeable perfume.

ESSENCE (Roses). Syn. *Essentia Rosæ* (Odorata).—Lat. *Prep.* 1. *Attar of roses* (genuine), 2 dr.; *alcohol*, 1 pint; agitate frequently until they unite.

2. *Attar of roses*, 1 *oz.; rectified spirit*, 1 gall.; mix in a close vessel, and assist the solution by placing it in a bath of hot water. (See *Ess. of Musk.*) As soon as the spirit gets warm, take it from the water and shake it till *quite cold;* the next day filter.—*Obs.* Unless the spirit of wine is of more than the common strength it will not retain the whole of the otto in solution in very cold weather.

3. To each pint of either of the preceding, add of *oil of bergamotte*, 30 drops; *neroli* and *essence of musk*, of each, 20 drops.

4. *Petals of roses*, 3 *lb.;* digest in *spirit of wine*, 5 quarts, for 24 hours; distil to dryness in a water bath; digest the *distilled spirit* on 2 *lb.* of fresh *rose petals*, as before, and repeat the whole process of maceration and distillation a *third*, *fourth*, *fifth*, and *sixth* time, or oftener, the last time only drawing over 1 gall. which is the essence. Each of the above is very superior. The last has a peculiar delicacy of flavour, when the spirit used to make it is pure.

ESSENCE (Roses,—Red). Syn. *Essentia Rosæ* (Rubra), *Tinctura R. Concentrata*,—Lat. *Prep.* From *rose leaves*, 1 *lb.;* *proof spirit*, 1 gall.; digest for 14 days, press, strain, add, *concentrated acetic acid*, 2½ *fl. dr.*; mix well, and the next day filter. *Used* to make *extemporaneous syrup* and *honey of roses*, *&c.* Smells, colours, and tastes strongly of the flower. *Concentrated infusion of roses* is also sold under the same name.

ESSENCE (Rosemary). Syn. *Essentia Rosmarini*,—Lat. *Prep.* From *oil of rosemary*, as *Essence of Allspice*. *Used* as a perfume; also to make *extemporaneous rosemary water*.

ESSENCE (Royale). *Prep.* 1. (Soubeiran.) *Ambergris*, 40 gr.; *musk*, 20 gr.; *civet* and *carbonate of potassa*, of each, 10 gr.; *oil of cinnamon*, 6 drops; *oil of rhodium* and *otto of roses*, of each, 4 drops; *rectified spirit of wine*, 4 fl. oz.; (say ¼ pint;) macerate for 10 days or longer. Antispasmodic and aphrodisiac. A few drops on sugar, or in syrup of capillaire.

2. See *Essence of Ambergris*.

ESSENCE (Royale pour faire la Barbe). See *Essence of Soap*.

ESSENCE (Sarsaparilla). Syn. *Concentrated Essence of Sarsaparilla; Essentia Sarzæ, E. Sarsaparillæ*,—Lat. *Prep.* 1. *Sarsaparilla root* (best red Jamaica), 2¾ *lb.*, is carefully decorticated, the *bark* reduced to coarse powder, and digested for a week or 10 days in *sherry* ¾ pint, and *rectified spirit*, ¼ pint, with frequent agitation; after which the essence is expressed, and in a week the clear portion is decanted from the sediment. A very elegant preparation. ½ *fl. dr.* added to 7½ fl. dr. of *water*, forms 1 fl. oz. of a solution of equal strength to *decoction of sarsaparilla* of the Ph. L. Every fl. oz. represents the active principles of 2 oz. (= 2 *oz.* 85 *gr.*, avoir.) of sarsaparilla root. In other words, it is *twice* as strong as the *root*, and 16 *times* as strong as the decoction.

2. *Alcoholic extract of sarsaparilla*, 7 *oz.;* *sherry*, ¾ pint; *rectified spirit*, ¼ pint; dissolve, and filter. Strength as the last.

3. (Beral.) *Alcoholic extract*, 4 oz.; *sherry wine*, 1 pint; dissolve, and filter. About 3 fl. dr. added to *water*, 1 pint, form an extemporaneous decoction.

4. (Guibourt.) *Alcoholic extract*, 4 oz.; *white wine*, 1 ℔. Strength the same as Nos. 1 and 2 (nearly.)

5 (Hening.) *Sarsaparilla* (bruised), 10 oz.; *distilled water*, 6 pints; macerate at a temperature of 120° Fahr. for six hours, and strain; repeat with the same quantity of fresh *water;* mix the liquors, and evaporate in china vessels at 160° Fahr. If reduced to 10 fl. oz. (or to 9 fl. oz., with 1 fl. oz. of *rectified spirit* added), 1 fl. dr. mixed with 7 fl. dr. of *water*, will be equal to the decoction of the usual strength. If *reduced* to 5 fl. oz., 1 *fl. dr.* will be equal to 2 fl. *oz.* of the decoction.

6. The *bark* separated from *sarsaparilla root*, 2¾ *lb.*, is exhausted with *water* as last; the liquid is evaporated, as quickly as possible, in a water-bath, to 16 fl. oz., and when *cold*, mixed with *rectified spirit*, 4 fl. oz. Strength, same as No. 1.

7. The infusion in No. 6 is evaporated to 10½ fl. oz., and when cold mixed with *sherry*, ½ pint; in a week the clear portion is decanted from the sediment. Strength, same as No. 1.

Obs. The formulæ No. 1, 2, 6, and 7, have each in turns been extensively employed by us in the laboratory, with the most satisfactory results. See *Liquor of Sarsaparilla*.

ESSENCE (Sarsaparilla,—Compound). Syn. *Essentia Sarsaparillæ Composita, E. Sarzæ C.*,—Lat. *Prep.* 1. *One pint* of No. 1, 2, 6, or 7 (above), is triturated with the *extract* prepared from *mezereon bark*, 3¼ *oz.*, and *extract of liquorice*, 4 oz.; when mixed, it is returned to the bottle, and *essence of guaiacum*, 1½ fl. dr.; and *oil of sassafras*, 20 drops, are added; the whole is then *well agitated* for at least 15 minutes, and after a week's repose the clear portion is decanted, as before. ½ fl. dr. with 7½ fl. dr. of *water*, forms *extemporaneous compound decoction of sarsaparilla*.

2. (Cadet.) *Sarsaparilla* (bruised), 8 oz.; *hot water*, q. s.; exhaust the root by successive macerations; unite the liquors, and evaporate to 10 fl. oz,; strain, and add, when cold, of *alcohol* (·842) and *tinctures of guaiacum* and *mezereon*, of each, 4 fl. dr.; *white wine*, 1 fl. oz.; *oil of sassafras*, 12 drops; *extract of liquorice*, 2 dr.; agi-

tate, and after repose decant as before. This is nearly 8 times as strong as *Dec. Sarzæ Co.*,—Ph. L. The first is the best formula. See *Liquor of Sarsaparilla* (Compound).

ESSENCE (Savory Spices). *Prep.* 1. *Black pepper*, 4 *oz.; powdered turmeric*, 3 dr.; *coriander seeds*, 1½ dr. (all ground and genuine); *oil of pimento*, 1½ fl. dr.; *oils of nutmeg, cloves, cassia*, and *caraway*, of each, ½ dr.; *rectified spirit*, 1 pint; digest, with agitation, for a fortnight. Very fine.

2. *Black pepper*, 3 *oz.; allspice*, 1¼ *oz.; nutmegs* and *burnt sugar*, of each, ½ *oz.; cloves, cassia, coriander*, and *caraway seeds*, of each, 1 dr. (all bruised or ground); *rectified spirit*, 1 pint; digest, with agitation, as before for 14 days, press, and filter. Used as a flavouring. When made with *proof spirit* or *brandy*, and only ½ the above weight of spice, it is called "*Tincture of Savory Spices.*"

ESSENCE (Senna). See *Liquors* and *Infusions* (Concentrated).

ESSENCE (Smoke). See *Westphalian Essence.*

ESSENCE (Soap). Syn. *Spirit of Soap, Shaving Fluid; Esprit de Savon, Essence de Savon, Essence Royale pour faire la Barbe*, —Fr.; *Essentia Saponis, Tinctura Saponis Concentrata*,—Lat. *Prep.* 1. *Castile soap* (in shavings), 4 *oz.; proof spirit*, 1 pint; dissolve, and add a little perfume.

2. *Venetian soap*, ¾ *lb.; salt of tartar*, 1 *oz.; benzoin*, ½ *oz.; spirit of wine*, 1 gallon.

3. *Best soft soap*, ¼ *lb.; boiling water*, 1 pint; dissolve, cool, and add *oils* of *cinnamon* (cassia), *verbena*, and *neroli*, of each, 6 drops; dissolved in *rectified spirit*, 1 pint; mix well, and if not perfectly transparent, add a little more *strong spirit*, or filter through blotting paper.

Obs. This alcoholic solution of soap is chiefly used for shaving, and is very convenient in travelling, as a good lather may be instantly produced without the trouble of employing a soap-box. Instead of the above perfumes, 15 drops of essence of musk or ambergris, or 30 drops of any of the perfumed spirits, or 3 drops of attar of roses, or 6 drops of any of the aromatic essential oils, may be added, when a corresponding name is given to the preparation, as *esprit de savon, de la rose*, &c.

4. (P. Cod.) *White soap*, 3 oz.; *carbonate of potassa*, 1 dr.; *proof spirit*, 12 oz.; dissolve. *Used* medicinally. They are all used as frictions, &c.

5. (*Camphorated*,—Guibourt.) *White soap*, 3 parts; *camphor*, 1 part; *spirit of rosemary*, 16 parts; dissolve. A variety of opodeldoc. *Used* as an embrocation in rheumatic pains, sore throat, &c.

ESSENCE (Soup Herbs). Syn. *Spirit of Soup Herbs, Conc. Tincture of do.*, &c. *Prep.* (Kitchener's.) *Lemon thyme, winter savory, sweet-marjoram*, and *sweet basil*, of each, 1 *oz.; lemon peel* (grated), and *eschalots*, of each, ½ *oz.; bruised celery seed*, ¼ *oz.; proof spirit* or *brandy*, 1 pint; digest for 10 days, or a fortnight. A superior flavoring essence for soups, gravies, &c. See *Essence of Savoury Spices.*

ESSENCE (Spearmint). See *Essence of Mint.*

ESSENCE (Sprats). Syn. *Essence of British Anchovies.* From *pickled sprats* (British anchovies), as *Essence of anchovies*, for which it is commonly sold.

ESSENCE (Spruce). Syn. *Fluid Extract of Spruce; Essentia Abietis, Extractum A. Fluidum*,—Lat. *Prep.* A *decoction* of the *young tops* of the *black spruce-fir* (abies nigra), evaporated to the consistence of a thick syrup. *Used* to make *spruce beer, &c.*

ESSENCE (Toothache). Syn. *Essentia Odontalgica*,—Lat. *Prep.* 1. *Acetate of morphia*, ½ dr.; *tincture of pellitory of Spain* (made with rectified spirit), 2 fl. oz.; *acetic acid* (glacial), 4 fl. dr.; dissolve, and add of *oil of cloves*, 6 fl. dr.

2. (Redwood.) *Pellitory*, ½ ℔; *extract of belladonna*, 2 dr.; *rectified spirit*, 1 pint; digest 14 days, strain, and add of *hyponitrous ether*, 1 oz.; *oil of wine*, ½oz.; *oil of cloves*, 2 dr. See *Odontalgic Drops.*

ESSENCE (de Tuberose). *Prep.* The *flowers* are stratified with *sheep's* or *cotton wool*, impregnated with the purest *oil of ben* or of *olives*, in an earthen vessel, closely covered, and kept for 12 hours in a *water bath;* the flowers are then removed and *fresh ones* substituted, and this is repeated until the oil (*huile au tuberose*) is sufficiently scented. The *wool* or *cotton* is then mixed with the *purest spirit of wine*, and distilled in a *water bath;* or it is first digested in a warm situation, and in a well-closed vessel, for several days, during the whole of which time frequent agitation is had recourse to. A similar plan is followed for the preparation of the *essences of jasmine, violets*, and *other like flowers.* See *Spirits.*

ESSENCE (Turtle). Syn. *Essence of Green Turtle. Prep.* From *essence of anchovies* and *shallot wine*, of each, 3 *oz.; basil wine*, ½ pint; *mushroom ketchup*, ½ pint; *the juice of* 2 *lemons;* the *yellow* *peel of* 1 *lemon; curry powder,* ½ *oz.;* digest for a week. *Used* to impart the flavour of turtle to soups and gravies.

ESSENCE (of Tyre). See *Hair Dyes.*

ESSENCE (Vanilla). Syn. *Essentia Vanillæ, Tinctura V. Concentrata,*—Lat. *Prep.* 1. *Vanilla* (cut small), 2 *oz.; rectified spirit,* 1 pint; digest a fortnight.

2. (Wholesale.) *Vanilla,* 2 *lb.; rectified spirit,* 1 gall.; proceed as for *essence of musk.* Very superior.

3. *Vanilla* (best), ¾ *lb.; spirit of ambrette,* 1 quart; *cloves,* 30 gr.; *grain musk,* 7 gr.; as last. Much esteemed. It is chiefly *used* as a perfume and for flavouring.

ESSENCE (Verbena). Syn. *Essence of Lemon-grass, Ess. of Citronelle; Essentia Verbenæ,*—Lat. *Prep.* 1. From *oil of lemon-grass* or *verbena* (andropogon citratum), as *Essence of Allspice.*

2. To the last, add of *essences of ambergis* and *bergamotte* (oil), of each, 1 fl. dr.; *neroli,* ½ fl. dr.

3. To No. 1, add of *oils of lavender* and *bergamotte,* of each, ½ dr.; *essence of vanilla,* 2 fl. dr. A powerful and refreshing perfume.

ESSENCE (Violet). Syn. *Essentia Violæ,*—Lat. *Essence des Violettes,*—Fr. See *Essence of Tuberose* and *Spirits.*

ESSENCE (Vittie Vayr). Syn. *Essence of Vetiver; Essence de Vittie Vayr double,*—Fr. *Prep.* 1. *Vittie vayr* or *cuscus* (the root of andropogon muricatus, cut small and bruised), 3 *lb.; proof spirit,* 9 pints; digest a week, add of *water,* 5 pints, and the next day, distil over 1 gall. of *essence.*

2. To the last, before distillation, add of of *otto of roses,* ½ dr.; *eau de melisse* (spirit of balm), ½ pint; and proceed as before. *Used* as a perfume. In 1831 it was much employed in Paris as a prophylactic of cholera.

ESSENCE (Volatile,— Acetic). Syn. *Pungent Acetic Essence; Essentia Volatilis Acetica,*—Lat. Aromatic vinegar.

ESSENCE (Volatile, — Ammoniacal). Syn. *Pungent Ammoniacal Essence, Aromatic Ammoniacal Ess.; Essentia Volatilis, E. V. Ammoniacalis, E. V. Aromatica, &c.,*—Lat. *Prep.* 1. *Oil of cinnamon,* 6 drops; *otto of roses,* 12 drops; *oil of cloves,* 1 fl. dr.; *essence of bergamotte,* 2 fl. dr.; *oil of lavender* (Mitcham), 4 fl. dr.; *essence of musk,* 5 fl. dr.; *liquor of ammonia* (strongest), 1 pint; mix in a cold place, and shake the bottle until the whole is combined.

2. *Essence of violets* and *oil of cinnamon,* of each, 12 drops; *neroli, essence of jasmine,* and *otto of roses,* of each, ½ dr.; *oil of lavender,* 1 dr.; *essence royale* and *essence* (oil) *of bergamotte,* of each, 2½ dr.; *liquor of ammonia* (strongest), 1 pint; as the last.

3. *Oils* of *lemon* and *bergamotte,* of each, 5 fl. dr.; *oil of lavender,* 1½ fl. dr.; *otto of roses,* 1 fl. dr.; *oils of cassia, neroli, cloves,* and *cedrat,* of each, ½ fl. dr.; *oil of sandal wood,* 15 drops; *liquor of ammonia* (strongest), 1 pint.

4. *Essence of bergamotte,* 6 fl. dr.; *oil of lavender,* 4 fl. dr.; *oil of cloves,* 3 fl. dr.; *oil of cassia,* 1½ fl. dr.; *oil of verbena* (lemon grass), 1 fl. dr.; *otto of roses,* 30 drops; *liquor of ammonia,* 18 fl. oz.

5. (Redwood.) *Oil of bergamotte,* 3 oz.; *essence of lemons,* 2 oz.; *oil of lavender,* 6 dr.; *essence of jasmine,* 4 dr.; *oil of sassafras,* 3 dr.; *oil of neroli,* 2 dr.; *otto of roses,* 1½ dr.; *oil of origanum* and *essence of ambergis,* of each, 1 dr.; *musk,* 20 gr.; macerate for a week, and decant the clear portion. It is added to the strongest *liquor of ammonia* in proportion of 1½ oz. to the pint.

Obs. The above are used to fill smelling bottles. They are all very fragrant and refreshing

ESSENCE (Ward's). See *Headache Essence.*

ESSENCE (Water-fennel). Syn. *Essentia Phellandri Aquatici, E. Fœniculis A.,*—Lat. *Prep.* (Cottereau.) *Water-fennel seeds* (fine-leaved water-hemlock, bruised), 1 oz.; *proof spirit,* 4 fl. oz.; digest. Narcotic and pectoral. *Dose.* 5 to 25 drops, combined with bark, in phthisis, &c.

ESSENCE (Westphalian). *Essence of Smoke, Essence of Wood-smoke, Cambrian Essence, Smoking Fluid; Essentia Fuliginis, &c.,*—Lat. *Prep.* 1. *Crude* or *empyreumatic pyroligneous acid,* 1 pint; *sugar colouring,* 2 *oz.;* dissolve, and in a week decant the clear portion.

2. *Tar,* 3 dr.; *sugar colouring,* 2 oz.; *hot crude pyroligneous acid,* 1 pint; agitate constantly for 1 hour, and after repose decant the clear portion.

3. *Acetic acid* (Ph. L.), 1 pint; *creasote,* 5 dr.; mix. White.

4. *Barbadoes tar,* ¼ *oz.; burnt sugar* and *common salt,* of each, 1 *oz.; strong pickling vinegar,* ¾ pint; *port* or *elder wine,* ¼ pint; digest as before. Inferior to the preceding. *Used* to impart a smoky flavour to meat, fish, &c., by brushing it over them, or adding a little to the brine in which they are pickled.

ESSENCE (Wormwood). Syn. *Essentia Amara, E. Absinthii,*—Lat. *Prep.* 1. *Extract of wormwood,* 4 oz.; *oil of wormwood,* 1 oz.; *rectified spirit,* 1 pint; digest a week, and filter. Tonic, stomachic, and vermifuge. *Dose.* 10 drops to a teaspoonful.

2. (Van Mons.) *Tincture of wormwood,* 1 pint; *salt of wormwood,* 5 dr.; *extract of wormwood,* 1 dr.; digest, as before. *Dose.* ½ to 1½ fl. dr.

ESSENCES (Flavouring). Syn. *Culinary Essences, Spice do., Essences for the Table, &c.* Those used by *cooks, confectioners, liqueurists, &c.,* are all made by either dissolving 1 *fl. oz.* of the *essential oil* of the particular substance in 1 pint of *rectified spirit,* or, by digesting 4 to 6 *oz.* of the *bruised spice,* or 5 to 10 *oz.* of the *dried herb,* in a *like quantity* (1 pint) *of spirit.* The *first* method is preferable, from being the least troublesome, and yielding the finest product. They are commonly labelled "*Concentrated Essence of* ——." An inferior article, vended under the names of "*Essences of Culinary Herbs,*" "*Culinary Tinctures,*" "*Tinctures for Kitchen Use,*" *&c.,* are prepared from *half* the *above quantity of oil* or *spice,* infused in a pint of *proof spirit* or *British brandy.* The principal compounds of this class, are the *Essences of allspice, caraway, cardamoms, cassia, cayenne, celery seed, cinnamon, cloves, coriander seed, fennel, garlic, ginger, lemon-peel, mace, marjoram, nutmegs, orange-peel, peppermint, spearmint, sweet basil,* and the like. The whole of these are employed to flavour soups, gravies, sweetmeats, pastry, wines, mulled wines, liqueurs, &c.

ESSENCES (of Flowers). Those for which separate formulæ are not given in this work, may most of them be made from the *essential oil of the flowers* and *rectified spirit,* as the last; or by digesting the *flowers* (crushed or bruised), 3 to 5 *lb.,* in *proof spirit,* 2 gall., for a few days, and then drawing over, by distillation, 1 gall. For the *essences of those flowers* which are not *strongly odorous,* the spirit thus obtained, is distilled from a like quantity of flowers, a second, and a third time, or even oftener. The *essences of other organic substances* whose fragrant principles are volatile, may be prepared in the same manner. A small quantity of some other odorous essence is frequently added to the product to enrich or modify the fragrance. See *Flowers* and *Essences* (by Infusion).

ESSENCES (Fragrant). See *Essences of Flowers,* (above), *Essentia Odorata, Perfumery, &c.*

ESSENCES (Fruit). See *Essences* of *Apple, Pine Apple, Jargonelle, &c.*

ESSENCES (by Infusion). This term, among perfumers, is commonly applied to those *essences, eaux,* and *esprits,* which are prepared by digesting the ingredients in the spirit used as the vehicle for the aroma, in opposition to those obtained by "distillation," or by "contact" or "pressure." Thus the *essences of ambergris, musk,* and *vanilla,* are of this class.

ESSENCES (Vinous). Syn. *Essentia Vinosa,*—Lat. These are prepared in a similar way to the *wines* (VINA) of the pharmacopœia, by using 8 times the usual quantity of ingredients, and the *very strongest sherry wine.* 1 fl. dr. added to 7 fl. dr. of *wine* or *water* (properly the first only), forms an *extemporaneous* imitation of the officinal *vina medicata.* Some of the above are largely used in dispensing, and by travellers.

ESSENCES (Vinous,—by Fermentation). See *Liquors* and *Wines.*

ESSENTIA BINA. See *Colouring.*

ESSENTIA ODORATA. *Prep.* 1. *Oil of lavender,* 1 dr.; *oils of cloves, cassia,* and *bergamot,* of each, ½ dr.; *neroli,* 20 drops; *essence royale,* 2 fl. dr.; *rectified spirit,* ½ pint; mix.

2. (Redwood.) *English oil of lavender,* 48 drops; *oil of cloves,* 32 drops; *oil of orange-peel,* 16 drops; *oil of bergamotte* and *sweet spirit of nitre,* of each, 8 drops; *oil of yellow sandal-wood, neroli,* and *otto of roses,* of each, 2 drops; *oil of cinnamon,* 1 drop; *rectified spirit,* and *essence of ambergris* and *musk,* of each, 1 oz.; *honey water,* 8 oz.; mix. *Used* as a perfume for the handkerchief, &c. The last form seems unnecessarily complicated and minute.

ESSENTIA ODORIFERA. *Prep.* 1. *Grain musk* and *balsam of Peru,* of each, 10 gr.; *civet,* 4 gr.; *oil of cloves,* 5 drops; *oil of rhodium,* 3 drops; *salt of tartar* (dried by a dull red heat and cooled), ½ dr.; *rectified spirit* (strongest), 2½ fl. oz.; macerate for 14 days, and pour off the clear.

2. *Oil of rhodium* and *balsam of Peru,* of each, ½ dr.; *oil of cloves,* 1 dr.; *spirit of ammonia,* 2 fl. dr.; *essences of civet* and *vanilla,* of each, 2 fl. oz.; *essence of musk,* 5 fl. oz.; *neroli, oils of lavender, verbena,* and *cassia,* of each, 6 drops. As last. Both are very pleasant, durable, and powerful perfumes for personal use.

ESSENTIAL OILS. See *Oils* (Volatile).

ESSENTIAL SALT OF BARK. See *Bark* and *Extracts.*

ESSENTIAL SALT OF LEMONS. Syn. *Salt of Lemons; Sal Limonum,*—Lat. The preparation sold under this name is made by mixing *cream of tartar* (bitartrate of potassa) with *twice its weight* of *salt of sorrel* (quadroxalate of potassa), both in fine powder. It is used to remove *fruit stains, &c.,* from linen, by rubbing a little of it on the part moistened with warm water. It is *poisonous*, if swallowed in quantity.

ETCHING. A species of engraving, in which the design is formed on the plate by the action of an acid, or some other fluid, instead of being cut out by the graver.

Proc. The plate is covered with "*etching varnish*," and the design is scratched on the metal through the varnish or ground, by means of a pointed tool of steel (*etching needle* or *point*). A border of *wax* is then placed round the plate, and the "biting" menstruum (*etching fluid*) poured on, and allowed to remain till the "lights" or finest portion of the design is sufficiently "bit in." The etching fluid is then poured off, the plate washed, and the light parts "stopped up" with *wax* or *varnish*, when the solvent is again poured on, and allowed to remain until the finest portion of the exposed lines are sufficiently deep, when the acid is again poured off, and the whole process is repeated till the very darkest lines or shadows are sufficiently formed. The plate is then cleaned, and is ready to be printed from. Occasionally the etched design receives a few finished touches with the "graver."

There are several varieties of etching, of which the following are the principal:—*Etching with a soft ground*, when a coating of *lard* or *tallow* is employed, and the design is drawn on a piece of paper, laid evenly on the ground, by which means the fatty matter adheres to the paper, on the parts pressed on by the point or pencil, and the copper beneath becomes exposed, and is then acted on by the acid. The effect resembles that of chalk or pencil drawings.—*Stippling*, or executing the design in dots instead of lines.—*Aquatinta*, in which a coating of *asphaltum* is given to the plate, or weak *spirituous solution of gum mastic* or *shell-lac* is poured over it, placed in a slanting direction, in the way already explained. (See *Aquatinta.*) The fineness or coarseness of the grain depends entirely upon the condition of the powdered asphaltum, or on the quantity of matter dissolved in the spirit employed to form the ground.

The fluids (*etching fluids*) employed for "*biting in*" the designs, vary considerably; almost every artist having his own receipt. *Aquafortis*, more or less diluted, is, however, generally employed for *copper*, and *this*, with the *addition of pyroligneous acid*, for etching on *steel;* but any fluid that rapidly dissolves the metal may be used for the purpose. The *etching varnish* or *ground* may be formed of any substance capable of resisting the action of the etching fluid, and which is, at the same time, sufficiently soft to allow of the free use of the needle or point, and sufficiently solid to prevent an injury to the design during the "*scratching in.*"

In *etching* on *glass*, the ground is laid on, and the design "scratched out" in the usual way, when *liquid hydrofluoric acid* is applied, or the glass is exposed to the action of *hydrofluoric acid gas.* The former renders the surface of the etching *transparent*, the latter *opaque.* A *simple modification* of the *process*, is to wet the design with *sulphuric acid*, and then to sprinkle on some *finely-pulverized fluor spar* (fluoride of calcium), by which means hydrofluoric acid is set free and attacks the glass. This method may be very easily applied to the *graduation of glass vessels*, *thermometer tubes*, *&c.*

A *rapid method* of *etching* on *iron* or *steel*, capable of very general application, is as follows:—The metal is warmed until it is capable of melting a piece of *bees' wax*, or *etching varnish*, which is then carefully rubbed over it, so as to form a thin and even coating; when cold, the design is "scratched in" in the common way; a little *powdered iodine* is then sprinkled on the exposed parts, and at the same time a *few drops of water* are added, and the two worked into a liquid paste with a camel-hair pencil. The paste is then moved about over the intended etching, for a period varying from one to five minutes, according to the depth of the lines required to be produced. Afterwards the whole is removed, and reapplied, &c., as with the usual etching fluids. The same *etching-paste*, by being kept for a few days, again acquires the property of dissolving iron, and may be used again and again; but independently of this, the *iodide of iron* formed during the process, if rapidly evaporated to dryness in a clean iron vessel by a moderate heat, and placed in stoppered bottles, will sell for more than the original cost of the iodine. To travellers and amateurs who amuse themselves with the delightful art of etching, iodine, from its portability and convenience, will, doubtless, prove invaluable. We have adopted it with considerable success, and have found it especially useful in marking surgical instruments, razors, and other edge tools. We published this method above 12 years ago. Several parties have since availed themselves of our suggestions and formulæ, but without the slightest acknowledgment of the source from which they obtained them. (See *below.*)

ETCHING FLUIDS. 1. (For Copper.) *a.* From *aquafortis*, 2½ fl. oz.; *water*, 5 fl. oz.; mix.

b. To the last add of *verdigris*, 1 *oz.; water*, 2½ fl. oz.; dissolve. For light touches.

c. (*Eau Forte*,—Callott and Piranesi). *Alum, sal ammoniac, sea salt*, and *verdigris*, of each, 4 *oz.; vinegar* (pyroligneous acid), 8 fl. oz.; *water*, 16 fl. oz.; mix, dissolve, boil for 1 or 2 minutes in a glazed or stoneware vessel, cool, and decant the clear portion. *Used* as the last.

2. (For steel.)—*a.* From *iodine*, 1 *oz.; iron filings* or *wire*, ½ dr.; *water*, 4 fl. oz. It must be kept in a stoppered bottle, until required for use. (See *above.*)

b. From *iodine*, 3 dr.; *iodide of potassium*, 1 dr.; *proof spirit*, 1 fl. oz.; *water*, 2 fl. oz. As the last.

c. (Mr. Turrel.) *Pyroligneous acid*, 4 fl. oz.; *alcohol* (rectified spirit), 1 fl. oz.; mix, and add of *nitric acid* or *double aquafortis* (sp. gr. 1·28), 1 fl. oz.

d. From *hydrochloric acid*, 5 parts; *water*, 95 parts; mix, and add the liquid to a solution of *chlorate of potassa*, 1 part, in *water*, 50 parts. See *Etching.*

ETCHING VARNISH. *Prep.* 1. *Bees' wax*, 5 parts; *linseed oil*, 1 part; melted together.

2. (Callott's *Hard Varnish, Florentine do., Florence do.*) From *linseed oil* and *mastic*, equal parts, melted together.

3. (Callott's *Soft Varnish.*) From *linseed oil*, 4 *oz.; gum benzoin* and *white wax*, of each, ½ *oz.;* boil to two-thirds.

4. (Lawrence.) *White wax*, 2 *oz.; black pitch* and *burgundy pitch*, of each, ½ *oz.;* melt, add by degrees, of *powdered asphaltum*, 2 *oz.;* and boil together, until a piece, when thoroughly cold, will break by being bent double 2 or 3 times between the fingers; next pour it into *warm water*, make it into small balls, and place each of them in a piece of taffety for use.

Obs. The preceding compositions are applied to the surface of the plates previously made sufficiently warm to melt them easily, their even diffusion being promoted by dabbing them with a wad of cotton. Those that are white are then generally blackened on the surface by skillfully passing them over the smoky flame of one or more candles, by which the marks of the *etching point* on the bright metal, are rendered the more visible.

ETHAL. A peculiar substance discovered by Chevreul, and formed during the saponification of spermaceti.

ETHALIC ACID. Syn. *Cetylic Acid.* See *Cetyle.*

ETHALIC ALCOHOL. Syn. *Cetylic Alcohol.* See *Cetyle.*

ETHER. Syn. *Sulphuric Ether, Oxide of Ethyle, Hydrate of Etherine; Æther,*—Ph. L. *Æther Sulphuricus,*—Ph. E. D. & U. S., & Ph. L. 1836. *Æther Rectificatus,*—Ph. L. 1809 & 1824. *Æther Vitriolicus,*—Ph. L. 1788. *Spiritus Vitrioli Dulcis,*—Ph. L. 1746. *Vitriolic Naphtha, Naphtha Vitrioli, N. Vini, N. Sulphurica, Oleum Vitrioli Dulci, &c.,*—*Obs.* A highly volatile, fragrant, inflammable, and intoxicating liquid, obtained by distilling a mixture of sulphuric acid and alcohol. It was not known before the 13th century.

Prep. There are two methods employed for the preparation of ether. The *one* is by *mixing the whole of the ingredients at once, and immediately subjecting them to distillation at a proper temperature;* the *other* is by *adding the alcohol in a slender streamlet to the acid, previously heated to the etherifying point.* The *former*, though less economical, is the one more generally employed. "Ether is also formed by the decomposition of the *bisulphate, biphosphate*, and *biarseniate of oxide of ethyle*, (sulphovinic, phosphovinic, and arseniovinic acids), and by the action of *fluoride of boron, chloride of zinc, chloride of tin*, and other *chlorides* on *alcohol.*" (Liebig.)

1. (Ph. L., 1836.) *Rectified spirit*, 3 ℔; *sulphuric acid*, 2 ℔; *carbonate of potassa*, (previously ignited), 1 oz.; pour 2 ℔ *of the spirit* into a glass retort, add the *acid*, and place the vessel on a sand-bath, so that the liquor may boil as quickly as possible, and the ether, as it forms, pass over into a well-cooled receiver; continue the distillation until a heavier fluid begins to pass over, then lower the heat, add the remainder of the spirit, and distil as before; mix the distilled liquors together, pour off the supernatant portion, add the carbonate of potassa, and agitate occasionally for one hour; finally, distil the ether from a *large* retort, and keep it in a well-stoppered bottle. Sp. gr. 0·750.

2. (Ph. L. 1851.) Included in the *materia medica.* (See *below.*)

3. (Ph. E.) *Rectified spirit*, 2½ pints; *sulphuric acid*, 10 fl. oz.; pour 12 fl. oz. *of the spirit* gently over the acid contained in an open vessel, and mix well; transfer the mixture *immediately* into a glass mattrass connected with a refrigeratory, and raise the heat, *quickly*, to about 280° Fahr. As soon as ether begins to distil over, supply fresh spirit through a tube into the mattrass, in a continued stream, and in such quantity as to equal that of the fluid

which distils over. When 42 fl. oz. have distilled over, and the whole of the spirit has been added, the process may be stopped. Agitate the product with 16 fl. oz, of a *saturated solution* of *chloride of calcium* containing ½ oz of *lime* (recently slaked); pour off the supernatant liquor, and distil it with a very gentle heat, so long as the liquor which passes over has a density not above 0·735. More ether of the same strength may then be obtained from the *solution of chloride of calcium;* and from the residuum of both distillations a weaker ether may be obtained in a small quantity, which must be rectified by gently distilling it again.

4. (Ph. D.) Nearly similar to the last, but substituting *quicklime* (in powder) for the chloride of calcinm. Sp. gr., 0·750.

5. (Apothecaries' Hall.) The apparatus consists of a *leaden still,* having a *pewter head,* and connected by means of about 6 feet of *tin pipe,* with a *powerful worm condenser,* surrounded by a constant stream of ice-cold water, and this is connected with pewter receivers, furnished with glass lids. The still is heated by a coil of *lead pipe,* supplied with *high pressure steam,* and the *alcohol* is supplied to the *acid,* as required, by means of a *small pipe* entering the upper part of the still. (Brande.)

6. (Boullay.) The *strongest oil of vitriol,* 3 parts, are mixed with *alcohol,* q. s. (about 2 parts at 0·830) to reduce its sp. gr. to 1·780; an object which may be easily obtained by distilling off some of the ether, if required. The still or retort is then connected with a vessel full of *alcohol,* of at least 90%, by means of a *small syphon tube* furnished with a stopcock; the longer limb of which should be of glass, and so arranged that it just dips into the *mixture* of *acid* and *alcohol.* Heat is next applied, and the contents of the still raised to the boiling point as *rapidly* as possible, and as soon as full ebullition commences, the stopcock of the syphon is cautiously turned, so as to allow the alcohol to flow down in such a manner as to keep the *boiling liquid exactly at the same level;* or in other words, to supply a quantity of alcohol *exactly equal* to that of the liquid which distils over. By careful manipulation the whole of the alcohol which enters the retort passes over as *ether* and *water,* and this decomposition proceeds for some time, and would continue for an unlimited period, did not the sulphuric acid ultimately become too weak to form ether, from the gradual absorption of the superfluous water contained in the alcohol. Were it convenient or practicable to use *absolute alcohol,* a given weight of sulphuric acid, of the proper strength, would maintain the power of producing ether for an indefinite period. In practice, the quantity of alcohol that may thus be etherefied, is twice or thrice as much as by the common process, while neither *sulphurous acid, sulphovinic acid,* nor *sweet oil of wine* is generated, and, the residual liquid of the distillation continues limpid, and has only a pale brown colour. (Gieger.)

7. (Liebig.) *Alcohol* of 90%, 5 parts are mixed with *oil of vitriol,* 9 parts, in a vessel of *copper* or *iron,* immersed in *cold water;* the mixture is next introduced into a still or retort, and raised to a state of ebullition as rapidly as possible, as before. A fresh quantity of *alcohol,* equal in bulk to the liquid distilled over, is then added to the liquid in the still, and distillation again had recourse to. As much *concentrated alcoholic solution of potassa* as will give it a perceptible alkaline reaction, is next added to distilled liquor, which is then rectified by the heat of a water-bath, as long as the ether which distils over, has the sp. gr. 0·720 to 0·725 at 80° Fahr. Instead of the potassa, a little *milk of lime* may be used, along with its own bulk of *water.* By allowing the product to stand for some days over *chloride of calcium* or *quicklime,* and again rectifying it along with one of these substances, *perfectly pure ether* may be obtained.

Prop., &c. Pure ether is a colourless, transparent, and very limpid fluid, having a penetrating and agreeable smell, and a burning, sweetish taste; its evaporation produces the sensation of extreme cold; when prevented, a sensation of heat is experienced. Its specific gravity has been variously stated by different chemical writers,—0·7119 at 75°, 0·7154 at 68°, and 0·7237 at 55° Fahr. (Liebig and Gregory); 0·713 to 0·715 at 60°, (Ure, &c.); 0·713 at 68°, (Dumas; Boullay;) about 0·720, (Fownes.) It is said to begin to crystallize in brilliant white plates when cooled to —24° Fahr., and at —46° or —47° Fahr. it becomes a white crystalline mass, (Ure, Liebig, Fourcroy, Vauquelin;) but, according to others, absolutely pure ether cannot be solidified by any degree of cold that can be produced, (Thenard and Bussy.) It remained fluid when placed in contact with solid carbonic acid, at a temperature of about—148° Fahr. (Pereira.) It boils at 96° or 97° Fahr.; is very combustible;

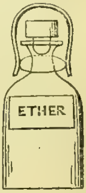
is soluble in about 10 parts of distilled water, and mixes with alcohol in all proportions. It abstracts *corrosive sublimate, terchloride of gold, sesquichloride of iron*, and many of the alkaloids, from their watery solutions, and is hence invaluable in analysis and pharmacy. It readiy dissolves the volatile and fixed oils, and most fatty matters, as well as sulphur and phosphorus in small quantities. By exposure to light and air it absorbs oxygen, and water and acetic acid are gradually formed. It is decomposed by exposure to a high temperature. Its evaporation occasions intense cold. "The greatest degree of cold yet produced (= —166° Fahr.) has resulted from the admixture of ether with solid carbonic acid." (Drs. A. S .Taylor and G. O. Rees.)

Tests. Ether may be recognised by its volatility, odour, taste, sparing solubility in water, admixture with alcohol in all proportions, great inflammability (burning with a yellowish white flame), and its power of dissolving fats and resins. Its further identification can only be effected by ultimate analysis.

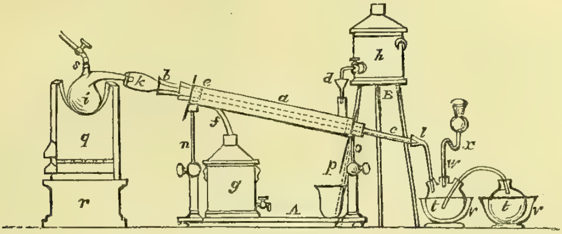
Pur. The ether of the shops, generally, contains alcohol, water, or acetic acid, and sometimes all of them. Its usual specific gravity fluctuates between 0·733 and 0·765. The London College states that it should be ·750, while the Edinburgh College fixes it at ·735 or under. "It totally vaporizes in the air, and slightly reddens litmus." (P. L. 1836.) "Its specific gravity does not exceed ·750. Exposed to the air it volatilizes. It turns litmus paper red; sometimes very slightly, or even not at all. ½ *fl. oz.* mixes completely with ½ pint of water." (Ph. L. 1851.) Pure ether should, however, be *neutral* to test paper. "When shaken in a minim measure with half its volume of *concentrated* solution of *chloride of calcium*, its volume is not lessened." (Ph. E.) *Ten fluid ounces of water* should only dissolve 1 *fluid ounce of ether*, and remain transparent.

Uses, &c. Ether is powerfully stimulant, narcotic, and antispasmodic, and externally refrigerant, if allowed to evaporate, or stimulant and counter-irritant, if its evaporation is prevented, and is used in various diseases. Applied to the forehead by means of the fingers or a strip of linen, it generally relieves simple cases of nervous headache. In *pharmacy* it is largely employed in the preparation of tinctures, alkaloids, spirits, &c.; and in *chemistry* is invaluable in *organic analyses*. It is also employed as a solvent of resins, Indian rubber, &c., in the preparation of varnishes, and for several other useful purposes. *Dose.* 20 drops to 2 fl. dr.; in water or wine. It has been successfully administered by Mr. Borlaise Childs, and others, as a powerful, diffusible stimulant, in cholera and diarrhœa. Excessive doses of ether produce intoxication resembling that from alcohol, and require similar antidotes. It is commonly taken as a stimulant by *fashionable ladies*, and though generally disguised by Cologne water, may be often distinguished in the breath of persons belonging to the higher ranks.

Pres. Ether rapidly evaporates at common temperatures when kept in *corked* bottles, and even in bottles secured with ground-glass stoppers and tightly tied over with bladder and leather; it also becomes sour by age. To prevent this waste, the stoppers should fit very accurately, and the bottles should be placed in as cool a situation as possible. Bottles furnished with *ground-glass caps*, as well as stoppers, are frequently employed (See *Engr.*) Dewar's ether phial is formed on a similar principle. We have seen bottles of ether accurately stoppered, tied over with bladder, and thickly coated with wax, which have yet become *quite empty* by a voyage to the tropics, though they still appeared to be as firmly secured as when they were first filled.



Obs. The mixture of alcohol with oil of vitriol requires some caution. It is best done by introducing the alcohol into a suitable vessel, and imparting to it a rapid whirling motion, by which a considerable conical cavity is formed in the centre, and into which the acid may be gradually poured with perfect safety. The mixed fluids should be brought to a state of rapid ebullition, as quickly as possible, as without this precaution much of the alcohol distils over before the liquor acquires the proper temperature for etherification. On the small scale, a *tubulated retort*, connected with a *Liebig's condensing tube*, and *two globular receivers* surrounded with a *freezing mixture*, or *ice-cold water*, may be employed as the distillatory apparatus. The second receiver should be connected with the first one by means of a bent glass tube, reaching nearly to the bottom of the former; and the whole of the joints should be securely luted, as soon as the expanded air has been allowed to escape. We have employed the following convenient little apparatus for the preparation of small quantities of ether, and it will be found very suitable for the distillation of most other highly volatile liquids, and particularly for boiling mixtures of alcohol and organic acids, described below.



a, Condenser tube.

b, *c*, Glass tube.

d, Funnel by which cold water runs in from the water bottle, *h*.

e, Pipe by which water escapes through *f* into the bottle *g*.

i, Retort.

k, Adopter, connecting the retort with the condenser.

l, Adopter, connecting the condenser with the bottles *t*, *t*.

A, Wooden tressel, with moveable arms, *n*, *o*, for supporting and adjusting the heights of the condenser.

B, Wooden stool for supporting the water bottle.

q, Furnace.

r, Support for the furnace.

p, Gutter for carrying off water that overflows the funnel *d*, and preventing its escape along the pipe *c*.

s, Leg of syphon connected with bottle containing alcohol.

t, *t*, Glass globes, placed in the basins *v*, *v*, and surrounded with *pounded ice* or *ice-cold* water.

w, Safety tube, containing a little mercury at *x*.

By connecting the neck of a flask or digester containing volatile fluids with the *lower* instead of the *upper* end of the refrigerator, ebullition may be carried on without loss, as the vapour will be condensed, and run back into the vessel from which it has distilled.

For the *rectification* of ether, a water-bath is employed along with the above simple refrigerator, and the receivers surrounded by ice or a freezing mixture.

Ether has been regarded by different authorities as a *dihydrate of olefiant gas;* a *hydrate of etherine;* and as an *oxide of ethyle* or *ethereum.* These opinions do not, however, so greatly differ as their advocates have represented; and if, as suggested by Kane and Malaguti, *acetyle* is taken as the hypothetical radical of the series, the similarity is very evident. According to Liebig, ether is the *oxide* of "*ethyle*," or "*ethule;*" and alcohol is the *hydrate* of this oxide. On the admixture of *sulphuric acid* and *alcohol*, a *hydrated bisulphate of ether* (oxide of ethyle) is formed, and this is subsequently decomposed by heat into *ether*, *water*, and *sulphuric acid.* "If we consider each particle of the *hydrated bisulphate of oxide of ethyle*, as composed of *ether* (oxide of ethyle), *anhydrous sulphuric acid*, and *water*, it is clear that the *anhydrous acid*, at the moment of its separation from the ether, must seize on all water, free or combined, in the vicinity of the ether. Thus, at the moment the ether becomes free, the anhydrous acid, also set free, prevents it from uniting with water to form alcohol. But when the gaseous ether passes through the undecomposed hydrated bisulphate of oxide of ethyle, a certain portion of the water of that compound must evaporate in the dry gas; and under these circumstances the ether and water do not combine together. The surface of the effervescing liquid has the temperature at which the hydrated bisulphate of oxide of ethyle is decomposed; but at this temperature (284°), the water of that compound is gaseous. There are thus produced simultaneously,—*water*, in the gaseous form, and *ether*, also gaseous, by decomposition; which, as both are in the nascent state, unite to form *alcohol.* Thus, the alcohol, always observed to distil over with the ether, is derived from the *surface;* and the ether and water which distil over, proceed from the decomposition in the *interior* of the liquid. This explains why no ether is obtained, when the liquid is not in a state of *brisk ebullition*, no matter how *high* the temperature may be; it explains further why more alcohol is obtained when a current of dry air passes through the liquid; as, in that case, the same decomposition goes on in the interior of the liquid as generally occurs at the surface." (Liebig.)

The *compound ethers* (acetic ether, hydrochloric ether, &c.) are now generally regarded as formed by the union of *ethyle* with *chlorine*, *iodine*, *bromine*, *&c.*, and of its *oxide* (oxide of ethyle, ether); with the *oxygen acids.* In these ethers, ethyle and its oxide act as salt-basyles, and give rise to compounds, resembling in constitution the haloid salts and the salts of the basic metallic oxides.

According to theory, 2 equivalents, or 46 parts of *absolute alcohol*, should produce 1 eq., or 37 parts of *pure ether;* but in practice, the greatest product obtained by operating according to Boullay's method, which produces more ether than any other, does not exceed 33½ parts for the preceding quantity of alcohol, or 71·5%. (Geiger.) A mixture of 9 parts of *oil of vitriol*, and 5 parts of *alcohol* of 90%, ceases to produce *ether*, after 31 parts of such alcohol have been added. Sulphuric acid containing more than 4½ atoms of *water* to 1 atom of *dry acid*, is too weak for the etherification of alcohol, and 3½ to 4 atoms of water appears to be the limit of dilution, fixed by experience, for the productive preparation of ether. (Liebig.)

The *most economical method of etherification* is that known as the *continuous ether process*, or the *process of Boullay.* When this is adopted, the retort or flask should be fitted with a sound cork perforated by an aperture to receive a thermometer, and the application of the *heat*, and the *flow of alcohol*, should be so managed, that a temperature of 300° Fahr. and a state of *rapid* and *violent ebullition* (points of essential importance) are maintained.

Caution. The vapour of ether is very inflammable, and when mixed with atmospheric air, it forms a violently explosive mixture. The density of this vapour is 2·586, that of air being 1 (Gay Lussac); hence it rapidly sinks, and frequently accumulates in the lower parts of buildings, especially cellars which are badly ventilated, in the same way as water does. The only remedy is *thorough ventilation.* Many serious acidents have arisen from this cause, for no sooner is a light carried into an apartment where such vapour is present, than an explosion takes place. A late extensive fire in the city arose from a small bottle of ether being broken in the operation of packing. Dr. Reid, at his lectures, particularly calls attention to this point; and Dr. Pereira mentions the case of an apothecary at Berne, whose house was blown up in consequence of a lighted candle being taken into the cellar, in which a bottle of ether had been broken. See *Ethyle*, and *below.*

ETHER (Acetic). Syn. *Acetate of Ether*, *Acetate of Oxide of Ethyle; Æther Aceticus,*—Lat. *Pyroligneous Ether*, *Acetic Naphtha*, *Naphtha Aceti,*—Obs. A compound of acetic acid and ether, discovered by the Count de Lauraguais in 1759.

Prep. 1. (Fownes.) *Acetate of potassa*, 3 parts; (or an equiv. quant. of *acetate of soda*;) *alcohol* (85%), 3 parts; *oil of vitriol* (strongest), 2 parts; are mixed together and distilled by the heat of a sand bath, from a glass or earthenware retort into a well-cooled receiver; the distillate is agitated with a *little water* to remove undecomposed alcohol, and then digested *first* with a little chalk, to remove acidity, and afterwards with *fused chloride of calcium*, to absorb water; it is, lastly, rectified by a gentle heat.

2. (Liebig.) *Acetate of soda* (cryst), 10 parts, *oil of vitriol*, 15 parts; *alcohol* (85%), 6 parts; are distilled as before, and rectified along with *chloride of calcium*, to absorb the water, and fresh slaked lime to remove free acid.

3. (Liebig.) *Acetate of lead* (dry), 32 parts; *oil of vitriol*, 12 parts; *alcohol*, 9 parts; as the last.

4. (P. Cod. 1839.) *Rectified spirit* (sp. gr. 0·84), 50 parts; *acetic acid* (sp. gr. 1·075), 33 parts; are mixed together, and *oil of vitriol* (strongest), 10 parts, added; the distillation is continued until 65 parts have passed over, and the distillate, after digestion for some hours on a little dry *carbonate of potassa*, is rectified as before, the first 50 parts only being kept for use.

5. (Ph. Bor.) *Acetate of soda* (cryst), 20 oz. (or, *dried*, 12 oz.); *alcohol* (0·810 to 0·813) and *oil of vitriol*, of each, 14 oz.; are distilled until 12 oz. have passed over; the distillate is agitated with a *solution of acetate of potassa* (contg. 34% of the salt), and after being decanted, is lastly rectified from 1 dr. of calcined magnesia.

6. (Ure.) *Acetate of lead*, 40 parts; *concentrated sulphuric acid* (oil of vitriol), 23 parts; *alcohol*, 20 parts; as before; the distilled liquor is agitated with a *weak lye of potassa*, and the supernatant ether decanted and rectified along with *magnesia* and *powdered charcoal.*

7. (Ure.) *Acetate of lead* (dried, or anhydrous), 32 parts; *oil of vitriol*, 10 parts; *absolute alcohol* (or its equiv. in *alcohol* of 80% or 85%), 9 parts; as before.

Prop., &c. Acetic ether is colourless, and bears a considerable resemblance to ordinary ether (*sulphuric ether*), but it has a much more agreeable and refreshing odour. It boils at 165° (Liebig; 166°,—Ure); has a sp. gr. of 0·89 at 60° Fahr. (Liebig; 0·866 at 45° Fahr.,—Ure); dissolves in 7 parts of water (Liebig; 8 parts,—Ure); and mixes in all proportions with alcohol and ether. It is decomposed by alkalis and the strong acids.

Acetic ether is diaphoretic, stimulant, antispasmodic, and narcotic. *Dose.* ½ to 2 fl. dr.; in similar cases to those in which sulphuric ether is employed, and especially in nervous and putrid fevers, spasmodic vomitings, and diseases of the bowels and stomach, arising from debility, and not of an inflammatory character. Its *principal consumption* is in the manufacture of British brandy. The product of the last rectification is equal in weight to that of the alcohol employed. (Liebig.)

ETHER (Acetic,—Chlorinetted). A dense oily liquid formed by the action of *gaseous chlorine* on *pure acetic ether.*

ETHER (Benzoic). Syn. *Benzoate of Ether, B. of Oxide of Ethyle; Æther Benzoicus,*—Lat. *Prep.* (Liebig.) *Alcohol* (sp. gr. 0·830), 4 parts; *benzoic acid* (cryst), 2 parts; *concentrated hydrochloric acid,* 1 part; are distilled together; as soon as the product turns milky when mixed with water, the receiver is changed, and the liquid that distils over collected; to this liquid, *water* is added, and the *supernatant ether* is decanted, and boiled with *water* and a little *oxide of lead* (to separate benzoic acid); it is, lastly, freed from water by allowing it to stand over *chloride of calcium.*

Prop., &c. A colourless oily liquid, slightly heavier than water, and possessing an aromatic odour and taste. It boils at 410° Fahr., and is miscible with alcohol and ether.

ETHER (Bichloric). A name given to chloroform by Soubeiran from a misconception of its composition.

ETHER (Boracic). Syn. *Borate of Oxide of Ethyle; Æther Boracicus,*—Lat. A thin, limpid, ethereal liquid, obtained by M. Ellermann by the action of *chloride of boron* on *absolute alcohol.* It is decomposed by water; its alcoholic solution burns with a green flame, at the same time evolving dense fumes of boracic acid. Sp. gr. 0·885; boiling point, 246° Fahr.

Obs. By substituting rectified spirit for alcohol, other compounds containing a larger portion of boracic acid are obtained. By acting on *anhydrous alcohol* with *fused boracic acid,* a *boracic ether* is formed, which is a solid, glassy, fusible substance, only volatile in an atmosphere of alcoholic vapour.

ETHER (Butyric). Syn. *Pine-apple Oil, Butyrate of Oxide of Ethyle; Æther Butyricus,*—Lat. *Prep.* 1. By passing *hydrochloric acid gas* into an *alcoholic solution of butyric acid,* and purifying the product from free acid.

2. (Commercial.) From *crude butyric acid* saponified with *caustic potassa* or *baryta,* and the resulting soap distilled along with *alcohol* and *oil of vitriol.*

Uses. Crude butyric ether forms the "*pine-apple oil*" of commerce, and when largely diluted with rectified spirit, the *pine-apple essence* so much employed as a flavouring substance by confectioners, liqueuristes, &c. It imparts a delicious flavour to sweetmeats, rum, arrack, punch, &c. The Germans add it to common rum, to form the flavouring for their "*pine-apple ale.*" See *Essences* and *Oils* (Volatile.)

ETHER (Camphoric). Syn. *Camphorate of Ether, C. of Oxide of Ethyle; Æther Camphoricus,*—Lat. *Prep.* By heating *camphoric acid, sulphuric acid,* and *alcohol* together, a colourless, syrupy liquid is formed, which is submitted to distillation, and the product dissolved in *alcohol;* as soon as the liquid ceases to deposit *crystals* (camphoric acid), *water* is added, when the ether separates under the form of an oily liquid, and is collected. It is heavier than water, and boils at 545° Fahr.

ETHER (of Cantharides). Syn. *Æther Cantharidalis,*—Lat. *Prep.* (Œttinger.) From *powdered cantharides,* 1 part; *ether,* 2 parts; digested together for 3 or 4 days, and the tincture expressed. *Used* as a vesicant, &c.

ETHER (Carbonic). Syn. *Carbonate of Ether, C. of Oxide of Ethyle; Æther Carbonicus,*—Lat. An ethereal liquid discovered by Ettling.

Prep. (Liebig.) *Fragments of potassium* are added to *oxalic ether,* gently warmed, as long as bubbles of gas are formed; the excess of metal is removed from the semi-solid mass, some water added, and the whole distilled. The *carbonic ether* floats on the surface of the liquid in the receiver, and is collected, dried by contact with *chloride of calcium,* and rectified along with some *potassium* or *sodium,* till it ceases to yield acetate of potassa when acted on by *caustic potassa.*

Prop., &c. Colourless, limpid, and aromatic; tastes pungent and burning; boils at 259° to 260° Fahr. It greatly resembles oxalic ether. It is decomposed by alkalies.

ETHER (Chlorhydric). See *Hydrochloric Ether.*

ETHER (Chloric). This name was applied by Dr. T. Thomson to the *chloride of* *olefiant gas*, or *Dutch liquid;* and afterwards, by Guthrie and Silliman, to *chloroform*, which they took for an *alcoholic solution of chloride of olefiant gas.* It now forms one of the synonyms of chloroform. The *medicinal chloric ether* of the shops, is a solution of *chloroform*, 1 part, in *rectified spirit*, 8 parts; of which the *dose* is 20 or 30 drops, in water, as an antispasmodic and anodyne. See *Terchloride of Formyle.*

ETHER (Chlorinetted). Formed by the action of *dry chlorine* on *pure ether.* When the action is long continued, a heavy oily product (*bichlorinetted ether*), smelling like fennel, is formed. By the still further action of *chlorine*, aided by sunlight, a white crystalline substance (*pentachlorinetted ether*), a compound resembling sesquichloride of carbon, is obtained.

ETHER (Chloro-carbonic). Syn. *Æther Chloro-carbonicus*,—Lat. Dumas has given this name to a peculiar liquid formed by saturating *absolute alcohol* with *chloro-carbonic acid* (phosgene gas.) The lower stratum that forms is the ether. It is purified by standing over *oxide of lead* and *chloride of calcium*, and by subsequent rectification. It has a disagreeable smell; boils at 200° Fahr.; burns with a green flame, and is decomposed by water. Sp. gr. 1·133.

ETHER (Cupreous). Syn. *Tinctura Cupri Chloridi Ætherea*, — Lat. *Prep.* (Van Mons.) *Sulphate of copper*, 6 parts; and *chloride of barium*, 5 parts; are triturated together, and the mixture digested in *ether*, 3 or 4 parts, until all the *chloride of copper* is dissolved. *Dose.* 2 to 5 drops; in epilepsy, &c.

ETHER (Cyanic). Syn. *Cyanate of Oxide of Ethyle; Æther Cyanicus*,—Lat. *Prep.* By distilling a dry mixture of *cyanate of potassa* and *sulphovinate of potassa*, in nearly equivalent proportions. A mixture of *cyanic* and *cyanuric ethers* passes over into the receiver. By distilling this mixture the two are readily separated; that which passes over by the heat of a water bath, being the *first;* and the residuum in the retort, the *second.*

Prop., &c. An ethereal, very mobile liquid, boiling at 140° Fahr.

ETHER (Cyanuric). Syn. *Cyanurate of Oxide of Ethyle; Æther Cyanuricus*,—Lat. *Bicyanuric Ether? Prep.* 1. See *Cyanic ether.*

2. By distilling a mixture of *sulphovinate of potassa* and *cyanurate of potassa*, as above, by the heat of a sand-bath.

3. (Wöhler and Liebig.) A mixture of *alcohol* and *ether* is saturated with *hydrated cyanic acid*, in vapour; in 24 hours the crystals are collected and purified by solution and crystallization in *hot alcohol* or *boiling water.*

Prop., &c. Tasteless, inodorous, colourless, transparent needles, and prisms; fusing at 185° Fahr.

ETHER (Formic). Syn. *Formiate of Ether, F. of Oxide of Ethyle; Æther Formicus*,—Lat. *Prep.* (Liebig.) *Dry formiate of soda*, 7 parts; *oil of vitriol*, 10 parts; *alcohol* of 90%, 6 parts; mix in a retort connected with a well-cooled receiver. The greater part will distil over by the heat spontaneously developed, after which the heat of a water bath may be applied. Purify by agitation, first with milk of lime, and afterwards with chloride of calcium. It is limpid, smells aromatic, is lighter than water, soluble in 10 parts of that fluid, and boils at 130° Fahr. Sp. gr., 0·915.

ETHER (Hydriodic). Syn. *Hydriodate of Ether, Iodide of Ethyle; Æther Hydriodicus*,—Lat. *Prep.* 1. *Phosphorus*, 1 part; *alcohol*, 5 parts; and *iodine*, 10 parts; are *gradually* and *cautiously* mixed together and distilled.

2. (Gay-Lussac.) By submitting a saturated *alcoholic solution of hydriodic acid* to distillation.

Prop., &c. A colourless liquid, possessing a strong ethereal odour, and boiling at 158° Fahr.; sp. gr. 1·92. It is reddened and decomposed by exposure to air and light. M. le Dr. Huette, in 1849, proposed the use of this compound in all cases where it was desirable to rapidly saturate the system with iodine, and especially in those in which we wish to carry this agent directly into the lungs. He administers it by putting 7 or 8 drops of *the ether*, with a spoonful of *water*, into a "*trial jar*" with a wide mouth. The patient respires the air contained in the upper part of the glass, whilst he holds the bottom part of it in the hand to promote the volatilization of the ether. The whole of the ether is generally absorbed in ten minutes, and in a quarter-of-an-hour, and for some time after, it is found in the breath, urine, &c. M. le Dr. Coffin and Dr. James Turnbull, have also used it with advantage. These authorities recommend it as a warm stimulant, a good anæsthetic, and an excellent remedy in scrofula, as well as in pulmonary consumption, and in cases of tubercle in other parts of the body. Dr. Turnbull declares it to be superior, in all cases, even to *iodide of methyle* as an inhalation in phthisis, dropsy of the heart, &c. It should, however, be avoided in cases in which the use of iodine is contra-indicated.

ETHER (Hydrobromic). *Bromuretted Ether, Bromide of Ethyle, Æther Hydrobromicus,*—Lat. A volatile ethereal liquid discovered by Serullas.

Prep. 1. *Bromine,* 8 parts; *alcohol,* 32 parts; dissolve, place the mixture in a retort, add of *phosphorus,* 1 part; and distil by a gentle heat as soon as the liquid becomes cold. The ether is separated from the distillate by the addition of water.

Prop., &c. A very volatile liquid with a penetrating taste and smell; boiling at 107° Fahr.; and heavier than water. Its *medicinal properties,* for the most part, resemble those of hydriodic ether, than which it is more pleasant to the taste, but at the same time much more costly. (Dr. James Turnbull.)

ETHER (Hydrochloric). Syn. *Hydrochlorate of Ether, Chlorhydic Ether, Light Hydrochloric do., Chloride of Ethyle; Æther Hydrochloricus,*—Lat. *Muriatic Ether, Light do. do., Marine Ether, Naphtha Marina, Æther Muriaticus, &c. Obs.* A highly volatile compound, formed of ethyle and chlorine.

Prep. 1. *Rectified spirit of wine* is saturated with *dry hydrochloric acid gas,* in the cold, and the product is distilled in a retort connected with a Woolfe's apparatus, the first bottle of which should be two-thirds filled with tepid water (70° to 75° Fahr.), and the remainder surrounded with a *mixture of ice and salt.* To render it perfectly anhydrous it must be digested on a few fragments of *fused chloride of calcium.*

2. (Thénard.) From a mixture of *concentrated hydrochloric acid* and *absolute alcohol,* equal volumes; distilled as last.

3. A mixture of *oil of vitriol,* 3 parts; and *alcohol,* 2 parts; is poured upon *common salt* (dried), 4 parts; and the whole distilled as before.

Prop., &c. This ether has a sweetish taste; is soluble in about 15 parts of water, and miscible in all proportions with alcohol; boils at 51° Fahr.; burns with a flame edged with green; is neutral to test paper; and does not affect a solution of nitrate of silver. Sp. gr. 0·921, at 32°, and 0·874 at 40° Fahr. *Dose.* 10 to 30 drops, as an antispasmodic and a powerful diffusible stimulant. Owing to its extreme volatility it can only be taken dissolved in spirit. Of the above, the *first* is the most convenient process.

ETHER (Hydrochloric,—Heavy). Syn. *Heavy Muriatic Ether; Æther Muriaticus Ponderosus,*—Lat. A name given by Scheele to a heavy ethereal liquid obtained by distilling a mixture of *oil of vitriol, peroxide of manganese, chloride of sodium,* and *alcohol.*

2. (Liebig). *Alcohol,* of 80 to 85%, is saturated, in the cold, with *chlorine gas, water* is next added, and the oily fluid that separates, collected and washed with *water,* as long as any of it is dissolved.

Prop., &c. Heavy muriatic ether is a volatile, oily, colourless liquid, boiling at about 245° Fahr. and heavier than water. Its precise constitution is undetermined. This ether enters into the composition of the *spiritus muriatico-ethereus,* a remedy occasionally used on the Continent.

ETHER (Hydrocyanic). Syn. *Cyanide of Ethyle, Cyanetted Ether; Æther Hydrocyanicus,*—Lat. *Prep.* (Magendie.) *Cyanide of potassium* and *sulphovinate of baryta,* equal parts, are mixed and distilled in a glass retort by a moderate heat. The product separates into two strata; the lighter one is *impure hydrocyanic ether*; this is decanted and agitated with 4 or 5 times its bulk of *water* at 120° to 140° Fahr., and the operation is repeated with about 2 parts of water; the ether is again decanted, and placed in contact with *chloride of calcium* for 24 hours, and then rectified.

Prop., &c. It boils at 190½° Fahr. Sp. gr. 0·788. In its therapeutical effects it resembles hydrocyanic acid, but is less active. Its odour is, however, more penetrating and offensive. *Dose.* 2 to 6 drops, in mucilage or emulsion; in obstinate or convulsive coughs, gastrodynia, hysterical affections, &c.

ETHER (Hydrotelluric). Syn. *Telluride of Ethyle; Æther Hydrotelluricus,*—Lat. *Prep.* (Wöhler.) By distilling the mixed *aqueous solutions* of *sulphovinate of baryta* and *telluret of sodium.* The latter (telluret *or* telluride of sodium) is prepared by calcining *tellurium* or *telluret of bismuth* with *carbonate of soda* and *charcoal,* and must be used as soon as made.

Prop., &c. Hydrotelluric ether has a yellowish red colour, like bromine, and is heavier than water.

ETHER (Hyponitrous). See *Nitrous Ether.*

ETHER (Iodhydric). See *Hydriodric Ether.*

ETHER (Ioduretted). See *Tinctures* (Ethereal).

ETHER (Margaric). Syn. *Margarate of Oxide of Ethyle; Æther Margaricus,*—Lat. *Prep.* By passing *dry hydrochloric acid gas* into an *alcoholic solution of marga-*

ric acid, as for *butyric ether.* By cautious evaporation it forms brilliant, colourless crystals, which when pure, melt at 72° Fahr., and may be distilled without decomposition.

ETHER (Methylic). Syn. *Oxide of Methyle, Wood Ether, Methyl-ether; Æther Methylicus,*—Lat. *Prep.* From *wood spirit,* 1 part; *concentrated sulphuric acid,* 4 parts; mix in a retort, apply heat, pass the evolved gas (*methylic ether*) through a little *strong solution of potassa,* and then collect it over mercury. See *Oxide of Methyle.*

ETHER (Muriatic). See *Hydrochloric Ether.*

ETHER (Nitric). Syn. *Nitrate of Oxide of Ethyle; Æther Nitricus,*—Lat. A compound of ethyle and nitric acid only recently obtained by means of the peculiar action which urea exerts on the acid.

Prep. (M. Millon.) *Nitric Acid* (sp. gr. about 1·375), 50 parts; *nitrate of urea,* a little (say 2 or 3 parts); dissolve, add *alcohol,* 50 parts; and distil with the usual precautions, until 7-8ths of the whole (of the liquid portion) have passed over; agitate the distillate with a *little water* to separate the ether, and preserve the heavier portion.

Prop., &c. Nitric ether possesses an agreeable sweetish taste and odour; it is insoluble in water; the alcoholic (but not the aqueous) solution of potassa decomposes it rapidly; sp. gr., 1·112. Its vapour is very apt to explode when strongly heated, and, therefore, a small quantity only should be prepared at a time.

ETHER (Nitrous). Syn. *Hyponitrous Ether, Nitrite of Ether, Nitrite of Oxide of Ethyle, Hyponitrite of do.; Æther Nitrosus, Æ. Hyponitrosus,*—Lat. This compound, of which "*sweet spirit of nitre*" is an impure alcoholic solution, was first mentioned by Kunckel in 1681. Chemists differ in opinion as to its precise composition; some of them regarding it as *nitrite of oxide of ethyle,* and others, as the *hyponitrite* of that base. The analysis of Dumas and Boullay appears to establish the latter opinion, according to which its most correct name is *hyponitrous ether.*

Prep. 1. (Liebig.) *Starch* (potato farina), 1 part; *nitric acid* (sp. gr. 1·30), 10 parts; mix in a capacious retort, connected with a wide tube 2 or 3 feet long, bent at right angles, and terminating near the bottom of a two-necked bottle, containing a *mixture* of *alcohol* (of 85%), 2 parts; and *water,* 1 part; and surrounded with a freezing mixture, pounded ice, or very cold water; the other neck of the bottle being connected by a long glass tube with a good refrigerator or condenser. All elevation of temperature must be avoided. The heat of a water bath only must be *cautiously* applied to the retort. Pure *hyponitrous acid* will be thus set free, and passing into the *alcohol* will cause the *hyponitrite of oxide of ethyle* to distil in a gentle stream. The tube connecting the retort and bottle must be cooled by means of *rag* or *moist paper,* kept wetted with *ice-cold* water; as if the temperature of the tube and the alcohol rises only a little, the latter becomes spontaneously hot, and boils violently, by which the product is vitiated. This process is very *productive* and *economical,* and yields *absolutely pure hyponitrous ether.*

2. (M. Pedroni.) A mixture of *oil of vitriol,* 8 parts; and *alcohol,* 9 parts; is poured upon *crystallized nitrate of ammonia,* 11 parts, contained in any suitable distillatory vessel connected with a well-cooled receiver. Hyponitrous ether *gradually* distils over on the application of a gentle heat. An admirable process, but more expensive than the preceding. Even a common fire may be employed without danger, as the liberation of the ether proceeds gradually, and not almost instantaneously, as in operating in the usual way. Sulphate of ammonia is left in the retort. The product is scarcely inferior to that of the last formula.

3. (Ph. E.) *Rectified spirit,* 46 fl. oz.; *pure nitric acid* (sp. gr. 1·500), 7 fl. oz.; put 15 fl. oz. of the spirit, with a little clean sand, into a quart matrass, fitted with a cork, and a safety tube reaching to within an inch of the spirit, and a second tube leading to a refrigeratory. Fill the safety tube with pure nitric acid, then add through it, gradually and cautiously, 3½ fl. oz. of the acid. When the violent action that ensues is nearly over, gradually add the remaining portion of the acid, ½ fl. oz. at a time, and at intervals. Agitate the ether that distils over, *first* with a little *milk of lime,* till it ceases to redden litmus paper, and *then* with half its volume of *concentrated solution of chloride of calcium.* "The pure hyponitrous ether thus obtained should have a density of 0·899."

4. (Ph. D. 1826.) A mixture of *sulphuric acid,* 1 ℔; and *rectified spirit of wine,* 19 fl. oz. is poured very gradually on *nitre* (dried and powdered), 1½ ℔, placed in a tubulated retort, and connected with a well-cooled receiver, by means of a tube and bottle, containing *rectified spirit,* 1 ℔., (to wash the ether in its passage to

the receiver,) adopting the usual precautions; the product is shaken with about 1 dr. of *dried* and *finely powdered carbonate of potassa*, and the ether is decanted after a time. The last two contain aldehyde and alcohol.

5. (Turner.) *Alcohol*, of 85%, 9 parts; *water*, 4 parts; strong *fuming nitric acid*, 8 parts; introduce the *spirit* into a strong cylindrical glass vessel, 3 times as high as wide, capable of holding $\frac{1}{5}$th more than the liquid to be placed in it, by means of a funnel tube reaching to the bottom, and having a small orifice; add the *water*, cautiously, so that it may form a stratum beneath the alcohol, without mixing with it; in like manner add the *acid*, taking great care that the three strata do not mix; stop up the vessel, and allow it to repose at a temperature under 53° Fahr., for 2 or 3 days, when the *stratum of ether* which has formed must be collected and purified by rectification, &c., as before.

6. *Rectified spirit*, 3 parts; *nitric acid* (sp. gr. 1·28), 2 parts; mix and distil with the usual precautions, withdrawing the heat as soon as the liquid boils. Contains both aldehyde and alcohol.

Prop., *&c.* Pure nitrous or hyponitrous ether has a pale yellow colour, a mixed odour of apples and Hungary wines, and boils at 62° Fahr.; sp. gr. 0·947, at 60° Fahr. *Commercial nitric ether* contains aldehyde, boils at 70° Fahr., has a more or less suffocating odour combined with that of the pure ether, has a sp. gr. of 0·886 at 40° Fahr., and turns brown when mixed with alcoholic solution of potassa, while the latter remains unaltered. It also acidifies by age, whilst *pure* hyponitrous ether remains neutral. They are both very inflammable, and burn with a white flame. Ordinary hyponitrous ether dissolves in about 48 parts of water, and mixes in all proportions with alcohol and sulphuric ether. (Liebig.)

Hyponitrous ether is refrigerant, diaphoretic, and diuretic, but is seldom employed alone, though, when largely diluted with alcohol, (*sweet spirits of nitre*, *spirit of nitric ether*,) it is a common remedy in several diseases. It is also used to flavour malt spirit, in imitation of brandy (*British brandy*), although for this purpose it is vastly inferior to acetic ether. See *Spirits* (Medicinal).

ETHER (Œnanthic) Syn. *Œnanthate of Oxide of Ethyle.* This is the oil obtained towards the end of the distillation of fermented liquors, especially wines. It is purified by agitation with a weak solution of *carbonate of potassa*, repose, and decantation. It is colourless; lighter than water; boils at about 480° Fahr.; and has a powerful intoxicating vinous odour; resembling that of an empty wine cask or bottle that has been exposed to the air for some time. It is very sparingly soluble in water; freely soluble in alcohol; sp. gr. 0·862. As obtained by distillation it is united with a little *œnanthic acid.* 2200 imperial gallons of wine (about 35 hogsheads) only yielded 2$\frac{1}{5}$ *lb.* of the mixed oil. (Liebig and Pelouze.)

ETHER (Oxalic). Syn. *Oxalate of Ether*, *O. of Oxide of Ethyle*, *Neutral do. do.*; *Æther Oxalicus*,—Lat. *Prep.* 1. *Alcohol* and *dehydrated oxalic acid*, equal parts; are digested together in a glass flask furnished with a very long glass tube of small bore, so that the spirit volatilized by the heat, may be condensed, and flow back into the flask. After 6 or 8 hours the process is generally complete, and the liquid contains merely a trace of free acid, from which it may be separated. See *Ethers* (Organic), and *below*.

2. (Ettling.) A mixture of *binoxalate of potassa* and *alcohol* of 90%, of each, 4 parts; and *oil of vitriol*, 5 parts; are mixed in a glass retort and distilled with a quick fire nearly to dryness; as soon as the product becomes turbid when mixed with water, the receiver is changed, and the distillate collected; the latter is then agitated with 4 or 5 times its weight of *water*, and the agitation is repeated with fresh water until the ether becomes neutral to test paper; it is then rectified in a dry retort that it will about $\frac{9}{10}$ths fill, and as soon as the boiling proceeds smoothly, instead of by jerks, the receiver is changed; the remaining product is *pure anhydrous oxalic ether.*

Prop., *&c.* A colourless oily liquid, slightly heavier than water, boiling at 365° Fahr., only slightly soluble in water, and having an aromatic smell. Alkalies decompose it. Sp. gr. 1·09.

ETHER (Oxamic). See *Oxamethane.*

ETHER (Oxygen). See *Acetal.*

ETHER (Perchloric). Syn. *Perchlorate of Oxide of Ethyle*; *Æther Perchloricus*,—Lat. *Prep.* (Hare and Boye.) *Sulphovinate of baryta* and *perchlorate of baryta*, in equivalent proportions, are carefully triturated together, and the powder placed in a retort connected with a receiver surrounded with ice; heat is then applied by means of an *oil-bath*, and gradually raised from 300° to 340° Fahr. To prevent an explosion the ether should be received into a little absolute alcohol; about twice the weight of the sulphovinate employed.

Prop., &c. It is heavier than water, and explodes by heat, friction, and percussion, and often *without any assignable cause.* Its explosive power appears to be fully equal to that of the *chloride* or *iodide of nitrogen;* but this property is destroyed by solution in alcohol, as above. The addition of an equal volume of water to the latter solution immediately separates the ether, which sinks to the bottom of the mixed liquids. We have reason for presuming that this is the explosive material which was used by the late Capt. Warner, and of which so much has been heard. An alcoholic solution of a *sufficient quantity* of this substance to *blow up a line-of-battle ship,* might *safely* be carried in the pocket; and this might at any time be exploded by the addition of a few drops of water, and the *slightest* friction or percussion. ⁂ Not more than 1 dr. to 1½ dr. of the sulphovinate should ever be distilled at a time, and even then the operator should be well protected with a mask and gloves.

ETHER (Phosphorated). See *Tinctures* (Ethereal).

ETHER (Phosphoric). Syn. *Phosphate of Oxide of Ethyle, Tribasic do. do.; Æther Phosphoricus,*—Lat. An aromatic, limpid liquid, obtained by heating *phosphovinate of lead* to a temperature ranging between 355° and 375° Fahr. It is lighter than water, and boils at 288·5° Fahr.

ETHER (Pyroacetic). See *Acetone.*

ETHER (Pyroxilic). See *Oxide of Methyle.*

ETHER (Silicic). Syn. *Silicate of Oxide of Ether; Æther Silicus,*—Lat. *Prep.* From *anhydrous alcohol* and *chloride of silicium,* as *boracic ether.* It is a colourless, aromatic, ethereal liquid, boiling at about 330° Fahr. Water resolves it into alcohol and silicic acid. By exposure to moist air, it is transformed into *hydrate of silica,* which is translucent, and hard enough to scratch glass.

ETHER (Sulphuric). This is now one of the common names, and was formerly the pharmacopœial name of ether (*oxide of ethyle*), already noticed. Recently, however, a *true* sulphuric ether (*sulphate of ether, sulphate of oxide of ethyle,*) has been obtained.

Prep. The *vapour* of *pure anhydrous sulphuric acid* is passed (with the usual precautions) into *perfectly anhydrous ether;* the resulting syrupy liquid is agitated with a *mixture* of 4 volumes of *water,* and 1 volume of *ether,* and after repose, the upper stratum, which is an ethereal solution of the *new sulphuric ether,* is decanted, and the oxide of ethyle (ether) volatilized by a very gentle heat. The colourless liquid forming the residuum is the true *sulphuric ether* or *sulphate of oxide ethyle* just referred to. It is a very unstable compound, and cannot be distilled without suffering decomposition.

ETHER (Sulphuric—Alcoholized). See *Spirits.*

ETHER (Sulphurous). Syn. *Sulphite of Ether, S. Oxide of Ethyle; Æther Sulphurosus,*—Lat. *Prep.* From *sub-chloride of sulphur,* by treating it with *anhydrous alcohol,* in excess; a limpid, fetid liquid distils over, which is the *ether.* It is slowly decomposed by water, and boils at about 338° Fahr. Sp. gr. 1·085.

ETHER (Valerianic). Syn. *Valerianate of Oxide of Ethyle; Æther Valerianicus,*—Lat. *Prep.* By passing *dry hydrochloric acid gas* into an *alcoholic solution of valerianic acid.* It is a fragrant volatile liquid, lighter than water, having a high boiling-point, and a rich fruity odour, said to closely resemble that of butyric ether or pine-apple oil. It is used to flavour liqueurs, &c.

ETHER (Washed). Syn. *Æther Lotus,*—Lat. *Ordinary ether,* agitated *first* with 2 or 3 times its volume of *distilled water,* and a few grains of *carbonate of potassa,* or a few drops of *milk of lime;* and after decantation, again agitated with a like quantity of *water* only. *Used* for inhalations. For other purposes the *washed ether* is afterwards digested on *chloride of calcium,* to deprive it of retained water.

ETHERS (Organic). The preparation of some of the *organic ethers* is attended with considerable difficulty, and hence the attention of chemists has been more particularly directed to the subject, and various methods have been proposed and adopted, with variable success. Until lately, the common plan pursued was the *admixture* of a *salt of the organic acid* with *alcohol,* to which some strong *inorganic acid* was added, when the acid of the salt being liberated in the nascent state, it entered into a new combination, forming ether. (*Acetic ether, oxalic ether, &c.*) Or the *organic acid* being *mixed* with *alcohol, sulphuric* or *hydrochloric acid* was added, the substitution being assisted by heat. (*Benzoic ether.*) Some of the *organic ethers* have also been formed by the *simple distillation* of the *organic acids* with *alcohol;* but this method, as hitherto managed, is tedious, and requires a considerable time for its performance. *More recently* it has been shown that when the *organic acids* are heated *nearly* to their *point of decomposition*, and *alcohol* is gradually and cautiously dropped on them, the ethers of those acids are readily formed. In this way many of the acids which are wholly or partly volatile—as the *oxalic*, *benzoic*, and *succinic acids*—yield large quantities of ether. (Gaultier de Claubry.) This method is applicable to most of the *organic acids* that do not suffer decomposition at a low temperature, but in other cases the product would be vitiated and uncertain. Thus, *citric acid* under this treatment might yield *citric*, *itaconic*, *citraconic*, or *aconitic ether*, or a mixture of two or more of them, and this is in a way entirely beyond the power of the operator to influence. *Another method*, highly recommended, and very suitable to the preparation of the ethers of the fatty acids, is—to *dissolve* the *organic acid* in *alcohol*, and to *pass a current of dry hydrochloric acid gas* through the solution. A *still simpler plan*, and one which appears likely to supersede most others, at least in the majority of cases, is to place a mixture of equal parts of *alcohol* and the *organic acid*, with $\frac{1}{8}$th to $\frac{1}{4}$th of *oil of vitriol*, in a *flask* or *digester*, fitted with a cork, through which passes an *upright thin glass tube*, 5 or 6 feet long, and after luting the the joint quite securely, and making the proper arrangements for its safety, to keep the liquid in a state of *gentle ebullition* in a sand-bath, or over a spirit lamp for several hours. In this way the spirituous and ethereal vapours are condensed in the cooler portions of the tube, and fall back again into the matrass, by which means no loss of either can possibly occur. A Liebig's refrigerator *reversed* may also be used for this purpose. In this way several of the organic ethers may be formed that can scarcely be obtained pure by the usual plan. Thus *mucic ether* may be obtained by this process, which will become perfectly white by crystallization, while by other methods, the first product is quite black, and is purified with difficulty. One or other of the above plans may be adopted for the *preparation* of *all those ethers* for which *formulæ* are *not inserted in this volume.*

ETHEREAL OIL. See *Oils.*

ETHEREO-SULPHURIC ACID. See *Sulphovinic Acid.*

ETHEREUM. See *Ethyle.*

ETHERIFICATION. The act or operation of etherifying or making ether. See *Ether.*

ETHERINE. Syn. *Camphor of Oil of Wine.* A volatile, white, crystalline substance, deposited by *light oil of wine* when left in a cold situation for some time. It is isomeric with *etherole*, and received its name from the assumption of its being the base of the ethereal compounds. According to this hypothesis, ether is a *hydrate of etherine. Etherine* forms brilliant prisms and plates; is tasteless; soluble in alcohol and ether; fuses at 230° Fahr.; and boils at 500° Fahr.; and is a little lighter than water. The crystals are purified by pressure between the folds of *bibulous paper*, solution in *ether*, and evaporation. The word *etherine* has also been loosely employed by some as a *new* name for *olefiant gas.*

ETHEROLE. The yellowish, oily liquid, forming the residual portion of *light oil of wine*, after it has deposited its *etherine.* It is lighter than water; is freely soluble in both alcohol and ether; and has a rather high boiling point. *Light oil of wine* is also called *etherole.* It is probable that the two are identical. See *Etherine* and *Oils.*

ETHEROXAMIDE. See *Oxamethane.*

ETHIONIC ACID. *Prep.* An *alcoholic solution* of the *crystals* of *sulphate of carbyle*, is diluted with *water*, the whole neutralized with *carbonate of baryta*, the filtered liquid evaporated by a very gentle heat to a small bulk, and a large quantity of *alcohol* added; the precipitate (*ethionate of baryta*) is treated (cautiously) with *dilute sulphuric acid* (avoiding excess), by which the baryta is withdrawn, and *hydrated ethionic acid* left in solution.

Prop., *&c.* Ethionic acid closely resembles sulphovinic acid. It is decomposed by heat. Its salts (*ethionates*), however, differ completely from the sulphovinates. They are all soluble in water, and are said to be anhydrous. The *ethionates of ammonia*, *potassa*, and *soda*, crystallize readily; those of *lead*, *baryta*, *lime*, and the other earths, are uncrystallizable. According to Brande it is also formed by the action of the vapour of *anhydrous sulphuric* on *alcohol.* See *Isethionic Acid.*

ETHIOPS. Syn. *Æthiops*,—Lat. A name given by the older chemists to several black powders, on account of their colour, and recently re-introduced into medicine by certain eccentric practitioners.

ETHIOPS (Absorbent). Syn. *Æthiops Absorbens*,—Lat. The *quicksilver with chalk* of modern pharmacy.

ETHIOPS (Animal). Syn. *Æthiops Animalis*,—Lat. The calcined bodies of various animals, as the *bat*, *hedgehog*, *mole*, *sparrow*, &c., reduced to powder.

ETHIOPS (Antimonial). Syn. *Æthiops Antimonialis,*—Lat. This has been already noticed at page 73. The following are additional formulæ:—

Prep. 1. (James's Dispensatory, 1764.) *Black antimony* and *sea salt*, equal parts, fused together, and the product triturated with an *equal weight of quicksilver*, until the globules are perfectly extinguished.

2. (Ph. Bor.) From the *black sulphurets of antimony* and *mercury*, equal parts, triturated together.

3. (Ph. Lusitan.) *Oxysulphuret of antimony*, 3 parts; *quicksilver*, 2 parts.

4. (Dr. Plummer's.) *Golden sulphuret of antimony* and *calomel*, equal parts. This preparation appears to have been unjustly neglected in modern practice. See *Antimony* (Ethiops of).

ETHIOPS (Golden). Syn. *Æthiops Auripigmentalis,*—Lat. From *red sulphurets of arsenic* and *mercury*, triturated together. *Very poisonous.*

ETHIOPS (Graphitic). Syn. *Ethiops of Plumbago; Æthiops Graphiticus,*—Lat. From *plumbago*, 2 parts; *quicksilver*, 1 part; triturated together until the globules disappear. *Dose.* 5 to 10 gr.; in herpes, and some other obstinate skin diseases.

ETHIOPS (Martial). Syn. *Æthiops Martialis, Æ. Chalybeatus,*—Lat. *Black oxide of iron*, prepared by keeping iron filings under *water*, and occasionally shaking them. It is washed with *water*, dried as quickly as possible, and preserved from the air, to prevent further oxidation. Formerly much esteemed as a tonic.

ETHIOPS (Mineral). Syn. *Ethiops Mineral; Æthiops Mineralis,*—Lat. Black sulphuret of mercury.

Prep. 1. (Ph. L. 1721.) From *quicksilver* and *sulphur*, equal parts; triturated together until the globules are extinguished.

2. (Mr. Tyson's.) *Oxide of mercury* (prepared by decomposing *calomel* with an equivalent proportion of *liquor of potassa* to which a little liquor of ammonia has been added) and *flowers of sulphur*, equal parts, triturated together. Mr. Tyson recommends this as an efficient substitute for the old and uncertain preparation commonly sold under the name of *Ethiop's mineral.* It is, however, of more than *double* the usual strength, and should therefore be taken in proportionate doses. See *Mercury* (Sulphurets.)

ETHIOPS (of Mercury) Syn. *Æthiops per se, Æ. Mercurialis,*—Lat. Protoxide of mercury obtained by assiduously shaking a *little of the metal* in a large bottle.

ETHIOPS (Plummer's). Syn. *Plummer's Alterative Powder; Æthiops Plummeri, Pulvis Plummeri, P. P. Alterativus,* —Lat. *Prep.* See *Antimonial Ethiops* (No. 4.)

ETHIOPS (Saccharated). Syn. *Æthiops Saccharatus,*—Lat. *Prep.* (Ph. Madrit.) *Quicksilver*, 1 part; *white sugar*, 2 parts; as the last. A mild mercurial.

ETHIOPS (Vegetable). Syn. *Æthiops Vegetabilis, Pulvis Quercûs Marinæ,*—Lat. *Bladder wrack* (fucus vesiculosus), burned in a close vessel till it becomes black and friable. *Used* in bronchocele, scrofula, &c. Like *burnt sponge*, it probably owes its virtues to the presence of a very minute quantity of iodine. *Dose.* 20 gr. to 1 dr., or more, made into an electuary with *honey* or *sugar.*

ETHYLE. Syn. *Ethule, Ethereum.* The radical of the ether-compounds, or the so-called *ethyl-series*, according to the ingenious theory of Liebig. Until recently its existence was hypothetical, but Dr. Frankland has succeeded in obtaining it in an isolated form, by the action of *zinc*, at a high temperature, upon *iodide* of *ethyle* (hydriodic ether). The process is similar to that by which *amyle* is obtained from its *iodide.*

Ethyle is a colourless and inflammable gas, incondensable to the liquid state at zero; under a pressure of 2¼ atmospheres, at 37·5° Fahr., it assumes the form of a colourless, transparent, ethereal liquid. Sp. gr., in the gaseous state, 2·0039. ('Journ. Chem. Soc.,' vol. ii.) It is a *salt-basyle.* Its *oxide* is *ether;* its *hydrated oxide* is *alcohol.* Its compounds (*salts*) with the *halogen bodies* (bromine, chlorine, iodine, cyanogen, &c.), and those of its *oxide* with the *acids*, are the COMPOUND ETHERS already noticed. See *Zinc-ethyle* and *above.*

ETHYLAMINE. Syn. *Ethyl-ammonia.* One of the new bases furnished by the ethyl-series.

Prep. 1. *Iodide* or *bromide of ethyle*, (hydriodic or bromic ether) is digested with an *alcoholic solution of ammonia*, until the alkaline action disappears; the liquid is evaporated to dryness by a gentle heat, and the white crystalline residuum (*bromide of ethylammonium*), mixed with *powdered quicklime*, and distilled in a glass retort connected with a well-cooled receiver.

2. (M. Wurtz.) From a *mixture* of *cyanate of ethyl* (cyanic ether) and *hydrate of potassa*, distilled together.

Prop., &c. An ethereal liquid, boiling at 64½° Fahr.; it smells strongly of ammonia, and has an alkaline reaction. With the acids it forms neutral, crystallizable salts, analogous to the corresponding compounds of ammonia. Treated with chlorine, it furnishes *chloride of ethylamine* and a yellow liquid (*bichlorethylamine*), the fumes of which rapidly excite tears. The *bichloride of platinum and ethylamine* forms orange-yellow, leaf-like crystals. *Ethylamine* is distinguished from *ammonia* by the inflammability of its vapour and producing a salt, crystallizing in *golden scales* which are rather soluble in water.

A mixture of solution of *ethylamine* and *bromic ether*, heated for several hours in a sealed glass-tube, solifies to a crystalline mass (*bromide of biethylamine*), which when distilled with *potassa* yields a colourless liquid, termed *Biethylamine*, or *biethyl-ammonia*. This compound is alkaline, boils at 133° Fahr., and forms beautiful crystallizable salts with the acids. The *bichloride of platinum and biethylamine* forms beautiful orange-red grains.

By heating a mixture of *solution of biethylamine* and *bromic ether* in a glass-tube, as before, a fibrous mass of *bromide of triethylamine* is obtained, which by distillation with *potassa* yields a new base, termed *triethylamine* or *triethyl-ammonia*. This compound is a colourless, highly alkaline liquid, which boils at 196° Fahr., and forms crystallizable salts. That of its chloride with bichloride of platinum (*bichloride of platinum and triethylamine*) is very soluble, and crystallizes in magnificent large orange-red rhombs.

Oxide of Tetrethyl-ammonium, another compound of this series, is formed by mixing *anhydrous triethylamine* with *anhydrous iodide of ethyle* (hydriodic ether), when a violent reaction ensues, and a white crystalline mass (*iodide of tetrethyl-ammonium*) forms, which is dissolved in *water*, and its *iodine* removed by agitation with *freshly precipitated oxide of silver;* the filtered solution, evaporated *in vacuo*, yields a semi-solid mass of *hydrated oxide of tetrethyl-ammonium*. The aqueous solution of this compound is bitter, alkaline, and caustic, and, as well as that of the iodide (see above), may be boiled without suffering decomposition, even when in contact with caustic potassa. In the dry state, however, it is rapidly decomposed by heat, pure *triethylamine* and *olefiant gas* being formed. It corrodes the skin, saponifies the fats, with the formation of true soaps, and exhibits the same reactions with the salts of the metals as hydrate of potassa. Its salts are neutral; several possess great beauty. The double chloride with platinum (*platino-chloride of oxide of tetrethyl-ammonium*) forms orange-yellow octahedrons, of little solubility.

Oxide of tetrethyl-ammonium is one of the most remarkable and interesting substances known, on account of its unusual stability, its resemblance to potassa, which is a metallic oxide, and its constitution being precisely the same as that of the hypothetical *oxide of ammonium* of Berzelius, if, indeed, it is not actually the same substance.

ETHYLAMYLANILINE. An aromatic ethereal oil, formed by treating *ethylaniline* with *iodide of amyle*, and distilling the resulting *iodide of ethyl-amyl-aniline* with *caustic potassa*. It boils at 503° Fahr.

ETHYLANILINE. Syn. *Ethylophenylamine*. A liquid resembling aniline, boiling at 400° Fahr., obtained by treating aniline with *bromide* or *iodide of ethyle*, in the way described under *ethylamine*. Another like compound is *biethylaniline* (biethylophenylamine). There are other members of the series, analogous to those of the *ethylamine-bases* just noticed, but the names which have been foolishly given them, are too long and complicated, and the compounds themselves are of too little practical interest to be included in this work. See *Nomenclature*.

ETHYLENE. See *Olefiant Gas*.

ETHYLOPHENYLAMINE. See *Ethylaniline*.

ETHYLOTOLUIDINE and *Biethylotoluidine*. Artificial mixed bases, obtained by treating *toluidine* with *bromide* or *iodide of ethyle*. See *Ethylamine*.

ETHYLOXAMIDE. A peculiar substance, obtained as a white precipitate, by adding *ethylamine* to *oxalic ether*.

EUCALYPTINE. A substance resembling a mixture of pectine and tannic acid, existing in Botany Bay kino.

EUCHLORINE. Protoxide of chlorine, on account of its vivid green-colour. The *euchlorine*, of Davy, prepared by gently heating *chlorate of potassa* with *hydrochloric acid*, is said to be a mixture of chlorous acid and free chlorine.

EUCHRONE. A deep blue, insoluble substance, formed when *euchronic acid* is placed in contact with *metallic zinc* or other *deoxidizing agents*.

EUCHRONIC ACID. An acid obtained along with *paramide*, when *neutral mellitate of ammonia* is submitted to distillation. It forms colourless crystals, which are sparingly soluble in water, whilst paramide is insoluble in cold water; properties which afford the means of their separation. See *Euchrone*.

EUGENIC ACID. Syn. *Heavy Oil of*

Cloves, Clove Acid, Caryophyllic Acid. Its salts are termed *Eugenates,* or *caryophyllates,* and those with potassa, soda, and ammonia, are also sometimes called *clove-acid alkalies.* See *Oils* (Volatile).

EUGENINE. Syn. *Stéaroptène of Oil of Cloves, Clove Camphor.* Thin, white, pearly scales, found by Bonastre in oil of cloves. It smells and tastes of cloves, is soluble in alcohol and ether, and is reddened by nitric acid. This name is applied by Brodie to *caryophyllin,* before noticed. This latter substance is also, sometimes, incorrectly, called *clove camphor.*

EUPHORBIUM. Syn. *Gum Euphorbium; Euphorbium,*—Ph. L. E. & D. The concrete resinous juice of the *euphorbia canariensis* (Linn.) or *Canary euphorbium tree.* It is a powerful acrid, purgative, rubefacient, sternutatory, and vesicant, and the violence of its action has led to its disuse. It is excluded from the recent edition of the pharmacopœia.

EUPION. An ethereal liquid forming the chief portion of the *light oil of wood-tar,* and which also exists in the *tar* obtained during the destructive distillation of *animal* and *vegetable substances,* particularly in the fluid product thus obtained from *rape oil.* It is separated from these substances by agitating them with *oil of vitriol,* or a *mixture* of *oil of vitriol* and *nitre,* and subsequent cautious distillation. *Pure eupion* is tasteless, exceedingly thin, limpid, and aromatic; boils at 116½° Fahr.; and is the lightest fluid known; sp. gr. 0.655. It is very inflammable, burns with a very bright flame, and gives a transient greasy stain to paper. It is isomeric with *hydruret of amyle,* and frequently consists chiefly of that substance, when its specific gravity and boiling point rises in proportion. Other volatile oils of like origin are often confounded with eupion by chemical writers. Thus, Brande and others, state its sp. gr. to be 0·74, and that it boils at 340° Fahr.

EUPYRION. Contrivances for obtaining instantaneous light; as *lucifer matches, &c.*

EUXANTHIC ACID. See *Purreic Acid.*

EUXANTHONE. See *Purrenone.*

EVACUANTS. Syn. *Evacuantia,*—Lat. Medicines which augment the secretions or excretions. *Cathartics, cholagogues, diaphoretics, diuretics, emetics, errhines, expectorants, and sialogues,* belong to this class.

EVAPORATION. The conversion of a fluid into vapour by means of heat, diminished atmospheric pressure, or exposure to a dry atmosphere. Evaporation is had recourse to—1. For the *vapour* as a *source of heat* or power, as in the case of *steam boilers, &c.;*—2. To *separate volatile fluids* from *impurities* or other bodies, which are either fixed or less volatile;—3. To *recover solid bodies from their solutions,* as in the preparation of *extracts, chemical salts, &c.*;—4. To *concentrate* or *strengthen* a *solution* by the expulsion of some of the fluid matter that forms the menstruum; — 5. To *purify liquids* by the *dissipation* of the *volatile matters* which may contaminate them.

It is found that, under ordinary circumstances, evaporation is confined to the surface of the heated liquid, and is therefore slower or quicker, in proportion to the extension of that surface. Hence has arisen the adoption of *wide shallow vessels* for containing fluids during their exposure to heat for this purpose. Evaporation proceeds most rapidly when a current of air (especially hot and dry air) is made to pass over the surface of the fluid; as, in this case, the vapour is prevented resting upon the surface, and impeding the process by its pressure. For a similar reason, liquids evaporate more rapidly in vessels *partially covered,* than in *open ones.* In the *former* case the cool incumbent air condenses and throws back a portion of the vapour, which thereupon, besides its cooling action, offers mechanical resistance to the diffusion of the vaporous particles as they arrive at the surface of the liquid. In the *latter* case these obstacles are avoided, and the impetus of the vapour pouring forth from a contracted orifice (or pipe), not only readily overcomes the pressure of the atmosphere, but offers less surface for its cooling action, until it has passed much beyond the points at which it can exert any influence on the fluid from which it has escaped. In this way the chemical action of the atmosphere on the liquid operated on, is also considerably lessened. On the *small scale,* shallow capsules of glass, Wedgwood-ware, porcelain, or metal, are commonly employed as evaporating vessels, and these are exposed to heat by placing them over a lamp, or naked fire, or in a water-bath, or sand-bath, according to the temperature at which it is proper to conduct the process. On the *large scale,* high-pressure steam is usually employed as the source of heat. The term "*spontaneous evaporation*" is applied to the dissipation of a fluid by mere exposure in open vessels, at the common temperature of the atmosphere, and without the application of artificial heat. The celerity of this species of evaporation wholly depends on the degree of humidity of the surrounding air, and differs from the former, in which the rate of evaporation is proportionate to the degree of heat at which the process is conducted, and the amount of pressure upon the surface of the liquid. *Evaporation "in vacuo"* (as it is called) is conducted under the receiver of an air-pump, or in an attenuated atmosphere, produced by filling a vessel with steam, by which means the air is expelled, when all communication with the external atmosphere is cut off, and the vapour condensed by the application of cold. *Fluids* are also evaporated in air-tight receivers over *sulphuric acid*, by which they are continually exposed to the action of a very dry atmosphere. When such a receiver is connected with an air-pump in action, evaporation proceeds with increased rapidity, and intense cold is produced. It appears, from the experiments of Dr. Ure, that "if the bottom of a pan, and the portion of the sides immersed in a hot fluid medium, (solution of chloride of calcium for example,) be corrugated, so as to contain a *double expanse of metallic surface*, that pan will evaporate exactly *double the quantity of water*, in a given time, which a like pan, with smooth bottom and sides, will do, immersed equally deep in the same bath. If the corrugation contain *three times the quantity of metallic surface*, the evaporation will be *three-fold* in the above circumstances. But if the pan, with the same corrugated bottom and sides, be set over a fire, or in an oblong flue, so that the current of flame may sweep along the corrugations, it will evaporate no more water from its interior than a smooth pan of like shape and dimensions placed alongside it in the same flue, or over the same fire."

Mr. Williams, the inventor of the original "argand," or "smoke-consuming furnace," many years ago demonstrated the superior evaporative power of a boiler, with *small plugs* or *rods of metal* projecting from both the exterior and inner surfaces, when heated by an open fire. This principle is, we believe, included in one of his patents, now expired.

In the *laboratory*, steam heat is now almost exclusively employed. Copper, or tinned, glazed, or silvered copper pans, boilers, and stills, are surrounded by a "jacket" of cast-iron, and high-pressure steam admitted between the two. By due management of the supply-cock, a range of temperature may be thus obtained, extending from about 90° to 325° Fahr.

It is found that, under ordinary circumstances, 10 square feet of *heated surface*, will evaporate *fully* 1 *lb.* of water per minute; and that a thin copper tube exposing 10 feet surface, will *condense* about 3 *lb.* of steam per minute, with a difference of temperature of about 90° Fahr. This is equal to 30° Fahr. per *lb.;* and, consequently, the heat of the steam employed to produce the evaporation should be $212° + 30° = 242°$ Fahr. See *Steam.*

An attention to the facts and principles thus briefly explained above, will be found of great value in the laboratory.

EVERNIC ACID. From the *evernia prunastri*, or ragged hoary *evernia;* a parasitic lichen growing on the trunks of trees. It is obtained by digesting *the lichen* in *milk of lime.* It is feebly soluble even in boiling water, and is turned yellow by chloride of lime.

EVERNINIC ACID. A crystallizable substance obtained by boiling *evernic acid* with *alkalies.* It differs from evernic acid in its free solubility in boiling water.

EXCIPIENT. See *Prescription.*

EXCITANTS. See *Stimulants.*

EXCORIATIONS. Syn. *Sprays, Chafings,*—Vulg. Superficial injuries or affections of the skin, consisting of the removal of the scarf-skin or cuticle, accompanied with more or less irritation and slight inflammations. When arising from rough friction or attrition, they are more commonly called ABRASIONS. *Young children* are very apt to be chafed under the arms, behind the ears, between the thighs, and in the wrinkles and folds of the skin generally, unless great attention is paid to cleanliness, and wiping the skin *perfectly dry* after washing them. Whenever there is a tendency to excoriations of this kind, either in adults or children, a little *finely powdered starch*, or *violet powder*, applied by means of a *puff*, or a small bag of muslin, once or twice a day, will generally remove them, and prevent their occurrence in future. Mild unguents, as *cold cream*, or *spermaceti cerate* or *ointment*, may also be used with advantage. The preference should, however, be given to the remedies first named, from their not soiling the linen. Excoriations arising from the removal of the skin by friction or external violence, have been noticed under the head *Abrasion.*

EXERCISE is essential to the healthy performance of the functions of both body and mind. *Without* it, the stomach acts feebly, the bowels become inactive, and the circulation of the blood languid and imperfect; the chest contracts, the respiration becomes impeded, the brain is insufficiently supplied with pure arterial blood, the mind grows lethargic, the complexion assumes a sickly and effeminate hue, and the whole features lack the energy and expression which they possess in perfect health. *With it*, the bodily functions are performed with vigour and regularity, by which the constitution is strengthened, and the attacks of disease repelled. By exercise the mind too is excited to healthy action, its gloomy reveries are dispelled, and the fair face of creation is presented to the mind's eye in its proper hues. It robs undue mental exertion of half its injurious effects upon the body, whilst it stimulates and directs it in its proper course. It improves the temper, and humanizes the character. The disposition is refined, the passions restrained, violent emotions checked, the habits improved, and the personal charms promoted under the stimulus of judicious exercise.

To *females*, exercise is even more necessary than to males. The disposition and education of females are such as to tend to produce habits of sloth and indolence to a greater degree than in the other sex. Hence to them exercise is doubly important,—it is inseparable from health. The more retiring dispositions of females leads them almost unconsciously into habits of inactivity, which, above all, they should endeavour to shake off and avoid. By so doing,—by replacing habits of indolence and inactivity, by liveliness and moderate exercise, the development of the body will be promoted, additional grace and elegance imparted to its natural movements, and the enjoyments arising from both mental and bodily health increased, whilst disease and deformity will be prevented by the removal of their cause.

The *necessity of exercise* exists equally in every grade of society and age of life. Those who are engaged in *sedentary employments* or *in-door occupations*, should particularly seek refreshing *out-door* exercise, during the periods of relaxation from their diurnal duties. To the studious and delicate of both sexes, this is absolutely necessary to preserve the health and vigour of the body.

In *infancy*, exercise of a *suitable kind* should be almost the constant occupation of the little beings that claim our protection and care. It should, however, be always borne in mind, that the muscular exercise of very young children must be of the *gentlest class.* Prejudice and ignorance frequently induce nurses and parents to "*teach their children to walk*," as they falsely call it, and thus their feeble limbs are urged to make premature efforts to totter along, before the bones and muscles have acquired sufficient strength to support the body in an erect position. From this course the legs and joints frequently become bent and misshapened, and severe injuries are often inflicted on the head and body by blows and falls. It should never be forgotten, that *crawling* and *rolling* are their first modes of progression, and require the least exertion. Next comes the sitting posture ; from this the child gradually advances to the erect one ; then to walk by *slight assistance ;* and lastly, to walk safely *alone.* All this should come naturally, and never be promoted, further than by laying the infant on the carpet or floor, for the full exercise of its little strength. As soon as a healthy child is *able* to walk instead of crawl, its own disposition induces it to do so. The faculty of imitation, the spirit of enterprise, and the pride of "doing what others do," present even in infancy, is rather apt to lead the infant to over-exertion, than the contrary. The practice of constantly "dolling" children in the arms, is most prejudicial to the early development of their feeble powers.

In *childhood* the exercise should be regulated according to the constitution and age of the parties ; avoiding inactivity on the one hand, and excessive exercise on the other. The out-door plays and pastimes of *boys*, will generally be found sufficient, and in some cases will even require to be curbed, to prevent fatigue and the overtasking of the young frame. With *girls*, it is frequently difficult to find sufficient exercise without trespassing on the prejudices of the ignorant, or the routine of their daily education. With them, walking, and some healthy amusement, as *skipping*, *hooping*, or *the like*, should be indulged in for some hours daily. When this is impossible or inconvenient, they may be habituated to the practice of the more simple and cleanly portion of the domestic duties. In the performance of the latter, the health will be promoted, whilst the care and attention which is always due by a female to herself and others, at all periods of her life, will become an easy acquisition, and assist the cultivation of the best feelings of her nature.

In *youth* exercise matures and promotes the development of the frame ; and in *manhood*, it is equally necessary, as already noticed, to keep it in healthy action. In *age*, it will be found to assist the vital functions, and put off decay. In fact, to ALL,—*young*, *old*, *rich*, and *poor*, EXERCISE is *essential* to the *permanent enjoyment of health.*

In a medical point of view, "*exercise*, employed *moderately*, has a tonic and stimulating influence on the system, and is calculated to prove beneficial in a great variety of complaints. Used *immoderately*, it exhausts both the mental and bodily powers, and produces great debility." (Pereira.) Well-directed exercise favours the preservation of the general health, by calling into direct action the majority of the organs of the body; and it also acts powerfully on the skin, by stimulating its functions, increasing its temperature, awakening its tone, and subjecting it to a current of atmosphere favorable to its respiratory offices. But to be beneficial in the highest degree, exercise must be accompanied by feelings of present interest and enjoyment. The mind must direct and go with it,—to insure its full benefits the "soul must be present." "What is it that makes the difference between the exercise of youth and that of the felon on the tread-wheel; between the pedestrian in the Isle of Wight or Switzerland, and the pedestrian from Chelsea to the Bank; between the light and quick footstep wending to Greenwich Park, and the dull tread of the nursery-maid at home? Is it not mind? Is it not the young and buoyant joy of the school-boy that inspirits his laugh and his leap? while, silent and morose, humiliated, not convinced, the felon suffers his monotonous existence, moving, it is true, but not in exercise. It is not the novelty or the beauty of the scene, the pleasant weather, or the immunity from customary labour, that gives spirit to the pedestrian's tour, as compared with the dull, desultory repetition of the same sights, same persons, same things, and same path to and from business? It is not the prospect of enjoyment, of gaiety, or pleasure, that makes the difference between the elastic step of the maiden enfranchised from present duties, and the same person in the pursuit of her necessity-impelled and ordinary offices? We need not ask which is most calculated to be beneficial to health; which to arouse the dormant functions of the skin; to promote the removal of irritating elements from the blood; to increase the vigour of the frame, purify the complexion, and enrich the beaming tints of beauty. In MIND lies the great secret of *beneficial exercise*, and without it, exercise is a misnomer, and a fraud upon the constitution." (Erasmus Wilson.)

"During *convalescence*, properly regulated exertion is highly serviceable; but it should never be carried so far as to produce exhaustion, and should be pursued for some time in doors, before it be attempted in the open air; the latter, at first, should always take place in a carriage, that can be opened or closed at will; the patient may then attempt short walks in the open air; but, in all cases, it is of importance that he is not *unduly fatigued*, as otherwise, injury instead of benefit will be the result. One of the most serious errors, committed with regard to exertion, is that of permitting a convalescent to sit up too frequently, or for too long a time, under the mistaken notion of giving him strength. A patient should *never be allowed* to sit up *longer* than is *agreeable to his feelings*, and *never so long* as to produce a *sense of fatigue*." (Dr. R. E. Griffith.)

EXPANSION. The increased bulk which bodies acquire when heated. All substances, solid as well as liquid, when chemical change does not take place, expand by heat, and contract by cold. In some of them, this property occurs in a greater degree than in others, but is constant for the same substance under the same circumstances. The *chemist* avails himself of this property in the construction of his thermometer; the *wheelwright* in fixing on the tire of his wheels; the *engineer*, in restoring to the perpendicular the leaning walls of buildings; &c.

EXPECTORANTS. Syn. *Expectorantia*, —Lat. Medicines that promote the secretion of the tracheal and bronchial mucus. According to Dr. Good, true expectorants are "those medicines which rather promote the separation of the viscid phlegm with which the bronchiæ are loaded, than simply inviscate and dilute it; though these are also treated as expectorants by many writers." *Ammoniacum*, *antimonials*, *assafœtida*, the *balsams of Peru* and *tolu*, *benzoic acid*, *benzoin;* the *fumes of vinegar*, *tar*, and *several* of the *volatile oils;* *garlic*, *ipecacuanha*, the *oleo-resins*, *squills*, *tartarized antimony*, and the *smoke* of *tobacco* and *stramonium*, are among the principal substances commonly called expectorants. *Tartarized antimony*, *squills*, *chlorine*, and *ammoniacal gases*, have also been used (diluted) to provoke the coughing and favour the expulsion of foreign bodies from the aërian tube; and also to favour the expectoration of mucus, pus, and membranous concretions when the local irritation is not sufficiently great. (Schwilgue.) *Expectorants* are *commonly employed* in pulmonary complaints and affections of the air-tubes, attended by a vitiated state of the mucus, or an imperfect performance of the natural functions of the secretory vessels. "Of all classes of the materia medica, none are more uncertain in their action than expectorants." (Pereira.) The act of ejecting matter from the chest is called *expectoration.*

EXPERIMENTS are acts or operations, intended to develop some unknown fact, principle, or effect; or to establish or demonstrate it, when discovered. Similar operations performed merely for amusement, are also often, though incorrectly, called by this name. In rational experiments these two objects are combined. To experimental research is due the present high state of advancement and usefulness of the various sciences most intimately connected with our happiness and well-being. The danger of taking things for granted has been thus pleasantly and instructively pointed out by Archbishop Whateley:—"It was objected to the system of Copernicus when first brought forward, that if the earth turned on its axis, as he represented, a *stone dropped from the summit of a tower* would *not fall* at the *foot* of it, but at a *great distance to the west;* in the same manner as a *stone dropped from the masthead of a ship in full sail* does *not fall at the foot of the mast,* but towards the stern. To this it was answered that a stone, being a part of the earth, obeys the same laws, and moves with it; whereas it is no part of the ship, of which consequently its motion is independent. The solution was admitted by some, but opposed by others; and the controversy went on with spirit; nor was it till one hundred years after the death of Copernicus that, the *experiment being tried,* it was ascertained that the *stone,* thus *dropped from the head of the mast,* DOES fall at the *foot of it.*"

EXPLOSIVE COMPOUNDS. See *Gunpowder, Fulminating Compounds, Perchloric Ether, &c.*

EXPRESSION. The mechanical operation by which a fluid contained in the pores or cells of a solid is pressed out or expelled. Many of the fluid substances employed in pharmacy and chemistry are obtained by expression. Thus, the *unctuous vegetable oils,* as those of *almonds, linseed, &c.,* are procured by submitting these substances to powerful pressure between iron plates, which are either made warm, or the bruised seeds are previously exposed in bags to the steam of boiling water. The *juices of fresh vegetables* are also obtained by expression. The substances are first bruised in a marble mortar, or, on the *large scale,* in a mill, and immediately submitted to the press, to prevent them passing into a state of fermentation, which would injure the quality of the product. *Fruits* which contain *highly-flavoured* or *fragrant seeds,* or which have *rinds* containing *essential oil,* are generally deprived of them before being sent to the press. The *subacid fruits* are also allowed to lay together for some days before pressing them, as the quantity and quality of the product is thereby increased. The *fluid matter* absorbed by the ingredients employed in the preparation of *tinctures, infusions, decoctions, extracts, &c.,* is generally obtained by powerful pressure. *Expression* is also frequently had recourse to for the purpose of obtaining *solids* in a *state of purity,* as in the *expulsion* of *oleine* from *stearine, water* from *bicarbonate of soda, &c.* On the *small scale,* the common *screw-press,* or one of like construction, is usually employed; but the power thus obtained is insufficient to expel the *whole* of a fluid diffused through the pores of a solid. Hence has arisen the use of the *hydraulic press,* which is now almost alone employed on the *large scale.* In all these cases, the substances are placed in bags made of *hair-cloth,* or *coarse canvass,* previously to their being submitted to pressure. For *tinctures* and *like pharmaceuticals,* a small screw-press (*tincture press*) made of zinc or tinned-iron, and varying in capacity from 1 quart to several gallons, is employed.

EXSICCATION. See *Desiccation.*

EXTIRPATION (of Vermin). See *Beetles, Rats, &c.*

EXTRACT. Syn. *Extractum,*—Lat. Among *chemists* this term is understood to apply to the residuum of the evaporation of aqueous decoctions or infusions of vegetable matter. In *medicine* and *pharmacy* it has a less definite signification, being applied to various preparations obtained by evaporating the expressed juices, or the decoctions, infusions, or tinctures of vegetable substances, until a mass, of a solid or semi-solid consistence, is formed. Extracts vary in their nature and composition with the substances from which they are prepared, and the fluids employed as solvents. When *water* is employed as the menstruum, the products (*aqueous extracts, watery do.; extracta aquosa, ext. simpliciora;*) usually consist of gum, starch, sugar, albumen, extractive, and saline and other matter, along with the pecular principles on which the medicinal virtue of the vegetable depends. When *spirit* is employed as the solvent, the products (*alcoholic extracts; extracta alcoholica;*) contain most of the substances above enumerated, except the gum and starch, together with several other substances which are *soluble* in *spirit*, but which are either wholly or nearly *insoluble* in *water;* as *resins*, *essential oils*, and the *proximate principles of vegetables.* These preparations, with scarcely an exception, are considerably more powerful than the *aqueous extracts* of the same vegetables. In some cases *proof spirit* or *under-proof spirit* is employed, when the extracts (*spirituous extracts ; extracta spirituosa ;*) generally possess properties between those of the above. In other cases, *dilute acetic acid* or *acidulated water* is employed as the menstruum when the products (*acetic extracts; extracta acetica ;*) possess much greater activity than when prepared with water; and would in many cases prove fatal, if exhibited in doses as large as those of the aqueous extracts. Still more active extracts are obtained by a *combination* of the *last two menstrua.* According to Ferrari, plants treated with *rectified spirit of wine*, mixed with $\frac{1}{36}$th part of *acetic acid*, yield extracts of remarkable activity. (Prov. Med. Jour. 1843.) On the Continent, *ether* is sometimes used as the menstruum for the active principles of certain substances, as *cantharides*, *cubebs*, *worm-seed*, *&c.*, when the products are called "*ethereal extracts*" (*extracta etherea*). To this may be added, that the term "*simple extract*" is applied to an extract prepared from a *single* plant or vegetable substance, and the term "*compound extract*" to one prepared from *two* or *more* of such substances. The *fluid extracts* (*extracta fluida*) of modern pharmacy, are those which are only evaporated to the consistence of a *thin syrup*, and then mixed with 1-10th to 1-8th of their volume of rectified spirit.

Prep. The preparation of medicinal extracts may be conveniently considered under two divisions, viz.—*the production of a solution of the soluble portion of the substances operated on, and—the reduction of this solution by evaporation to the consistence of an extract.*

The *preliminary operations* in the manufacture of extracts are similar to those employed in the preparation of *decoctions*, *infusions*, and *tinctures.* The proper quantity of the ingredients being taken, the whole is *well bruised* or *reduced* to *coarse powder*, or otherwise divided by *slicing with a knife*, that every portion may be fully exposed to the solvent action of the fluid. In some few cases (as with *gentian*, &c.,) the "slicing," or reduction to fragments, is often conveniently deferred, until the action of the menstruum shall have so far softened the ingredients as to render them of easy division by the knife. Those substances (as *sarsaparilla*, *chamomiles*, *&c.*,) whose medicinal principles reside in the *cortical portion*, or which are of *easy solubility*, are commonly subjected to the action of the menstruum without being subjected to any particular preparation.

In the *preparation* of *aqueous extracts*, the ingredients are treated with *water* until *all* the soluble matter that it is desired to obtain is dissolved out. There are several methods of effecting this object, depending upon the nature of the substances acted on. In some cases, *maceration* in *cold water* is resorted to; in others, *percolation* with that fluid in a displacement apparatus. More generally, however, *boiling water* is poured on the substance, and is digested on it for some time, as in the preparation of *infusions;* or the substance is exhausted by *boiling* it in *water*, as in the preparation of *decoctions.* After the ebullition or infusion has continued a sufficient time, the heat is removed, and the liquid portion drawn off. The ingredients are then *pressed* to extract the remaining liquid; or they are *washed* or *sparged* with *hot water*, which expels it by displacement. According to the usual practice in the *majority of cases*, a *second quantity of water* is poured on after the first has been thoroughly drained off, and the *infusion* or *coction* is repeated a *second* and even a *third* time, or until the ingredients are *perfectly exhausted* of their soluble portion. The liquor or liquors thus obtained being allowed to repose for 15 or 20 minutes, for the purpose of depositing the sand or other gritty and heavy matter that is mechanically mixed with them, are carefully decanted from the sediment, and, after being run through a fine hair-sieve, or flannel bag, are ready for concentration. In some instances, however, this method proves insufficient to render the liquid *clear.* In such cases, the solutions may generally be rendered transparent by *clarification* with a *little white of egg*, removing the scum as it rises, and straining the liquid through flannel, as before; or the liquid may be filtered through a bag made of fine *Welsh flannel*, or of *tweeled cotton cloth* (Canton flannel), both of which should be soaked in clean water for at least an hour before use. In the small way, filters of linen or paper are sometimes employed; but as all media sufficiently fine to render vegetable solutions transparent soon choke up, this filtration is objectionable, from the length of time it occupies. In *some houses*, the aqueous infusion or decoction is allowed to repose for 24 hours, and then decanted and evaporated; but such a plan is objectionable, as however smooth and glossy extracts so prepared may appear, their medicinal virtues are lessened by the lengthened exposure to the atmosphere.

When about *one-half* of an *aqueous solution* has evaporated, it is often advantageous to repass it through a *flannel* or *horse-hair strainer*, to remove the flocculi that generally form by the action of the heat and air. This is especially necessary with *vegetable solutions* prepared *without boiling*, and should be adopted whenever a smooth and sightly extract is desired.

The *reduction of the solution* to the *proper consistence* is effected by evaporation. The mode in which this is performed varies for different extracts. The LONDON COLLEGE directs that "unless otherwise ordered, the evaporation should be conducted as quickly as possible, in a *broad shallow pan*, placed in a *water-bath*, until a proper consistence is acquired for forming pills; stirring assiduously with a spatula towards the end of the operation." The DUBLIN COLLEGE orders that "all *simple* (aqueous) *extracts* (extracta simpliciora), unless otherwise ordered, are to be prepared by *boiling* the *vegetable matter* in 8 *times its weight of water*, till the *liquid is reduced to one half;* the liquor is then to be *expressed*, and after a short time allowed for *defecation*, to be *decanted, filtered*, and *evaporated in a* (steam or) *water bath*, until it begins to thicken, and then finally inspissated by a reduced heat, with continual stirring until a consistence for forming pills be attained." The instructions of the EDINBURGH COLLEGE are similar, with the one important exception, however, of ordering the evaporation to be conducted in a *water-bath*, saturated with *chloride of sodium*.

Though the water-bath has the sanction of the *London college*, it is ill adapted for the purpose to which it is here ordered to be applied, as, from its low evaporative power, the advantages which are derived from its equable temperature, are vastly overbalanced by the lengthened exposure of the solution in a heated state to the action of the atmosphere. It has been shown that a vegetable extract so prepared is *inferior* in quality to a similar one formed by rapid evaporation in a shallow pan over a naked fire, or placed in a sand-bath, provided proper care is taken, and assiduous stirring is adopted during the *whole time* of the exposure to heat. *In practice*, however, the use of a naked fire is perfectly *inadmissible*, as the least neglect on the part of the operator would probably lead to the incineration of the whole. These objections are obviated by the addition of $\frac{1}{5}$th part of *salt* to the water of the bath, which raises its boiling point to 218$\frac{3}{4}$° Fahr., when the temperature of the contained extract is fully 212°; the remaining 6° being lost by the interposition of the substance of the evaporating vessel.

On the *large scale*, the evaporation of infusions or decoctions for extracts is usually conducted in very wide, shallow, *copper* or *tinned-copper pans*, having steam-tight jackets of cast-iron, and heated by steam "playing" between the two. See *Evaporation.*

The *rapid deterioration* which *vegetable juices* and *solutions* undergo by *exposure to the air*, especially at high temperatures, has led to the introduction of apparatus, by which they may be concentrated without contact with the atmosphere, and at a less degree of heat than is required for that purpose in open vessels. Such is the method, commonly called *Barry's process*, in which the air is removed from certain air-tight refrigerators by the introduction of steam, which is then condensed by the application of cold, by which means a partial vacuum is obtained. *Another process* for attenuating the atmosphere over the surface of fluids during evaporation is by the action of an air-pump. This plan was introduced by Howard, and is commonly applied to the concentration of syrups in the sugar refineries. Extracts obtained by either of these methods are said to be prepared "*in vacuo*," and are found in practice to be immensely superior to the common extracts of the shops, and consequently require to be exhibited in proportionably small doses.

When *water, acidulated with acetic acid* is employed in the preparation of extracts, the vegetable substances are usually *macerated* in it, in the *cold*, or the *dilute acid* is sprinkled over the *bruised plant* in the *fresh* or *recent state*, and the whole is then submitted to strong pressure, to expel the juice, which is strained and evaporated in the usual way, but preferably in a well-tinned or plated-copper pan.

Alcoholic and *spirituous extracts* are prepared by evaporating a filtered concentrated tincture of the ingredients in any suitable vessel, by which the volatilized spirit may be saved. In general, *rectified spirit* is used as the menstruum; but in some cases *proof spirit* is employed; and in others, the substances are *first* digested in proof spirit, and *afterwards* in water, and the *mixed tincture* and *infusion* evaporated in the usual manner.

Ethereal extracts are obtained in a similar manner to alcoholic ones; but being merely prepared in small quantities at a time, the process may be conveniently performed in glass vessels. When it is required to boil either of the above fluids (*alcoholic* or *ethereal*) or any other volatile liquid on the ingredients, a vessel fitted with a long tube, or a Liebig's refrigerator *reversed*, as noticed under ether, may be used to prevent any loss of the menstruum.

The *inspissated vegetable juices* are classed with extracts by the *London College*, and are ordered to be prepared by evaporating the *expressed juice*, without filtration, in a water-bath. The directions of the *Edinburgh College* for preparing their inspissated juices (*succi spissati*) are—"Beat the *fresh substance*, and press it strongly through a canvas bag, in order to obtain the juice; which, being put into a wide, shallow vessel, and heated by means of boiling water saturated with sea-salt, is to be reduced to the consistence of honey. The mass, when cold, is to be put into glazed earthen vessels, and moistened with strong alcohol." By operating in this way a considerable portion of the activity of narcotic vegetables is lost. Some of their juices, as that of *aconite*, are impaired in so short a time as scarcely to compensate for the trouble of preparing them. This deterioration does not, however, take place in any remarkable degree, if the expressed juice from the recent vegetable be evaporated by exposing it in a *thin stratum to a current of very dry air*, as adopted by Mr. Squire. This may be managed by putting the juice into small flat trays or dishes, placed on shelves in a suitably arranged apparatus, alternated with similar vessels of *concentrated sulphuric acid;* or by causing a current of *very dry air*, at the common temperature of the atmosphere, to pass over them. It has been shown that 10 gr. of extract, thus prepared, were more than equal to 20 gr. prepared *in vacuo;* and to more than 60 gr., and, in some cases, 90 gr. of those prepared by the common process of boiling down the juice to an extract.

The concluding portion of the process of extract-making, technically termed "*finishing off*," requires the most scrupulous attention. As the evaporation advances, the *heat should be lessened*, and as soon as the extract acquires the consistence of thick treacle, it should be *removed altogether*, and the remainder of fluid matter evaporated by the heat retained by the copper pan, the escape of vapour being promoted by assiduous and laborious stirring with a suitably-shaped wooden spatula. This part of the process should be continued until a proper consistence is attained and the extract is *nearly cold.* When *high pressure steam* or a *chloride of calcium bath* is employed, care must be taken to *withdraw the heat before stirring* the semi-liquid mass; as, if an extract having a temperature of about the boiling point of water, or even a few degrees below it, is agitated, it *becomes full of bubbles*, and appears *rough* and *puffy*, and this appearance cannot be removed by subsequent stirring, or by any method but re-dissolving it in water and re-evaporation. This is especially the case with the *extracts of sarsaparilla* (simple and compound), *gentian, liquorice*, and most others of a similar class. A good laboratory man knows from experience the proper time for the removal of the heat, but unpractised persons often fail in this particular. In such cases, should the heat retained by the evaporating pan, and by the extract, prove insufficient to complete the process, a little more may be *cautiously* applied. Without assiduous and laborious stirring in the way described, a very *smooth* and *glossy* extract *cannot* be produced. To promote this *artificial* appearance, some persons add 3% or 4% each of *olive oil* and *gum arabic*, dissolved in water, with about 1% or 2% of *spirit of wine.*

The *consistence* of the *ordinary extracts* of the shops, is the same as that of electuaries and confections, and is described in the Ph. E. as equal to that "of *thick honey.*" The instructions of the Ph. L. and D., to evaporate the mass "until it acquires a consistence proper for making pills," except in 2 or 3 cases (as *Ext. Colocynth. Comp.*, *&c.*), is not adopted, and indeed would be found inconvenient in practice. Extracts evaporated to such a consistence are commonly termed "*pilular extracts;*" and when evaporated so that they are quite dry, and brittle when cold, they are called "hard extracts" (*extracta dura*).

Pres. Extracts should be put into pots as soon as taken from the pan, and, after being carefully and securely tied over with *bladder*, should be "stored" in a *dry* situation. *The London College* orders "a small quantity of rectified spirit to be sprinkled upon all the softer extracts, to prevent them becoming mouldy." A better way is to employ a *little spirit*, holding in solution a few drops of *oil of cloves*, or a still *less* quantity of *creasote.* This should be added to them the last thing before removing them from the evaporating pan, and when they are nearly cold. The same object is effected by *moistening* the *inside of the bladder* (used to tie them over) with a few drops of *oil of cloves* or *creasote.* Hard extracts should be kept in bladders or gut skins, placed in stone pots, and well covered over. With care, extracts prepared from recent vegetable substances may be preserved twelve months, or from season to season; and those from dry ingredients, or such as are less inclined to spoil, for perhaps double that time; but beyond these periods their virtues cannot be relied on, and they should consequently be discarded, if remaining unused or unsold.

Pur., &c. The quality of an extract cannot be ascertained by mere inspection, nor is it readily discovered by chemical tests. A knowledge of these facts has induced the mercenary and fraudulent manufacturer to employ damaged and inferior drugs in their preparation, alike regardless of the welfare of the patient, and the credit of the practitioner. A common practice with some manufacturers is, not only to pick out the *least expensive variety of every drug* for the preparation of their extracts, but the *most inferior*, and often *damaged* and *worthless portion* of this already inferior article. The production of a *smooth, bright*, and *glossy* extract is *all* that is usually attempted by these individuals, and *all* that is sought after by the mass of purchasers, who mistake the simulation of the mere external signs of good quality for its actual existence. It is a fact, which we can verify from extensive experience in the laboratory, and from years of practical observation on this point, that extracts faithfully prepared from good materials, do not possess the sightly and pleasing appearance of those commonly vended by the wholesale druggists. On comparing the extracts prepared by different metropolitan houses, we have found that those which have exhibited a remarkably *bright* and *glossy* appearance, have been *uniformly inferior*, and sometimes *nearly inert;* whilst others, with a less prepossessing appearance, have been generally of *good quality.* These facts are well established by reference to the extracts of those houses and institutions that are remarkable for the superior quality of their preparations, and by comparing them with the common extracts of the shops, supplied by the wholesale trade.

A *good extract* should be—1. Free from grit, and *wholly soluble* in 20 parts of the *menstruum employed in its preparation*, forming a *nearly clear solution;*—2. It should have a *uniform texture* and *colour*, and be of a *proper consistence;*—3. If a narcotic or active extract, it may be exhibited in proper doses, and its effects watched. Its activity may also be tested on any small animal.—4. An assay for the *proximate vegetable principle* (*alkaloid, &c.*) contained in the plant from which it has been prepared may be made. The extracts prepared from the expressed juices of plants, without straining off the coagulated albumen, are of course exceptions to the *first* test. Unfortunately, these tests are not always easily performed, and the last two are inapplicable to those extracts that exercise no very marked physiological action, unless when taken in repeated doses, long continued. This want of a ready means of accurately testing the qualities of extracts has enabled the fraudulent manufacturer to sell inferior articles with impunity, and often without the least fear or danger of detection.

In general, an extract more than six months old contains only *half* the activity of a similar one *newly* made. When more than twelve months old they should be rejected as *worthless*, and the stock renewed.

Uses, &c. The extracts of the shops are generally acknowledged to be the most varying, imperfect, and uncertain class of medicines belonging to modern pharmacy. They are mostly used in the same cases as the plants from which they are prepared, but in smaller doses.

Concluding Remarks. In the *preparation* of extracts the great desiderata to be aimed at are—to *suit* the *menstrua* and the *methods of manipulating* to the *peculiar characteristics* of the *active constituents* of the *vegetable substances* operated on. The pharmaceutist should always bear in mind that a *perfect* extract should be *a concentrated, solid mass, representing, as near as possible, in medicinal efficacy, the materials from which it has been prepared, and capable of being re-dissolved, so as to form a solution closely resembling that from which it has been derived.* An extract possessing *equal* strength to the *whole* mass of the ingredients from which it has been prepared, is almost next to an impossibility, however desirable such a degree of perfection may be. The medicinal properties of *all* solutions of vegetable matter are injured by being reduced to the solid state; and this deterioration, more or less, takes place, whether the solvent be *water*, *acetic acid*, *proof spirit*, or *alcohol.* The volatile portions, (the *essential oils*, the *aroma*, *&c.*,) are nearly or wholly dissipated, and though these do not always form the principal or active ingredients of the vegetables from which extracts are prepared, yet they generally exercise a modifying and controlling influence over the other ingredients, which considerably alters their therapeutical action. The loss of aroma may often be a trifling deficiency, but in the *extracts* of *aconite, henbane, hemlock, belladonna,* and other narcotic plants, this is not the case. In these cases it is well known that the inert preparations are wholly deficient of the odour of the recent plant, and that in *proportion* as the *odour is developed,* so *is their activity preserved.* The powerful smell of the *recently expressed juice of hemlock* with the scarcely perceptible odour of the extractum conii, of the Ph. L., offers an excellent example of this fact. The *dose* of the *one* often reaches 20 or 30 gr.; whilst that of the *other*, seldom exceeds 5 or 10 drops, or a portion equivalent in dry ingredients to considerably less than ½ gr.

When extracts are ordered in prescriptions, those of the London Pharmacopœia should be alone employed by the dispenser, as the substitution of others for them, would not only be violating faith with the prescriber, but might also produce consequences alike injurious to the dispenser and the patient. Many medical gentlemen prefer extracts prepared by particular processes or persons, but such intention is always indicated in their prescriptions. A serious accident of this sort occurred lately in this very metropolis. A druggist had prepared a number of prescriptions from an extract which he had purchased of a wholesale drug house, and which was labelled *Ph. L.*, but was in reality almost inert, and in consequence of the presumed insensibility of the patient to its narcotic action, the medical practitioner had gradually increased the quantity to an enormous extent. In the mean time, the druggist's small stock of extract was exhausted, and another pot purchased of the same parties, which was of an average quality. The prescription was brought to be dispensed as usual; but this time it was prepared from the new extract. The consequences were *loss of speech, coma, delirium,* and *death.*

EXTRACT (Aconite). Syn. *Extract of Wolfsbane, E. of Monkshood, Inspissated Juice of Aconite; Extractum Aconiti,*—Ph. L. E. & U. S. *Ext. A. cum Fæculâ,*—P. Cod. *Succus Spissatus Aconiti,*—Ph. D. 1826. *Prep.* 1. (Ph. L.) Take of *fresh leaves of aconite,* 1 ℔; bruise them in a stone mortar, express the juice, and evaporate it, *unstrained,* to a proper consistence. The *formulæ* of the Ph. D. & U. S. are similar.

2. (Ph. E.) Beat the *fresh leaves of aconite* to a pulp, and express the juice, then subject the residuum to percolation with *rectified spirit* until the latter passes through without being materially coloured; unite the *expressed juice* and the *percolated tincture,* filter, distil off the spirit, and evaporate in a vapour or a water bath to a proper consistence. Stronger than the preceding.

Obs. A variable and uncertain preparation. Numbness and tingling follow its application to the lips or tongue when it is of good quality. *Product.* 1 cwt. of fresh leaves yield between 5 *lb.* and 6 *lb.* of extract. *Prop.* Anodyne, sudorific and narcotic; *very poisonous. Dose.* ½ gr. to 2 gr., made into a pill with *liquorice powder;* once or twice a day in neuralgic pains, chronic rheumatism, glandular swellings, &c., gradually and cautiously increased to 5 or 6 gr.

EXTRACT (Aconite,—Alcoholic). Syn. *Extractum Aconiti Alcoholicum,*—Lat. *Prep.* 1. (P. Cod.) *Aconite* (in coarse powder), 1 ℔; *proof spirit,* 3½ ℔. (say 2½ pints;) proceed by the method of displacement, and when all the spirit has penetrated the powdered mass, keep this covered with distilled water, until the liquid begins to cause a precipitate in falling into that which has previously passed through; next distil the spirit from the tincture and evaporate the residuum to the proper consistence.

2. (Ph. U. S.) *Aconite,* 1 ℔; *spirit,* sp. gr. 0·935 (= 13 u. p.), 1 quart, or q. s.; as last.

3. (Ph. Baden.) From the tincture prepared with *rectified spirit,* and by either maceration or displacement. Stronger than the last two.

4. (Ph. Bor.) The *juice* is expressed from the *fresh herb,* which is then sprinkled with about ⅓rd of its weight of *water,* and again pressed; the mixed and strained liquid is evaporated in a vapour bath at 122° to 140° Fahr., to about one-half; to this, as soon as cold, an equal weight of *spirit* (sp. gr. 0·900), is added, and after frequent agitation for 24 hours, the whole is filtered, with pressure; the *marc* is treated with *fresh spirit* (equal to about 1-4th that first used) and again pressed; the mixed liquors are next filtered, and are, lastly, evaporated, as before, to the proper consistence.

Obs. Resembles the simple extract, but is much more powerful. It has been exhibited internally in the form of pills, and used externally combined with ointment or spread on simple plaster. *Dose.* $\frac{1}{12}$ to $\frac{1}{6}$ gr. every three hours.

EXTRACT (Aconite,—Ammoniated). Syn. *Extractum Aconiti Ammoniatum,*—Lat. *Prep.* (Dr. Turnbull,) *Extract of aconite,* 1 dr.; *liquor of ammonia* (strongest), 10 or 12 drops; mix.

EXTRACT (Aconite,—Dried). Syn. *Extractum Aconiti Siccum, E. A. Durum, E. A. cum Fæculâ,*—Lat. *Prep.* (P. Cod.) The *expressed juice,* strained through a sieve or coarse linen, is at once, without depuration, exposed in earthen dishes, in layers of about 2 lines deep, in a stove or current of dry air, to a temperature ranging between 95° and 104° Fahr., until reduced to dryness. The dried extract is to be packed in bottles.

EXTRACT (Aconite,—Saccharated). Syn. *Extractum Aconiti Saccharatum, E. A. Siccum, E. A. Pulveratum,*—Lat. *Prep.* From *extract of aconite* (Ph. Bor.), 4 oz.; *sugar of milk* (in powder), 1 oz.; mix, and dry the mass in a warm place, adding *sugar of milk,* q. s., to make the whole equal in weight that of the extract used (4 oz.) An excellent preparation which keeps well. The other *narcotic extracts,* as those of *belladonna, hemlock, henbane, &c.,* are to be treated in a similar manner.

EXTRACT (Aconite-root,—Alcoholic). Syn. *Extractum Aconiti Radicis Alcoholicum,*—Lat. *Prep.* (Dr. Fleming; Dr. Turnbull.) From a *tincture of the root* made with *rectified spirit.* It is said to be 12 times as strong as the extract of the leaves.

EXTRACT (Agaric). Syn. *Extractum Agarici,*—Lat. *Prep.* (P. Cod.) From the *infusion of white agaric,* prepared with *cold water.* Purgative. *Dose.* 1 to 4 gr.

EXTRACT (Agrimony). Syn. *Extractum Agrimonii,*—Lat. *Prep.* From a *decoction of the herb.* Vermifuge. *Dose.* 5 to 15 gr.

EXTRACT (Alcornoque). Syn. *Extractum Alcornocæ, E. Alchorneæ,*—Lat. *Prep.* From a *decoction* of *alcornoco bark* (South American). Astringent and tonic. *Dose.* 5 to 20 gr.; in phthisis, &c.

EXTRACT (Aloes). Syn. *Purified aloes, Washed do.; Extractum Aloës,*—Ph. L. *E. A. Purificatum,*—Ph. L. 1836. *E. A. Aquosum,*—Ph. D. *E. A. Hepaticæ,*—Ph. D. 1826. *Aloës Depurata, A. Lota, Gummi Aloes,*—Obs. *Prep.* 1. (Ph. L.) *Socotrine aloes,* 15 oz.; *boiling distilled water,* 1 gall.; digest with a gentle heat for 3 days, and strain; after repose, decant the clear portion, and evaporate it to the consistence of an extract.

2. (Ph. D.) *Aloes* (hepatic), 4 *oz.; water,* 1 quart; boil till dissolved; when cold, decant the clear liquid, and evaporate as before.

3. (Ph. Bor. 1847.) By macerating *powdered aloes* in *cold water* for 48 hours, with frequent agitation, and then evaporating in a water bath at a temperature not exceeding 150° to 165° Fahr., until a pilular consistence is attained.

Obs. The second is the form adopted in the laboratory. When made with the juice of borage, burgloss, &c., it forms the old *Aloes Insuccata. Dose.* 5 to 15 gr.

EXTRACT (Barbadoes Aloes). Syn. *Extractum Aloës Barbadensis,*—Ph. L. *Prep.* As the last.

EXTRACT (Anemone). See *Extract of Pasque Flower.*

EXTRACT (Angelica). Syn. *Extractum Angelicæ,*—Lat. *Prep.* 1. (Ph. Baden.) From a *tincture of the root,* prepared with *spirit* sp. gr. 0·944 (=$21\frac{1}{2}$ u. p.)

2. (Ph. Bor.) *Angelica root* and *rectified spirit,* of each, 2 parts; *water,* 9 parts; digest, strain, and evaporate. Inferior to the preceding.

3. (Dr. Moir.) *Angelica root,* 2 *lb.; rectified spirit,* 1 gall.; make a tincture; to the *marc* add *proof spirit,* 1 gall., and repeat the digestion; filter the two tinctures *separately,* mix, distil off the spirit, and evaporate. Balsamic, stomachic, and tonic. *Dose.* 10 to 20 gr. The last is the most balsamic and agreeable.

EXTRACT (Angola Seed). Syn. *Extractum Abrii, E. A. Precatorii,*—Lat. *Prep.* From the decoction.

EXTRACT (Apples,—Chalybeated). Syn. *Extractum Ferri Pomatum, Ext. Martis P.* sive *Cydoniatum,*—Lat. *Prep.* (Ph. Bor.) *Crab-apples* (unripe), 6 ℔; peel them and reduce them to a pulp; add *iron wire* (in small coils), 1 ℔; digest in a vapour bath for about a week, express, strain, decant, and evaporate in a porcelain vessel, with constant stirring, to the consistence of a soft extract; dissolve the residuum in *water,* 4 parts, strain and evaporate as before. *Dose.* 5 to 10 gr.; as a chalybeate tonic. The formula of the Ph. Baden is nearly similar.

EXTRACT (Arnica). Syn. *Extract of Arnica Flowers; Extractum Arnicæ Florum,*—Lat. *Prep.* 1. (P. Cod.) From the *dried flowers,* as *alcoholic extract* of *aconite,* P. Cod.

2. (Ph. Græca, 1837.) From a *tincture of the flowers,* prepared with *rectified spirit,*

3 parts; and *water*, 5 parts. *Dose.* 2 to 6 gr.; as a stimulant in various diseases accompanied with debility, deficient nervous sensibility, paralysis, dropsies, diarrhœa, amenorrhœa, dysentery, &c.

EXTRACT (Arnica). Syn. *Extract of Arnica Root, Extractum Arnicæ Radicis,*—*Prep.* 1. (Ph. Baden.) As *extract of angelica*, Ph. Baden.

2. (Ph. Græca.) As No. 2, (above.) The form of the Hamburg Codex is nearly similar. *Dose, &c.* As the last.

EXTRACT (Artichoke). Syn. *Extractum Cynaræ,*—Lat. From the *fresh leaves of the artichoke*, as *extract of aconite*, Ph. L. *Dose.* 3 to 6 gr., twice or thrice daily; in rheumatism, &c.

EXTRACT (Asparagus). Syn. *Extractum Asparagi,*—Lat. *Prep.* (Soubeiran.) From the *expressed juice of the shoots*, clarified and evaporated by a gentle heat.

EXTRACT (Asparagus-roots). Syn. *Extractum Asparagi Radicis,* — Lat. *Prep.* From the *roots*, as the last. Both the above are diuretic. *Dose.* 15 gr. to ½ dr. or more.

EXTRACT (Balsam Apple). Syn. *Extractum Balsaminæ,* — Lat. *Prep.* From the *fruit* or *fresh leaves* of the *balsam apple* (momordica balsamina,—Linn.) as *extract of aconite.* Balsamic, diuretic, restorative, and vulnerary. *Dose.* 5 to 20 gr.; in dropsies, &c.

EXTRACT (Bardana). See *Extract of Burdock.*

EXTRACT (Bark). See *Extract of Cinchona.*

EXTRACT (Bear's Whortleberry). See *Extract of Uva Ursi.*

EXTRACT (Belladonna). Syn. *Extract of Deadly Nightshade; Inspissated Juice* of *Belladonna; Extractum Belladonnæ,*—Ph. L. E. & D. *Succus Spissatus Belladonnæ,*—Ph. D. 1826. *Prep.* 1. (Ph. L.) As *Extract of aconite*, Ph. L.

2. (Ph. E.) Express the juice from the bruised *fresh plant*, sprinkle the *marc* with *water*, and again apply pressure; mix the expressed liquids, *filter* them, and evaporate the filtered liquid in a vapour bath to the consistence of an extract.

3. (Ph. D.) From the *leaves*, collected when the plant begins to flower. The expressed juice is allowed to stand for 24 hours, and the clear portion is decanted; the sediment is placed on a calico filter, washed with an equal bulk of *cold water*, and the filtrate mixed with the expressed juice. The mixed liquid is next heated in a water-bath, to coagulate its albumen, and after being skimmed, and filtered through flannel whilst hot, the *washed sediment* is added, and the whole evaporated, as before.

4. (Ph. U. S.) The *expressed juice* is heated to the boiling point, filtered and evaporated.

Obs. The P. Cod. directs this extract to be made by two different formulæ. The product of the one resembles that of the Ph. L.; that of the other, the *ext. belladonna*, Ph. E. That of the Ph. L., from retaining the fecula, is the weakest preparation. *Dose.* ½ gr. to 1 gr., gradually increased to 3 or 4 gr.; as an anodyne in neuralgia, tic-doloureux, &c.; as an antispasmodic to relieve rigidity and spasms, in various affections of the uterus, rectum, urethra, bladder, &c., and in hooping-cough; in various maladies of the eyes; and as a resolvent and discutient in several glandular diseases. It has been highly recommended as a preservative against scarlet fever. It is most frequently employed externally, under the form of a plaster, ointment, or lotion. It is *poisonous.* The treatment resembles that noticed under *aconite.* Fresh belladonna yields about 5% of extract. (Brande; 1-9th,—Gray.)

EXTRACT (Belladonna,— Alcoholic). Syn. *Extractum Belladonnæ Alcoholicum,* —Lat. *Prep.* 1. (P. Cod.) As *alcoholic extract of aconite*, P. Cod.

2. (Ph. U. S.) As the last (nearly), using spirit of 0·935 (= about 13 u.p.)

3. (Moir.) The *expressed juice* is coagulated by heat, cautiously applied, and filtered; the filtrate is reduced to the consistence of a syrup, and mixed with an equal volume of nearly *anhydrous alcohol* (say of 90%); the clear portion is lastly evaporated, as before.

Obs. The above is much more powerful than the common extract, and is chiefly used in external applications.

EXTRACT (Belladonna Berries). Syn. *Extractum Baccarum Belladonnæ,* — Lat. *Prep.* (P. Cod.) From the *expressed juice of the berries*, evaporated to the consistence of thick honey. *Dose.* 1 to 5 gr.

EXTRACT (Bistort). Syn. *Extractum Bistortæ,*—Lat. *Prep.* 1. (P. Cod.) From the *dried root of bistort* or *snake-weed*, by percolation with temperate *distilled water.*

2. From the *infusion* made with *boiling water*, or from the *decoction.* Astringent and tonic. *Dose.* 10 gr. to ½ dr.

EXTRACT (Bitter-sweet). Syn. *Extract of Woody Nightshade; Extractum Dulcamaræ,*—Lat. *Prep.* 1. From the *decoction of the stalks.*

2. (Ph. U. S.) From the *dried stalks*, by percolation with *temperate water*. Diaphoretic, diuretic, and narcotic. *Dose.* 5 to 10 gr.; in chronic asthma, rheumatism, and chest diseases; and particularly in chronic skin diseases.

EXTRACT (Black). Syn. *Extractum Nigrum*,—Lat. Extract of cocculus indicus. It is used by fraudulent brewers to impart an intoxicating property to ale.

EXTRACT (Black Pepper). See *Extract of Pepper.*

EXTRACT (Borage). Syn. *Extractum Boraginis*,—Lat. *Prep.* 1. (P. Cod.) From the *dried herb.*

2. (Ph. Lusit.) From the *clarified juice of the fresh plant.* Exhilarating, restorative, and pectoral. *Dose.* 10 to 30 gr., or more.

EXTRACT (Box). Syn. *Extractum Buxi, E. Corticis B.*, — Lat. *Prep.* (P. Cod.) From the *tincture of the root bark*, prepared (with *proof spirit*) by displacement, as *extract of aconite*, P. Cod.

EXTRACT (Broom). Syn. *Extract of Broom Tops; Extractum Scoparii; E. Cacuminum Genistæ*,—Ph. L. 1788. *E. Spartii Scoparii*,—Ph. D. 1826. From *decoction of broom tops.* Diuretic and cathartic; and, occasionally, emetic. *Dose.* 20 gr. to 1 dr.; in dropsy, &c. It is now seldom used.

EXTRACT (Bryony). Syn. *Extractum Bryoniæ, E. B. Albæ, E. Radicis B. A.*,—Lat. *Prep.* From the *infusion* or *decoction of the root of white bryony.* Purgative, diuretic, and emmenagogue. *Dose.* 10 gr. to ½ dr. It was once a favorite remedy in asthma, dropsy, epilepsy, &c.

EXTRACT (Buchu). Syn. *Extractum Buchu, E. Diosmæ*,—Lat. *Prep.* From *buchu leaves*, as the last.

EXTRACT (Buchu,—Ethereo-alcoholic). Syn. *Extractum Buchu Ethero-alcoholicum*, —Lat. *Prep.* (W. Procter.) *Buchu* (in coarse powder), 1 ℔; *ether*, 4 fl. oz.; *alcohol* (rectified spirit), 12 fl. oz.; percolate without digestion, adding *dilute alcohol* until a pint of *ethereo-alcoholic tincture* is obtained, and suffer this to evaporate spontaneously; treat the residue in the displacer with *dilute alcohol*, till 2 pints are obtained; evaporate to a syrup, add the product of the *first tincture*, mix, and complete the evaporation. *Dose.* 5 to 10 gr.; in diseases of the urinary organs, &c. See *Diosma.*

EXTRACT (Buchu,—Fluid). Syn. *Extractum Buchu Fluidum*,—Lat. *Prep.* (W. Procter.) *Buchu leaves*, 8 oz.; *rectified spirit*, 16 fl. oz.; for a tincture by displacement, adding *water*, until 12 fl. oz. have passed through; allow this to evaporate spontaneously until reduced to *one half;* next digest the mass in the percolator with *cold water*, 1 pint, for 12 hours, express a pint, and evaporate this to 10 *fl. oz.;* lastly, add the 6 *fl. oz.* of residual tincture, agitate together, and in a few days filter, or decant the clear portion. *Dose.* 1 to 2 teaspoonfuls. (See *above.*)

EXTRACT (Buckbean). Syn. *Extractum Menyanthis*,— Lat. *Prep.* 1. (P. Cod.) From the *expressed juice of the fresh plant.*

2. (Ph. Bor.) From the *infusion* made with *boiling water.* Bitter, tonic, and astringent. *Dose.* 5 to 10 gr. In larger doses it is purgative, cathartic, and even emetic.

EXTRACT (Buckthorn). Syn. *Extractum Rhamni, E. Baccarum R.*,— Lat. *Prep.* From the filtered *expressed juice of buckthorn berries.* Some persons allow it first to run into a state of fermentation; but the quantity of the product is thereby greatly lessened. Hydragogue and purgative. *Dose.* 15 gr. to 1 dr., or more.

EXTRACT (Burdock). Syn. *Extractum Bardanæ*,—Lat. *Prep.* 1. From the *decoction of burdock root.*

2. (P. Cod.) As *extract of bistort*, P. Cod. In gout, rheumatism, skin diseases, &c. *Dose.* 10 gr. to 1 dr. Sir Robert Walpole praised burdock-root as a gout medicine; and others have considered it an excellent substitute for sarsaparilla. (Lindley.)

EXTRACT (Butter-nut). Syn. *Extractum Juglandis, E. J. Cinereæ*,—Lat. *Prep.* (Ph. U. S.) From the *inner bark of the root* of the *butter-nut* or *white walnut*, as *extract of bitter sweet*, Ph. U. S. A mild, yet efficacious aperient and vermifuge. *Dose.* As a laxative, 5 to 10 gr.; as a purgative, 15 to 30 gr.

EXTRACT (Cabbage-tree Bark). Syn. *Extractum Geoffroyæ, E. G. Inermis*,—Lat. *Prep.* (Ph. Belg.) From the *decoction.* Vermifuge. *Dose.* 2 to 4 gr.

EXTRACT (Cahinca). Syn. *Extractum Caincæ*,—Lat. *Prep.* From *cahinca root* (chiococca densifolia) as *extract of box*, P. Cod. Diuretic and cathartic. *Dose.* 6 to 20 gr.; in dropsy, &c.

EXTRACT (Calamus). See *Extract of Sweet Flag.*

EXTRACT (Calumba). Syn. *Extractum Calumbæ, E. Radicis C.*,—Lat. *Prep.* 1. From the *infusion of the root* made with *hot water. Dose.* 10 to 20 gr.

2. (*Spirituous*,—P. Cod.) As *extract of*

box. The Ph. Baden. orders spirit of 0·944 to be used. *Dose.* 5 to 15 gr.

3. (*Alcoholic,*—Ph. Bor.) As the last (nearly), but using *stronger spirit;* the evaporation is to be conducted at a heat not above 167° Fahr., until it acquires the consistence of a pill-mass, which, after being rendered quite dry by a very gentle heat, is to be reduced to fine powder. It should have a brownish-yellow colour, and give a turbid solution with water. *Dose.* 4 to 12 gr. They are all tonic and stomachic.

EXTRACT (Cantharides). Syn. *Extract of Spanish Flies; Extractum Cantharidis, E. Lyttæ,*—Lat. *Prep.* 1. (P. Cod.) As *extract of box.*

2. (Soubeiran.) From a *tincture* prepared with *spirit* of the sp. gr. 0·923 (about 2 u.p.) See *below.*

EXTRACT (Cantharides,—Acetic). Syn. *Extractum Cantharidis Aceticum,* — Lat. *Prep.* From a *tincture* prepared with *acetic acid,* sp. gr. 1·048.

EXTRACT (Cantharides,— Ethereal). Syn. *Extractum Cantharidis Ethereum,*—Lat. *Prep.* From the *ethereal tincture.* The ether, acid, and spirit distilled from the above, must be either thrown away, or used to make fresh extract, as it is highly poisonous. They are all for external use only, and should have the consistence of soft butter.

EXTRACT (Cardamoms, — Ethereal). Syn. *Extractum Cardamomi Æthereum,* —Lat. *Prep.* (W. Procter.) By spontaneous evaporation of the *ethereal tincture.* It consists of the volatile and fixed oils of the seeds, and is used to aromatize pills, powders, &c.

EXTRACT (Carob Beans). Syn. *Extractum Ceratoniæ,*—Lat. *Prep.* From the *decoction* of the *pods* (carob *or* algaroba beans) *of the ceratonia siliqua,* or *St. John's bread tree.* See *Algaroba.*

EXTRACT (Carolina Pink). See *Extract of Pink-root.*

EXTRACT (Carrot Root). Syn. *Extractum Carotæ, E. Radicis C.*—Lat. *Prep.* (Swediaur.) From the *clarified expressed juice,* evaporated to the consistence of honey. Recommended as an application to ulcerated cancers.

EXTRACT (Cascarilla). Syn. *Extractum Cascarillæ, E. Corticis C.,*—Lat. *Prep.* 1. (Guibourt.) From the *alcoholic* (rectified spirit) *tincture.*

2. (Ph. Baden.) As the last, but using *spirit* of the sp. gr. 0·944.

3. (Ph. L. 1788.) As *extract of jalap,* Ph. L.

Obs. This extract is tonic, aromatic, and stomachic. *Dose.* 5 to 15 gr., or more, 2 or 3 times a day. 28 *lb.* of bark yield about $5\frac{1}{4}$ *lb.* of extract.

EXTRACT (Cassia.) Syn. *Extractum Cassiæ,*—Lat. See *Cassia Pulp.*

EXTRACT (Catechu). Syn. *Extractum Catechu,*—Lat. *Prep.* 1. From *decoction of catechu.*

2. (P. Cod.) From the *infusion in boiling water.* Astringent and tonic. *Dose.* 5 to 25 gr. See *Catechu.*

EXTRACT (Cathartic). Syn. *Extractum Catharticum,*—Lat. Compound extract of colocynth, Ph. L. 1836.

EXTRACT (Celandine). Syn. *Extractum Chelidonii,*—Lat. *Prep.* 1. (Ph. Bor.) From the *herb,* as *alcoholic extract of aconite,* Ph. Bor. *Dose.* 3 to 10 gr.

2. (Van Mons.) From the *expressed juice,* coagulated by heat, filtered, and evaporated; towards the end adding the coagulum. *Dose.* 5 to 15 gr. or more. *Used* as a drastic hydragogue in dropsies; and in scrofula, &c.

EXTRACT (Centaury). Syn. *Extractum Centaurii,*—Lat. Extracts under this name are prepared from *American centaury* (chironia angularis,—*Linn.*), *lesser centaury* (gentiana centaurium,—*Linn.*), and *great centaury* (centaurea centaurium,—*Linn.*), either by evaporating the *decoction,* or the infusion made with *hot water.* The *dose* and properties resemble those of extract of gentian.

EXTRACT (Centaury,—Alcoholic). Syn. *Extractum Centaurii Alcoholicum,*— Lat. *Prep.* As *extract of box.* (See *above.*)

EXTRACT (Cevadilla,—Alcoholic). Syn. *Alcoholic Extract of Sabadilla; Extractum Sabadillæ,*—Lat. *Prep.* (Dr. Turnbull.) From *tincture of cevadilla seeds,* made with *rectified spirit.* Employed by Dr. Turnbull as a remedy in painful rheumatic and neuralgic affections, and, generally, as a substitute for veratria. *Dose.* $\frac{1}{10}$ to $\frac{1}{6}$ gr. It is *extremely poisonous.*

EXTRACT (Chamomile). Syn. *Extractum Anthemidis,*—Ph. E. *Ext. Florum Chamæmeli,*—Ph. D. 1826. *Ext. A. Nobilis, E. Florum A.,*— Lat. var. *Prep.* From *decoction of the flowers.*

Obs. This extract contains only the bitter portion of the chamomile, the aromatic volatile oil being dissipated during the evaporation. It is usually prepared from old flowers that have lost their smell and colour, and are thus rendered unsaleable. The extract of chamomile that *smells strongly of the flowers,* frequently vended by the druggists, is prepared by adding 1 dr. of the *essential oil of chamomile* to *every pound of extract,* when nearly cold, and just before removing it from the evaporating pan. This addition, unlike many which are made in the laboratory, vastly increases the medicinal virtues of this article. The mass of extract of chamomile met with in the shops is nothing but extract of gentian scented with a little oil of chamomile. 1 cwt. of chamomiles yields about 48 *lb.* of extract.

Extract of chamomile is bitter, tonic, and stomachic. *Dose.* 10 to 20 gr., made into a pill, either alone, or combined with a little rhubarb and ginger. See *Pills, &c.*

EXTRACT (Chenopodium). Syn. *Extract of Stinking Goose-foot; Extractum Chenopodii,*—Lat. *Prep.* 1. From the *stinking orache* or *goose-foot* (chenopodium olidum), as *extract of aconite*, Ph. L.

2. (Mr. Houlton.) From the *expressed juice* by spontaneous evaporation. A better plan is to expose it to heated air. Antihysteric, emmenagogue, and vermifuge. *Dose.* 5 to 20 gr.

EXTRACT (Cinchona). Syn. *Extract of Bark, E. of Yellow do., E. of Heart-leaved Cinchona Bark; Extractum Cinchonæ Flavæ, Ext. Cinchonæ,*—Ph. L. & Ph. L. 1824. *Ext. Cinchonæ Cordifoliæ,*—Ph. L. 1836. *Prep.* 1. (Ph. L.) *Yellow cinchona* (coarsely bruised), 3 lb; *distilled water* (temperate), 4 pints; macerate for 24 hours (constantly stirring), and strain through linen; what remains, again macerate in *water*, 1 quart, for 24 hours, and strain; evaporate the mixed liquids to a proper consistence.

2. (Ph. L. 1836.) From the decoction.

Obs. The aqueous extracts of cinchona bark possess little medicinal virtue, owing to the insolubility of the alkaloids (*quinine, cinchonine, &c.*), in water, and also from the rapid oxidation of their extractive matter, when exposed in solution to the joint action of heat and atmospheric oxygen. *Dose.* 5 gr. to ½ dr., in mixtures, faintly acidulated with sulphuric acid. Cinchona bark yields from 24% to 30% of aqueous extract.

EXTRACT (Pale Cinchona). Syn. *Extract of Pale Bark, E. of Lance-leaved do.; Extractum Cinchonæ Pallidæ,* — Ph. L. *Ext. C. Lancifoliæ,*—Ph. L. 1836. *Ext. Cinchonæ,*—Ph. D. 1826. *Ext. Corticis Peruviani,*—Ph. L. 1745 & 1788. *Prep.* 1. (Ph. L.) From *pale bark*, as *extract of cinchona*, Ph. L.

2. (Ph. L. 1836, & Ph. D. 1826.) From the *decoction.* This forms the *extract of bark* of the shops. The *red* and *yellow cinchona barks* are scarcely ever used for making extracts. Their richness in *quinine* leads to their almost exclusive employment for the manufacture of that alkaloid, by which their value is greatly enhanced. As far as our knowledge extends, no other *extract of bark*, than this, is either employed or asked for.

EXTRACT (Red Cinchona). Syn. *Extract of Red Bark, E. Oblong-leaved do.; Extractum Cinchonæ Rubræ,*—Ph. L. *Ext. Cinchonæ Oblongifoliæ,* — Ph. L. 1836. *Prep.* 1. (Ph. L.) From *red bark*, as *extract of cinchona*, Ph. L.

2. (Ph. L. 1836.) From the *decoction.*

Obs. These extracts are ordered to be kept in two states, the one (*soft extract of cinchona; extractum cinchonæ molle;*) for making pills, &c.; the other (*hard extract of cinchona; extractum cinchonæ durum;*) for powdering. The *dose*, &c., of all the above are the same.

EXTRACT (Cinchona,—Dry.) Syn. *Essential Salt of Bark, Lagaraye's do.; Extractum Cinchonæ Siccum, Ext. C. per Aquam Frigidam,*—Lat. *Prep.* 1. (P. Cod.) From an *aqueous infusion of pale bark* (prepared by displacement with water at a temperature not above 77° Fahr.), evaporated to the consistence of a thick syrup, and then spread thinly and uniformly on earthenware dishes, or sheets of glass, and dried in a stove, by a very gentle heat. It is separated from the plates with a knife, and preserved in well-closed phials. Prior to spreading it out on the plates, about 4% or 5% of *thick mucilage* is commonly added.

2. (Ph. Bor.) As the above (nearly).

3. (Ph. Hann. 1831.) Similar to the above; but the liquid when it acquires the consistence of treacle is diluted with *water* and again evaporated to a like consistence; and this dilution and evaporation is repeated until, on the addition of water, it forms a clear solution. *Dose.* 5 to 25 gr. The product of the last formula is nearly inert, and that of the others possesses little activity.

EXTRACT (Cinchona,—Fluid). Syn. *Extractum Cinchonæ Fluidum,*—Lat. *Prep.* 1. See *Liquor of Cinchona.*

2. (Dr. Neligan.) From *yellow bark*, as *fluid extract of buchu.*

EXTRACT (Cinchona,—Resinous). Syn. *Alcoholic Extract of Bark; Extractum Cinchonæ Alcoholicum; Ext. Cinchonæ,*—Ph. E. *Ext. C. Resinosum,*—Ph. L. 1809. *E. C. cum Resinâ,* — Ph. L. 1788. *Prep.* (Ph. E.) From *any variety of cinchona bark* (in powder), 4 oz.; *proof spirit*, 24 fl. oz.; prepare a tincture by displacement, distil off most of the spirit, and evaporate the residuum to the consistence of an extract.

2. (Ph. L. 1809.) From the *tincture* made with *rectified spirit.*

3. (Ph. L. 1788.) As *extract of jalap*, Ph. L.

4. (Ph. U. S.) *Peruvian bark*, 1 ℔; *rectified spirit*, 4 pints; make 4 pints of tincture by displacement; add *water* to the mass in the percolator, digest, and obtain 6 pints of infusion; distil off the spirit from the tincture, and evaporate the infusion to the consistence of syrup, then mix the two, and complete the evaporation. More active than the aqueous extract. *Dose.* 5 to 20 gr.

5. (Ellis.) *Yellow bark*, 2 ℔; *hydrochloric acid*, 4 fl. dr.; *water*, 1 gall.; boil, strain, and repeat the decoction with *fresh water* and *acid;* mix the decoctions, filter, and agitate it with *fresh-slaked lime*, 2½ oz.; filter or decant; dry the residuum and exhaust it with *hot alcohol*, q. s.; lastly evaporate the alcoholic tincture to a pilular consistence. *Dose.* 1 to 5 gr. Some persons have proposed to call this "*essential salt of bark.*"

EXTRACT (Cinchona,—Vinous). Syn. *Extractum Cinchonæ Vinosum*,—Lat. *Prep.* (Ph. Hesse.) *Peruvian bark* (in powder), 1 part; *white wine* (sherry), 8 parts; digest 3 days, express, filter, and evaporate.

EXTRACT (Cocculus). Syn. *Extract of Cocculus Indicus, Black Extract, Extract* (Brewer's), *Beer Strengthener, Hard Multum; Extractum Cocculi, E. C. Indici*,—Lat. *Prep.* From *cocculus indicus*, by decoction. It is kept in two states,—*one*, that of thick treacle; the *other*, that of a pilular extract. The *first* is "put up" in bladders; the *last* is made into ½ *lb.* rolls, like lead plaster or roll-chocolate. It is narcotic and poisonous, and is employed by fraudulent brewers and publicans to give a false strength to their liquors. There is scarcely a drop of *porter* retailed in London that is not *poisoned* with it. See *Black Extract, Beer, &c.*

EXTRACT (Colchicum). Syn. *Extract of Meadow Saffron, Ext. of the Corms of Colchicum; Extractum Colchici*,—Ph. L. *Ext. C. Cormi*,—Ph. L. 1836. *Prep.* 1. (Ph. L.) From the *fresh corms* or *bulbs* of *meadow saffron* (having removed the outer coat), as *extract of aconite*, Ph. L.

2. (Wholesale.) From the *decoction* of the *dried corms. Prod.* 50% to 55%.

Obs. This extract is given in the usual cases in which colchicum is employed. *Dose.* 1 to 4 gr., every third or fourth hour. (Thomson.) "A favorite remedy of Dr. Hue, of St. Bartholomew's Hospital, in the early stages of acute rheumatism. The dose is 1 gr. every four hours." (Pereira.)

EXTRACT (Colchicum,—Acetic). Syn. *Acetic Extract of Meadow Saffron; Extractum Colchici Aceticum*,—Ph. L. & E. *Ext. Cormi C. A.*,—Lat. *Prep.* 1. (Ph. L.) *Fresh corms* or *bulbs*, 1 ℔; remove the outer coating, bruise them, and sprinkle on them, gradually, *acetic acid*, 3 fl. oz.; then express the juice, and, *unstrained*, evaporate it to a proper consistence, in wedgewood ware or earthen vessels.

2. (Wholesale.) *Dried corms*, 14 *lb.; acetic acid* (pyroligneous), 6 pints; *distilled water*, 5¼ gall.; digest for 14 days, express, filter, and evaporate. *Product*, 2½ to 3 *lb.*

Obs. The above extracts are generally prepared from the dried corms, and hence the very uncertain and inferior quality of those commonly met with. They also possess less activity than the Pharmacopœial preparations. They rapidly get dry and crumbly, and, unless a *little spirit* and *oil of cloves* are added, will scarcely keep a week in warm weather without becoming mouldy. *Dose.* 1 to 3 gr., two or three times a day. It is much stronger than the common extract, and contains the *acetate of colchicina.* Sir C. Scudamore prefers the acetic extract prepared by the 2d formula (see *above*).

EXTRACT (Colchicum, — Alcoholic). Syn. *Extractum Colchici Alcoholicum*,—Lat. *Prep.* (P. Cod.) As *extract of box.* More active than even the acetic extract. All the preparations of colchicum are *poisonous* in large doses.

EXTRACT (Colocynth). Syn. *Extract of Bitter Apple; Extractum Colocynthidis*, —Ph. L. & E. *Ext. C. Simplex*,—Ph. D. 1826. *Ext. C. Molle*,—Lat. *Prep.* 1. (Ph. L.) From *colocynth pulp* (cut in pieces and the seeds removed), by simple maceration in *cold water*, for 36 hours, frequently pressing it with the hands, and afterwards strongly pressing out the liquor, which must be strained before evaporating it.

2. (Ph. E.; Ph. L. 1836, & D. 1826.) From the *decoction.* This is the plan adopted at Apothecaries' Hall, and in the laboratory generally. Many houses do not even remove the seeds.

Obs. This extract rapidly gets hard, crumbly, and mouldy, by keeping. For the remedy see *above. Dose.* 5 gr. to 20 gr.; as a cathartic. Colocynth pulp yields about 65% of extract.

EXTRACT (Colocynth, — Alcoholic). Syn. *Extractum Colocynthidis Alcoholicum*,

—Lat. *Prep.* 1. (Ph. Baden.) As *extract of angelica*, Ph. Bad.

2. (P. Cod.) From a *tincture prepared* with *proof spirit*. Much more active than the simple extract. *Dose.* 2 to 7 gr.

EXTRACT (Colocynth, — Dry). Syn. *Extractum Colocynthidis Siccum*, — Lat. *Prep.* (Ph. Bor.) As the last, but using *spirit* of the sp. gr. 0·900 (*about* 16 o. p.), digesting at a tepid heat, evaporating to dryness, and powdering. *Dose.* 1 to 6 gr.

EXTRACT (Colocynth, — Compound). Syn. *Compound Extract of Bitter Apple, Cathartic Extract; Extractum Catharticum*,—Ph. L. 1746. *Ext. Colocynthidis Compositum*,—Ph. L. 1836, & Ph. D. 1826. *Prep.* 1. (Ph. L. 1836.) *Colocynth pulp* (sliced, without the seeds), 6 oz.; *proof spirit*, 1 gall.; digest with a gentle heat for 4 days, express, strain, and add of *extract of aloes* (Ph. L. 1836), 12 oz.; *powdered scammony*, 4 oz.; *Castile soap* (cut small), 3 oz.; and evaporate (distil) to a proper consistence; adding, towards the last, *powdered cardamoms*, 1 oz.

2. (Ph. D. 1826.) As the last, but using *hepatic aloes* in lieu of the aqueous extract.

3. (Wholesale.) The formulæ adopted by the wholesale druggists are mere modifications of that of the Ph. L. 1809; *water* being used instead of *spirit* as the menstruum, with actual benefit, as we honestly believe, to the quality of the preparation. The following are extensively employed by those who do most in this article, and we can speak highly of the quality of the products obtained by their use:

a. Turkey colocynth, 18 *lb.*, is boiled in about 20 times its weight of *water* for five or six hours; to the *strained decoction* is added *hepatic aloes*, 40 *lb.*, which are boiled until dissolved, when the solution is decanted. In the mean time the *colocynth* is *exhausted* with a *second quantity of water*, (less than the first,) and the strained liquor is added to the *undissolved residuum of the aloes*, and boiled for a few minutes; after which it is drawn off and mixed with the first *decoction of aloes;* the mixed liquors are then allowed to stand until *quite cold* (commonly until the next day) to deposit the resinous portion. The liquor is next decanted or drawn off, and set evaporating as quickly as possible; as soon as the consistence of treacle is arrived at, the whole is allowed to *cool considerably*, and *moist sugar* (clean), 4 *lb.*, and *Castile soap*, 10 *lb.* (previously melted with a *little* water), are added; *powdered scammony*, 6 *lb.*, is next gradually sifted in, the extract all the time being assiduously stirred by a second person. Lastly, the heat is further moderated, and the stirring continued until a *rather harder* consistence is acquired than is proper for the extract, when the steam is *wholly* "shut off," or the vessel removed from the heat, and as soon as the whole has become *sufficiently cool* to prevent any considerable *evaporation of the spirit, essence of cardamoms*, 2 *lb.* (say, 1 quart), is expertly stirred in; and the extract *at once* (whilst still warm) put into stone jars or pots, and tied or covered over, for store or use. The product is usually labelled *Ext. Colocynth. Comp. Opt.* It looks well, and smells very aromatic, and is really an excellent preparation.

b. Turkey colocynth, 2¼ *lb.; hepatic aloes*, 5½ *lb.; powdered scammony*, 1½ *lb.; powdered cardamoms*, 6 *oz.* (or *essence*, ½ pint); *Castile soap* (genuine), 1 *lb.* 2 *oz.; pale moist sugar*, ½ *lb.;* proceed as last. This produces a beautiful article, and of unquestionable quality, equally effective, and milder in its action than the college preparation. It is labelled and sent out as *Ext. Colocynth. Comp. Ph. L.* (1836.)

c. (Ph. L. 1809.) *Colocynth*, 6 dr., (6 parts;) *aloes*, 1½ oz., (12 parts;) *scammony*, ½ oz., (4 parts;) *hard soap*, 3 dr., (3 parts;) *cardamoms*, 1 dr., (1 part;) as No. 3, *a*, (nearly).

Qual., &c. Compound extract of colocynth is often adulterated with acrid cathartics to make up for the deficiency or inferiority of its proper ingredients, and foreign matter often becomes mixed with it by the use of impure scammony. The presence of CAPE ALOES may usually be detected by the *nauseous odour;* CHALK (an article frequently present in bad scammony), by placing a little ball of the extract in a glass tube, and pouring over it some *dilute hydrochloric* or *acetic acid*, when an effervescence will ensue, if that substance be present; JALAP, SCAMMONY *adulterated with fecula*, and other STARCHY SUBSTANCES, by the filtered decoction of the extract turning blue on the addition of *tincture of iodine;* GAMBOGE, by the decoction becoming deep red on the addition of *liquor of potassa*, and by a filtered alcoholic solution of the extract, forming a yellow emulsion with *water*, which becomes transparent and assumes a deep red colour on the addition of *caustic potassa;* and further, by this solution (if the alkali is not in excess) giving a yellow precipitate with *acids* and with *acetate of lead*, a brown precipitate with *sulphate of copper*, and a very dark brown one with the *salts of iron;* also by the *ethereal solution of the extract* dropped on *water*, yielding an opaque yellow film, soluble in *caustic potassa*, if it contains *gamboge*.

Dose. 3 gr. to 15 gr. It is a safe and mild, yet certain purgative. It may be mixed with calomel without the latter being decomposed. 2½ or 3 gr. mixed with an equal weight of *blue pill* and taken overnight, forms an excellent aperient in dyspepsia, liver complaints, &c. See *Abernethy Medicines.*

Obs. There are few formulæ which have undergone so many alterations in the hands of the College as that for *compound extract of colocynth.* Before 1809, *proof spirit* was ordered to be employed as the menstruum, and, omitting the soap, the preparation resembled that of the Ph. L. 1836. In 1809, the College directed *water* to be used instead of *spirit*, and *added* a certain quantity of *soap*. In the next edition of the Pharmacopœia, (1815,) the *soap* was *again omitted;* but in the edition of 1824, the formula of 1809 was again adopted, substituting, however, *proof spirit* for the *water*. These directions were also continued in the edition of 1836. In the present Pharmacopœia (1851) the formula for this extract is omitted altogether, and in its place, a pill (*pilula colocynthidis composita*) is inserted. Can these repeated changes be explained with credit to the pharmaceutical talents of the Colleges?

The *compound extract of colocynth* and the *simple* and *compound extracts* of *sarsaparilla* are in greater demand in the wholesale trade, and are sold in larger quantities at a time, than *all* the other *medicinal* extracts put together. As a proof, if it were necessary, that "honesty is the best policy," it may be mentioned, that a certain metropolitan druggist, remarkable for the superiority of this preparation, has obtained no inconsiderable fortune by its sale alone; while the host of miserable vendors of the evaporated decoction of *musty* colocynth seed, *Cape* aloes, *worthless* scammony, and *scentless* cardamoms, sold under the name, attempt to ruin each other, by offering their rubbish at a price that precludes the possibility of a large profit, or even of the establishment of a *respectable* connexion.

EXTRACT (Contrayerva). Syn. *Extractum Contrayervæ,* Lat. *Prep.* (Palat. Cod.) From *contrayerva root*, as *extract of cinchona*, Ph. L. *Dose.* 10 gr. to ½ dr.; as a diaphoretic tonic, in low conditions of the system.

EXTRACT (Copaiba). Syn. *Resinous Extract of Copaiba; Extractum Copaibæ, E. C. Resinosum,*—Lat. *Prep.* (Mr. Thorn.) From *balsam of copaiba*, by distilling off the oil, until the residuum assumes the consistence of an extract. *Dose.* 10 to 20 gr., or more. One of the many useless preparations which encumber modern pharmacy. It may be taken in 3 dr. doses without any perceptible effect beyond a fit of indigestion.

EXTRACT (Copalche). Syn. *Extractum Copalchi, E. Corticis C.,* — Lat. *Prep.* From *copalchi bark* (croton pseudo-china), as *extract of cascarilla*, which it for the most part resembles. *Dose.* 1 to 3 gr.

EXTRACT (Couch Grass). Syn. *Extract of Dog's Grass; Extractum Graminis,*—Lat. *Prep.* 1. (P. Cod.) From the root of *couch grass* or *dog's grass* (triticum repens,—Linn.), as *extract of bistort*, P. Cod.

2. From the *fresh root*, as *extract of aconite*, Ph. L. (See *below.*)

EXTRACT (Couch Grass,—Fluid). Syn. *Mellago Graminis, Extractum Graminis Fluidum,*—Lat. *Prep.* (Ph. Hann. 1831.) From the *decoction* of the *fresh root* of *couch grass*, evaporated to the consistence of new honey. Pectoral. *Dose.* 15 gr. to ½ dr., or more.

EXTRACT (Cubebs). Syn. *Extractum Cubebæ,*—Lat. *Prep.* 1. From the *alcoholic tincture* evaporated by a very gentle heat. *Dose.* 5 gr. to 30 gr.

2. (Mr. Toller.) To the last add a little *powdered Castile soap*, when it begins to thicken, and evaporate to a pilular consistence. *Dose.* 10 gr. to 30 gr.

EXTRACT (Cubebs,—Fluid). Syn. *Liquor Cubebæ, Extractum C. Fluidum,*—Lat. *Prep.* 1. *Cubebs* (ground in a coffee-mill), 1¼ *lb.*; *rectified spirit*, 1 quart; prepare a tincture either by displacement, or by digestion for a week, and reduce it, by distillation at a *very gentle heat*, until the whole measures exactly 1 pint. Every *fl. oz.* represents 2 *oz.* of cubebs. *Dose.* 20 to 40 drops.

2. (M. Puche.) From *cubebs* and *proof spirit*, equal parts, by percolation; without subsequent evaporation. Represents its own weight in cubebs. *Dose.* ½ to 1 fl. dr.

3. (Ph. U. S. 1851.) *Cubebs*, 1 *lb.* (nearly); *ether*, q. s.; make 1 *quart of tincture;* then distil off 1½ pint of the ether by the heat of a water bath, and expose the residuum in a shallow vessel until the remainder of the ether has evaporated. See *Oleo-resinous Extract of Cubebs.*

EXTRACT (Cubebs, — Oleo-resinous). Syn. *Extractum Cubebæ, E. Cubebarum, E. C. Oleo-resinosum,* — Lat. *Prep.* 1. (M. Dublanc.) The *essential oil*, resulting from the careful distillation of any given quantity of *cubebs*, is mixed with the *resinous extract* obtained by evaporating a *tincture* of the *dried residuum* made with *rectified spirit;* the whole being reduced to the consistence of a thick syrup. 1 *lb.* of cubebs yields about 6 *oz.* of this extract.

2. (Labelonge.) *Cubebs* are first exhausted with *ether*, and then with *proof spirit*, in a displacement apparatus; the *alcoholic tincture* is evaporated to an extract over a water bath, and when cold, the *ethereal tincture* is mixed with it, and the mixture abandoned to spontaneous evaporation until the ether is volatilized.

3. (W. Procter.) *An ethereal tincture* (by displacement) is poured into a large retort, and 5-6ths is drawn over by the heat of a water bath; the evaporation of the residuum, to the proper consistence, is carried on at a heat not exceeding 120° Fahr. The formula of the Ph. Baden is nearly similar. Said to represent 6 to 8 times its weight in cubebs. 1 *lb.* yields 2 *oz.* of this extract.

4. (Hamb. Cod. 1845.) This resembles No. 1, (*above.*)

Obs. This extract has a darkish-brown colour, and tastes and smells strongly of cubebs. It is only slightly soluble in water. *Dose.* 5 gr. to 20 gr.; made into an emulsion or pills, or enclosed in a capsule. See *Cubebs*, and *above.*

EXTRACT (Cucumber). See *Elaterium.*

EXTRACT (Cusparia). *Extract of Angostura Bark; Extractum Cuspariæ, E. Corticis C., E. Angosturæ,*—Lat. *Prep.* 1. From *angostura bark*, as *extract of cinchona*, Ph. L.

2. (Alcoholic.) As *extract of cinchona*, Ph. E. Stronger than the last. Both are aromatic, bitter, tonic, and stimulant. *Dose.* 10 gr. to ½ dr.; in dyspepsia, chronic diarrhœa, dysentery, &c.

EXTRACT (Daffodil). Syn. *Extractum Narcissi,*—Lat. *Prep.* 1. From the *fresh flowers of daffodil* or *yellow narcissus* (narcissus pseudo-narcissus,—*Linn.*), as *extract of aconite*, Ph. L.

2. (Alcoholic.) From the *dried flowers*, as *extract of box.* Both are pectoral and expectorant; and in large doses nauseant and emetic. *Dose.* ½ gr. to 2 gr.; in hooping-cough, &c.

EXTRACT (Dandelion). See *Extract of Taraxacum.*

EXTRACT (Digitalis). See *Extract of Foxglove.*

EXTRACT (Dog's Grass). See *Extract of Couch Grass.*

EXTRACT (Dogwood). Syn. *Extractum Cornûs, E. Corni,*—Lat. *Prep.* From *American* or *tree dogwood* (cornus florida,—Linn.), as *extract of cinchona bark.*

Obs. In its general effects American dogwood approaches the cinchonas, and is said to be not inferior to them in the cure of intermittents. (Bigelow.) It contains a peculiar bitter principle called *Cornine.* Several other varieties of the *genus* cornus, as *round-leaved dogwood* (cornus circinata), *swamp dogwood* (cornus sericea), &c., are used in America, but are less valuable.

EXTRACT (Dulcamara). See *Extract of Bitter Sweet.*

EXTRACT (Elaterium). Syn. *Inspissated Juice of the Squirting Cucumber; Succus Spissatus Momordicæ Elaterii.* For preparation and recent synonyms, see *Elaterium.*

EXTRACT (Elder Berries). Syn. *Elder Rob; Roob Sambuci, Extractum Sambuci, E. S. Nigræ, E. Baccarum S., Succus Sambuci Inspissatus,*—Lat. *Prep.* 1. (Ph. L. 1788.) The *expressed* and *depurated juice of elder berries*, evaporated to the consistence of honey.

2. (Ph. E. 1744.) To the above, when it begins to thicken, add 1-5th part of *sugar.*

3. (Ph. Bor.) As the last (nearly), but adding only 1 oz. of *white sugar* to each pound of the *extract* whilst still warm. *Dose.* 1 to 4 dr.; in rheumatism, gout, and various skin affections.

EXTRACT (Elecampane). Syn. *Extractum Inulæ, E. Radicum I. Campanæ, E. Helenii,*—Lat. *Prep.* 1. (Ph. L. 1746.) From a *decoction* of the *dried root.*

2. (P. Cod.) As *extract of bistort*, P. Cod.

3. (Ph. Suec. 1845.) From a *tincture* prepared with *proof spirit* and *water*, equal parts. *Dose.* 10 gr. to ½ dr.; as a diaphoretic, expectorant, and tonic; in asthma, hooping-cough, various skin diseases, &c.

EXTRACT (Elm). Syn. *Extractum Ulmi, E. Corticis U.,*—Lat. *Prep.* From the *decoction* of the bark of the *common elm* (ulmus campestris,—Linn.)

2. (Soubeiran.) As *extract of box.* Astringent and alterative. *Dose.* 20 gr. to 1 dr.; in secondary syphilis, chronic skin affections, &c.

EXTRACT (Ergot). Syn. *Aqueous Extract of Ergot, Hæmostatic Extract; Extractum Ergotæ, E. E. Aquosum, E. Secalis Cornuti, E. Hæmostaticum,*—Lat. *Prep.* See *Ergotine* (Bonjean's).

EXTRACT (Ergot,—Alcoholic). Syn. *Extractum Ergotæ Alcoholicum,* — Lat. *Prep.* See *Ergotine* (Wigger's).

EXTRACT (Ergot,— Ethereal). Syn. *Extractum Ergotæ Æthereum,*—Lat. *Prep.*

From the *ethereal tincture* by spontaneous evaporation.

EXTRACT (Fern). See *Extract of Male Fern.*

EXTRACT (Fleabane). Syn. *Extractum Erigeronis*,—Lat. *Prep.* From the *infusion* or *decoction* of the herb *Canadian fleabane*, (erigeron Canadense,—*Linn.*) Reputed to be diuretic, lithontriptic, and vulnerary, and useful in dropsies, diarrhœa, and the dysury of children. *Dose.* 5 to 10 gr. Less active extracts are prepared from *common fleabane* (erigeron acre,—*Linn.*), *Philadelphia fleabane* (erigeron Philadelphicum,—*Linn.*), and *American fleabane* (erigeron annuum,—*Pers.*); all of which are common in the United States of America.

EXTRACT (Flesh). Syn. *Extract of Meat; Extractum Carnis*,—Lat. See *Essence of Beef, Beef Tea, &c.*

EXTRACT (Foxglove). Syn. *Extractum Digitalis*,—Ph. L. and E. *Prep.* 1. (Ph. L. 1836.) From the leaves of *digitalis purpurea*, as *extract of aconite*, Ph. L.

2. (Ph. E.) From the filtered *expressed juice*, either evaporated *in vacuo*, with the aid of heat, or by exposure to a current of dry air.

3. (P. Cod.)—*a.* As *extract of bistort*, P. Cod.

b. As *extract of box*, P. Cod.

4. (Ph. Baden.) As *alcoholic extract of aconite*, Ph. Bad.

Obs. The juice of foxglove is very readily injured by exposure to air and heat. The evaporation should therefore be conducted as rapidly as possible, but at a low temperature. It is narcotic, sedative, and is powerfully *poisonous*. *Dose.* ½ gr. cautiously increased to 2 or 3 gr. It is principally given in fevers, dropsy, diseases of the heart, pulmonary consumption, epilepsy, scrofula, and asthma. This extract spoils by long keeping. The last two are stronger than the rest, and keep better. It is omitted in the present Ph. L.

EXTRACT (Fumitory). Syn. *Extractum Fumariæ*,—Lat. *Prep.* 1. From either the *infusion* or *decoction* of the *dried leaves* of *common fumitory* (fumaria officinalis,—*Linn.*)

2. (P. Cod.) From the *clarified juice* of the *fresh herb*. Slightly aperient, diaphoretic, and alterative. It has been given in obstructions of the liver and cutaneous affections of the leprous kind.

EXTRACT (Galls). Syn. *Extractum Gallæ, E. Gallarum*,—Lat. *Prep.* 1. From the infusion by maceration or displacement with *cold water.*

2. From the *hot infusion* or *decoction.* The first is to be preferred. Astringent. *Used* chiefly in ointments and injections for piles, foul ulcers, &c., and, *internally*, in hemorrhages, spitting of blood, &c.

EXTRACT (Gentian). Syn. *Extractum Gentianæ*,—Ph. L. E. & D. *Ext. G. Molle, Ext. Radicis G.; E. R. G. Luteæ*,—Ph. D. 1826. *Prep.* 1. (Ph. L.) *Gentian root* (sliced), 3 ℔; *distilled water* (temperate), 4 pints; macerate for 12 hours, and gently express the liquor; repeat the maceration with *water*, 1 quart, for 6 hours; and evaporate the mixed liquors.

2. (Ph. L. 1836). From the ordinary *infusion of the root* made with 10 or 12 times its weight of *boiling water*, the maceration being continued for 24 hours.

3. (Ph. E.) From an *infusion* prepared by percolation with *cold water.* The formulæ of the Ph. Baden, Paris, and U. S. are similar.

4. (Ph. D.) *Gentian*, 1 *lb.*; *water* (cold), 1½ pint; macerate for 6 hours, and repeat the process a second time with a like quantity of *water.*

5. (Ph. D. 1826.) From the *decoction.*

Obs. On the large scale this extract is almost universally prepared by exhausting the root by coction with water, as in the last formula. When well prepared it is one of the smoothest and brightest extracts of the pharmacopœia. Good gentian root *yields* by *infusion in hot water* fully 50%, and by *decoction*, about 60% of extract. *Dose.* 10 gr. to 30 gr., two or three times daily, as a stomachic bitter, and tonic; either alone or combined with rhubarb, ginger, or aloes. It is, however, more especially used as a vehicle for chalybeates and other metallic preparations. The principal consumption of extract of gentian is by the brewers in lieu of hops.

EXTRACT (Gentian,—Hard). Syn. *Extractum Gentianæ Durum*,—Lat. The last dried by a gentle heat until brittle enough to powder.

EXTRACT (Ginger). See *Zingiberine.*

EXTRACT (Goulard's). See *Liquor of Diacetate of Lead.*

EXTRACT (Guaiacum Wood). Syn. *Extractum Guaiaci, Ext. Ligni G., E. L. G. Molle, E. L. Vitæ*,—Lat. *Prep.* 1. (Ph. L. 1746.) From *lignum vitæ shavings* or *sawdust*, exhausted by coction with *water;* as soon as the mass becomes thick, 1-8th of *rectified spirit* is to be added.

2. As the last, omitting the spirit. Diaphoretic, diuretic, and alterative; in dropsy, gout, rheumatism, skin diseases, &c.

EXTRACT (Guarana). Syn. *Extractum Guaranæ, E. Paulliniæ*,—Lat. *Prep.*

(Dr. Gavrelle). From *tincture of guarana* (seeds of *paullinia sorbilis*), prepared by coction with *proof spirit.* Tonic and alterative. *Dose.* 2 to 5 gr., twice or thrice daily.

EXTRACT (Hæmostatic). See *Extract of Ergot.*

EXTRACT (Hardhack). Syn. *Extractum Spirææ*,—Lat. *Prep.* From the *root* of *spiræa tomentosa,* as *extract of bistort.* The extract of the leaves and flowers is more active than that of the root. *Dose.* 5 to 15 gr.; as a tonic and astringent.

EXTRACT (Hedge Hyssop.) Syn. *Extractum Gratiolæ*,—Lat. *Prep.* (Ph. Bor.) From the *herb,* as *alcoholic extract of aconite,* Ph. Bor.

2. (Ph. Baden.) As *extract of aconite,* Ph. Baden.

3. (*Vinous.*) As *vinous extract of cinchona.* Purgative, diuretic, and vermifuge. *Dose.* 2 to 5 gr., gradually increased, watching its effects; in dropsy, jaundice, gout, &c. It has been said to be the basis of the celebrated "*Eau Médicinale d'Husson.*"

EXTRACT (Hellebore). Syn. *Extract of Black Hellebore; Extractum Hellebori; Ext. Hellebori Nigri,*—Ph. L. 1788. *Prep.* 1. From the *infusion* or *decoction* of *black hellebore. Dose.* 5 to 12 gr.

2. (*Alcoholic,*—P. Cod. & Ph. U. S.) As *extract of box* (nearly). That of the Ph. Bad. is similar. *Dose.* 3 to 8 gr.

3. (*Vino-alcoholic,*—Cottereau.) *Powdered black hellebore,* 2 ℔; *salt of tartar,* $\frac{1}{2}$ ℔; *dilute alcohol* (sp. gr. ·935), 7 pints; digest 12 hours and express the tincture; add to the marc, *white wine,* 7 pints; digest for 24 hours, express, mix the tinctures, filter, and evaporate. *Dose.* 2 to 6 gr.

Obs. When prepared by coction with water till exhausted of soluble matter, black hellebore root yields about 40% of extract. In *small doses* it is alterative, purgative, and resolvent; in larger ones, it is a drastic, hydragogue cathartic, and emmenagogue, dangerous unless combined and its effects carefully watched.

EXTRACT (Hellebore,—Alkaline). Syn. *Extractum Hellebori Alkalinum, E. H. A. Bacheri,*—Lat. *Prep.* (P. Cod.) As *vino-alcoholic extract of hellebore.* See *above.*

EXTRACT (American Hellebore). Syn. *Extractum Veratri Viridis,*—Lat. *Prep.* (Osgood.) From the *fresh root of American hellebore* (veratrum viride), as *extract of aconite,* Ph. L. *Dose.* $\frac{1}{6}$ gr. to $\frac{1}{2}$ gr. *Used* in America in the same cases as white hellebore.

EXTRACT (White Hellebore). Syn. *Extractum Veratri, E. Hellebori Albi,*—Lat. As *extract of hellebore.* (See *above.*) *Dose.* $\frac{1}{12}$ gr. to $\frac{1}{4}$ gr. Emetic, purgative, stimulant, and highly acrid. In gout, rheumatism, and nervous affections, mania, &c. See *Veratria.*

EXTRACT (Hemlock). Syn. *Inspissated Juice of Hemlock; Extractum Conii,*—Ph. L. E. & D. *Succus Spissatus Conii,*—Ph. D. 1826. *Succus Cicutæ Spissatus,*—Ph. L. 1788; and Ph. D. 1807. *Prep.* 1. (Ph. L.) From the *fresh plant,* as *extract of aconite,* Ph. L.

2. (Ph. E.) As *extract of foxglove,* Ph. E.

3. (Ph. D.) As *extract of belladonna,* Ph. D.

Obs. Of all the *inspissated juices,* (not even excepting that of aconite,) this is the one most readily injured by exposure to the air and heat, and which soonest loses its qualities by age. Its active principle is *conia.* Extract of hemlock has a greenish colour, and a strong odour of the fresh-bruised plant. It is "of *good quality* only when a very strong odour of conia (a *mouse-odour*) is disengaged by degrees, on its being carefully triturated with liquor of potassa." (Ph. E.) "The extracts of hemlock may become feeble, if not inert, in one of two ways,—either by the heat being continued after the concentration has been carried to a certain extent, or,—by long keeping. On the one hand, I have always observed, that from the point at which the extract attains the consistence of *thin syrup,* ammonia begins to be given off in abundance, together with a modified odour of conia; and, on the other hand, I have found extracts, which were unquestionably well prepared at first, *entirely destitute of conia* in a few years." (Christison.) The most active extract is that which is procured by *moderate pressure* from the *leaves* only." (Brande.) On the *large scale,* the whole of the green portion of the plant is pressed for juice. 1 cwt. of hemlock yields from 3 to 5 *lb.* of extract. *Dose.* 2 gr., gradually increased to 5 gr., or more, until some obvious effect is produced; as an anodyne, alterative, and resolvent in various obstinate disorders, as glandular and visceral enlargements, foul and painful ulcers, scrofula, cancer, neuralgia, rheumatism, troublesome coughs, &c.

EXTRACT (Hemlock,—Alcoholic). Syn. *Extractum Conii Alcoholicum,*—Lat. *Prep.* 1. (Ph. Baden.) As *alcoholic extract of aconite,* Ph. Baden.

2. (P. Cod.) As the last, but using *proof spirit*. *Dose.* $\frac{1}{2}$ to 2 gr.

EXTRACT (Hemlock,—Dried). Syn. *Extractum Conii Siccum*,—Lat. *Prep.* As *dried extract of aconite*, P. Cod.

EXTRACT (Hemp). Syn. *Extract of American Hemp; Extractum Apocyni, Ext. A. Cannabini*,—Lat. *Prep.* From the *root of apocynum cannabinum* (Linn.), as *extract of gentian.* A hydragogue cathartic. *Dose.* 2 to 5 gr.; in dropsy, &c. The plant from which this extract is prepared, is called *Indian hemp* in the United States of America, a practice which should be avoided, as this name is now almost exclusively appropriated to *cannabis Indica*, a variety of the common hemp (*cannabis sativa*, var. *Indica;*) growing in India. We therefore proposed, some time since, to call apocynum cannabinum, *American hemp*, by which confusion would be avoided.

EXTRACT (Henbane). Syn. *Extract of Hyoscyamus; Extractum Hyoscyami*,—Ph. L. E. & D. *Succus Spissatus Hyoscyami*,—Ph. D. 1826. *S. S. H. Nigri, &c. Prep.* 1. (Ph. L.) From the *fresh leaves* and *leaf-stems* of *common henbane* (hyoscyamus niger), as *extract of aconite*, Ph. L.

2. (Ph. E.) As *extract of foxglove*, h. E.

3. (Ph. D.) As *extract of belladonna*, Ph. D.

4. (Ph. U. S.) From the *expressed juice* coagulated by heat and strained.

Obs. In the Paris Codex extracts are prepared from henbane both by the processes Nos. 1 and 4 above. *Product* (by the ordinary method);—1 *lb.* of the fresh leaves yielded fully 8 dr. of extract (Geiger); 1 cwt. yielded 4 to 5 *lb.* (Brande); 1 cwt. of the recent plant yielded, by an ordinary screw press, $59\frac{1}{2}$ *lb.* of *juice*, and this, evaporated in a water-bath, gave 5 *lb.* 9 *oz.* of extract. (Squire.) $1\frac{3}{4}$ cwt. of the green herb yielded 11 *lb.* of extract. (Gray.) *Dose.* 2 to 10 gr. as an anodyne, hypnotic, antispasmodic, sedative, and narcotic; more especially in those cases in which the use of opium is objectionable. *Externally*, as a topical application to sore or inflamed parts, either made into an ointment or spread on plaster.

EXTRACT (Henbane,—Alcoholic). Syn. *Extractum Hyoscyami Alcoholicum*,—Lat. *Prep.* The formulæ of the Ph. Bad. Par. & U. S. are similar to those for *alcoholic extract of aconite.*

EXTRACT (Henbane Seeds). Syn. *Extractum Seminum Hyoscyami*,—Lat. *Prep.* (P. Cod.) An *extract of the seeds* made with *spirit*, sp. gr. 0.900 (= about 16 o. p.) is dissolved in 4 parts of *cold water*, and the solution filtered, and evaporated. Stronger than the simple extract. *Dose,* $\frac{1}{4}$ gr. to 3 gr.

EXTRACT (Holy Thistle). Syn. *Extractum Cardui Benedicti*,—Lat. *Prep.* 1. (Ph. Baden.) From *holy* or *blessed thistle* (cnicus benedictus,—*Linn.*) by displacement with *cold water.*

2. (Ph. Bor.) As *extract of gentian*, Ph. L. (nearly). Tonic, diaphoretic, febrifuge, often diuretic, and occasionally, emetic. *Dose.* 5 to 15 gr., as a tonic or stomachic, chiefly.

EXTRACT (Hops). Syn. *Extractum Lupuli*,—Ph. L. & E. *Ext. Humuli*,—Ph. D.; & Ph. L. 1824. *Prep.* 1. (Ph. L.) From the *strobiles* or *catkins* of *humulus lupulus* (commercial hops), $2\frac{1}{2}$ ℔; *boiling distilled water*, 2 gall; macerate for 24 hours, boil to a gallon, strain whilst hot, and evaporate to a proper consistence. The form of the Ph. E. is nearly similar.

2. (Ph. D.) As *extract of aloes*, Ph. D. Tonic and stomachic, and slightly anodyne and hypnotic. *Dose.* 5 gr. to 30 gr.; in dyspepsia, and cases that do not permit of the use of opium. 1 cwt. of ordinary hops yield about 40 *lb.* of extract. (Brande.) The druggists usually employ hops 2 or more years old, called by the dealers "*yearlings*," "*olds*," or "*old olds*," because these may be purchased at $\frac{2}{3}$ to $\frac{1}{2}$ the price of those of the last season's growth. The first of the above are estimated to have only $\frac{2}{3}$ the strength of new hops; the second about $\frac{1}{2}$; and the last little or none, at least in a medical point of view.

EXTRACT (Hops,—Alcoholic). Syn. *Extractum Lupuli Alcoholicum*,—Lat. *Prep.* (Cottereau.) By displacement with *proof spirit.* Stronger than the last.

EXTRACT (Horehound). Syn. *Extractum Marrubii*,—Lat. *Prep.* 1. From the *fresh herb* as *extract of aconite.*

2. From the *infusion* or *decoction.* Antispasmodic, pectoral, tonic, and emmenagogue. *Dose.* 10 gr. to 1 dr.

3. (Ph. Baden.) By displacement with *cold water.*

EXTRACT (Horehound, — Alcoholic). Syn. *Extractum Marrubii Alcoholicum*,—Lat. *Prep.* From a *tincture* made with *proof spirit.* Said by M. Thoriel to possess considerable power as a febrifuge. *Dose.* 5 gr. to 20 gr.

2. (Ph. Lusit.) From a *tincture* made with a mixture of *rectified spirit*, 1 part; and *water*, 7 parts. Inferior to the last.

EXTRACT (Indian Hemp.) Syn. *Cannabine, Hemp Resin, Alcoholic Extract of*

Indian Hemp; Extractum Cannabis Indicæ, Ext. C. I. Alcoholicum, E. C. Resinosum, Cannabinum, Resina Cannabis,—Lat. *Prep.* (O'Shaughnessy.) The dried *resinous tops* of Indian hemp (*gunjah*) are boiled in *rectified spirit* until all the resin is taken up, when most of the spirit is distilled off, and the evaporation completed by the heat of a water bath. 1 cwt. yields about 7 *lb.*

2. (Mr. Robertson.) By slowly acting on the *gunjah* with the *vapour of alcohol*, by a species of percolation; the spirit of the resulting *tincture* is partly removed by distillation, and the rest by slow evaporation at a temperature not above 150° Fahr. 1 cwt. yields about 8 *lb. Dose* of the last two, 1 to 3 gr., gradually increased.

3. (Messrs. Smith.) The *bruised gunjah* is exhausted with *tepid water*, then with a *solution of carbonate of soda* (1 of *carbonate* to 2 of *gunjah*), and next with *pure water;* it is then pressed, dried, and exhausted by displacement with *rectified spirit;* the tincture is agitated with a *milk of lime* (containing 1 oz. of *lime* for every ℔ of *gunjah*), and after filtration or decantation, any retained lime is precipitated by a little *sulphuric acid* in slight excess; the tincture is next agitated with *animal charcoal*, and again filtered; most of the *spirit* is now removed by distillation, and 3 or 4 times its bulk of *water* being added, the *remaining spirit* is removed by a gentle heat; lastly, the remaining water is poured off, and the resin washed with *fresh water*, and dried. Product 6%. Commencing *dose*, ¼ gr.

Obs. Cannabine has been stated by different parties to be anæsthetic, anodyne, hypnotic, stimulant, phrenic, and aphrodisiac, and, in over doses, to produce catalepsy. (O'Shaughnessy, and others.) It has been recommended in hysteria, hydrophobia, cholera, rheumatism, chorea, convulsions, and various other painful spasmodic and nervous affections of a serious character. According to the above authority, 1 *gr.* produced catalepsy in a rheumatic patient. The extract prepared with the plant grown in our botanic gardens has quite a different effect to that of the Indian plant; and it also appears that the inhabitants of this country are less susceptible to its action than those of India, and consequently bear the drug in larger doses. This hemp is known in India as the "*increaser of pleasure*," the "*exciter of desire*," the "*cementer of friendship*," the "*causer of a reeling gait*," the "*laughter-mover*," &c. See *Extract of Hemp, Cannabine, &c.*

EXTRACT (Indian Hemp,—Purified). Syn. *Extractum Cannabis Indicæ Purificatum*,—Ph. D. *Prep.* (Ph. D.) *Extract of Indian hemp* (commercial), 1 *oz.; rectified spirit*, 4 *fl. oz.;* dissolve, and after defecation, decant, and evaporate.

EXTRACT (Ipecacuanha). Syn. *Extractum Ipecacuanhæ*,—Lat. *Prep.* 1. (P. Cod.) From *ipecacuanha*, as *extract of box*, P. Cod.

2. (Ph. Bor.) As *extract of henbane seeds*, Ph. Bor. Expectorant and emetic. *Dose.* 1½ to 8 gr.

EXTRACT (Iron). Syn. *Extractum Ferri, Ext. Martis*,—Lat. From *tincture of tartarized iron. Dose.* 2 to 10 gr. as a chalybeate tonic.

EXTRACT (Iron,—Compound). See *Extract of Apple* (Chalybeated).

EXTRACT (Jalap). Syn. *Extractum Jalapæ*,—Ph. L. & D. *Ext. sive Resina Jalapæ*,—Ph. E. *Ext. Jalapii*,—Ph. L. 1788. *Ext. Jalapæ Resinosum, E. Radicis J., E. Jalapii Molle*,—Lat. var. *Prep.* 1. (Ph. L.) *Jalap* (powdered), 2½ ℔; *rectified spirit*, 1 gall.; digest 4 days, and express the tincture; boil the *marc* in *water*, 2 gall., until reduced to ½ gall.; filter the tincture and decoction separately, and let the one *distil* and the *other* evaporate until each thickens; lastly, mix the two and complete the evaporation. The *formulæ* of the Ph. E. and U. S. are similar. *Product.* About 66%,=16% of *alcoholic*, and 50% of *aqueous extract.* (Brande.) 18 *lb.* yield 12 *lb.* of extract. (Lab. Journ.) *Dose.* 6 to 15 gr.

2. (Ph. E.) From *tincture of jalap* prepared by displacement with *rectified spirit.* It consists of *impure resin of jalap.* It is more active than the last. *Prod.* 16%. *Dose.* 2 to 6 gr.

Obs. Extract of jalap is an active purgative. It should be well beaten up with a little *sulphate of potassa, sugar*, or some *aromatic powder*, to prevent it griping. The substance commonly sold as *extract of jalap* in the shops is prepared by *boiling jalap root* for 3 or 4 hours in water, when it is taken out, and well bruised or sliced, and again *boiled with water* until *exhausted of soluble matter.* The mixed decoctions are then allowed 12 or 14 hours for defecation, after which the supernatant portion is decanted and evaporated.

Extract of jalap "should be kept in the soft state, (*extractum jalapæ; e. j. molle;*) so as to form pills; and in the hard state, (*hard extract of jalap; extractum jalapæ durum;*) that it may be rubbed to powder." (Ph. L.)

EXTRACT (Jalap,—Alkaline). Syn. *Extractum Jalapæ Alkalinum*,—Lat. *Prep.*

(Ph. E. 1744.) By adding *subcarbonate of potassa*, 1 oz.; to the *water*, used to make the *extract of jalap* (Ph. L.). The object was to increase its solvent power. *Dose.* 5 to 15 or 20 gr.

EXTRACT (Juniper). Syn. *Extractum Juniperi, Ext. Baccarum, J.*,—Lat. *Prep.* (P. Cod.) Macerate *juniper berries* in *water* at 77° to 86° Fahr., for 24 hours, strain, repeat the process with a fresh quantity of water, mix the liquors, filter, and evaporate. *Dose.* 20 gr. to 1 dr.; as a stimulant diuretic, in dropsy, &c.; and also as a pill-basis.

EXTRACT (Kaladana). Syn. *Extractum Kaladanæ*,—Lat. *Prep.* (Bengal Disp.) From the *tincture* of the berries of *convolvulus nil* (Linn.) or *kaladana.* Purgative. Said to be equal to extract of jalap, and of double the strength.

EXTRACT (Koochla Nut). See *Extract of Nux Vomica.*

EXTRACT (Lettuce). Syn. *Inspissated Juice of Lettuce; Extractum Lactucæ*,—Ph. L. *Succus Spissatus Lactucæ Virosæ*, —Ph. E. *Prep.* 1. (Ph. L.) From the *fresh leaves of garden lettuce* (lactuca sativa, — *Linn.*) as *extract of aconite*, Ph. L. Anodyne, sedative, hypnotic, and antispasmodic. *Dose.* 3 to 10 gr. 1 *cwt.* of lettuce *yields* 4 *lb.* to 5 *lb.* of extract.

2. (Probait.) From the *external parts of the stalks* and the *old* and *yellow leaves*, after the plants have flowered, by *maceration* in *water* for 24 hours, and *decoction* for 2 hours; the expressed liquid is first evaporated by a gentle heat, and afterwards spread on shallow dishes and dried by exposure to a current of air. Stronger than the last. *Dose.* 1 to 5 gr. See *Lactucarium* and *Thridace.*

EXTRACT (Wild Lettuce). Syn. *Inspissated Juice of Wild Lettuce; Extractum Lactucæ Virosæ; Succus Spissatus Lactucæ Virosæ*,—Ph. E. *Prep.* 1. (Ph. E.) From the *leaves* of *strong-scented wild lettuce* (lactuca virosa,—*Linn.*) See *general instructions*, page 419.

2. (P. Cod.) As *alcoholic extract of aconite*, P. Cod.

3. (Ph. Baden.) As *extract of foxglove*, Ph. Baden. *Prod., dose, &c.* Same as *extract of lettuce.*

EXTRACT (Liquorice). Syn. *Extractum Glycyrrhizæ*,—Ph. L. E. & D. *Ext. G. Molle*,—Lat. *Prep.* 1. (Ph. L.) From *fresh liquorice root*, as *extract of hops*, Ph. L.

2. (Ph. E.) From the *fresh root*, cut into slices, dried, and powdered, as *extract of gentian*, Ph. E. The form of the Ph. Baden, is very similar.

3. (Ph. D.) As ordered for *simple extracts* (extracta simpliciora,—Ph. D.)

4. (U. S. Disp.) *Crude liquorice* (Spanish juice), q. s., is dissolved in *water*, and the solution filtered and evaporated. To produce a good article (*extractum glycyrrhizæ purificatum*) in this way, the solution should be allowed some hours for defecation, and should not be decanted and strained until *quite cold.*

Obs. Soft extract of liquorice is often employed as a pill basis, and the *hard* extract (*Spanish juice, &c.*) is used as a lozenge to allay tickling cough. The principal portion of the latter is, however, consumed by the *porter brewers* and *brewers' druggists.* The product of the last formula evaporated until it is quite solid when cold, and made into small pipes, sticks, or rolls, forms the *best refined liquorice* or *refined juice* of the shops.

EXTRACT (Liquorice,—Hard). Syn. *Spanish Juice, S. Liquorice, Italian do., Black Sugar; Extractum Glycyrrhizæ Simplex, E. G. Durum, Succus G., S. G. Spissatus*,—Lat. This is seldom prepared by the English druggists, being principally imported in the dry state, from Spain and Italy. That from *Solazzi* (*Solazzi juice*) is the most esteemed. A great deal of the foreign extract is mixed with fæcula, or the pulp of plums, hence its inferior quality. It also frequently contains copper, derived from the boilers in which it is prepared. The *extract* prepared from the *fresh root* is usually preferred to the *best* foreign, as the latter has a less sweet and agreeable taste. *Refined juice* is prepared by dissolving the *foreign juice* in water, filtering and evaporating. See *Liquorice* and *above.*

EXTRACT (Lobelia). Syn. *Acetic Extract of Indian Tobacco; Extractum Lobeliæ, E. L. Inflatæ*,—Lat. *Prep.* (W. Procter.) *Lobelia seeds* (bruised), 8 oz.; *dilute alcohol* (sp. gr. 0·935), 4 pints; *acetic acid*, 1 fl. oz.; by maceration for 24 hours, and subsequent displacement. Expectorant and diaphoretic, in *small doses;* emetic and narcotic, in *larger ones.* It is principally used in asthma and other chest diseases. *Dose.* $\frac{1}{4}$ gr. to 5 gr.

EXTRACT (Logwood). Syn. *Extractum Hæmatoxyli*,—Ph. L. *Ext. H. Campechiani*, —Ph. E. *Ext. Scobis H. C.*,—Ph. L. 1826. *Ext. Ligni Campechensis*,— Ph. L. 1788. *Prep.* 1. (Ph. L.) From *cut logwood* (logwood chips), as *extract of hops*, Ph. L.

2. (Ph. E.) As the last nearly.

3. (Ph. D. 1826; & *Wholesale.*) From the decoction.

Obs. The Ph. U. S. 1841, orders the wood to be rasped. The Ph. Baden directs displacement with *cold water.* On the *large scale* it is prepared solely by decoction. 1 cwt. of wood yields about 20 *lb.* of extract, (Brande;) 80 *lb.* yield 14 *lb.* of extract. (Gray.) It is kept in two states, hard (*extractum hæmatoxyli durum*), and soft (*e. h. molle.*) The *Dose* of the *first* is 10 to 20 gr. dissolved in wine, or any cordial water; as an astringent, after each motion in diarrhœa; the *second* is often employed as a lozenge in the same disease, and is an inexpensive and agreeable remedy for simple relaxation of the bowels.

EXTRACT (Lovage). Syn. *Extractum Levistici,*—Lat. *Prep.* (Ph. Baden.) From *lovage* (levisticum officinale), as *extract of bistort,* P. Cod. Aromatic, stomachic, and diaphoretic. *Dose.* 5 to 15 gr.

EXTRACT (Lupuline). Syn. *Extractum Lupulinæ,*—Lat. *Prep.* 1. From *lupuline* by *infusion* in *cold water,* or by displacement.

2. (*Ext. Lupulinæ Coctione Paratum.*) From the *decoction.* Both similar to extract of hops, but stronger. The first is the most aromatic; the *last* the most bitter.

EXTRACT (Madder). Syn. *Extractum Rubiæ,*—Lat. *Prep.* (Ph. Hamb.) From the tincture of *dyer's madder* (rubia tinctorum), made with *rectified spirit,* 1 part; and *water,* 3 parts. *Dose.* 10 gr. to 30 gr.; as a diuretic, emmenagogue, and parturifacient; and in jaundice, &c.

EXTRACT (Mahogany). Syn. *Extractum Mahogonis.* From the *chips* and *saw dust* of *mahogany* (swietenia mahogoni,—*Linn.*) It is astringent, and is frequently sold for kino. It is also employed in tanning.

EXTRACT (Male Fern). Syn. *Alcoholic Extract of Male Fern; Extractum Filicis, Ext. F. Alcoholicum,*—Lat. *Prep.* (Dr. Ebers.) From the *tincture* of the *dried root* of male fern (*aspidium filixmas*), made with *rectified spirit.* In tape worm. *Dose.* 20 gr. to ½ dr., twice a day, made into an electuary with powdered sugar, and followed by a strong dose of *castor oil.*

EXTRACT (Male Fern,—Ethereal). See *Oils.*

EXTRACT (Malt). Syn. *Extractum Malti, Ext. Bynes,*—Lat. *Prep.* From the *infusion* made with *water* at a temperature ranging between 160° and 170° Fahr., drained off, without pressure, and evaporated to the consistence of honey. Nutritious and laxative. *Dose.* A tablespoonful, or more, ad libitum.

EXTRACT (Marygold). Syn. *Extractum Calendulæ,*—Lat. *Prep.* 1. (Guibourt.) By maceration of the *herb* and *flowers* of the *common marygold* (calendula officinalis, —*Linn.*) in *tepid water* for 24 hours, and subsequent coction for 15 or 20 minutes.

2. (Ph. Baden.) As *extract of angelica,* Ph. Baden. *Dose.* 2 to 10 gr.; cordial, diaphoretic, alterative, and emmenagogue; in dyspepsia, and schirrous and cancerous affections.

EXTRACT (May-apple). Syn. *Extractum Podophylli,*—Lat. *Prep.* (Ph. U. S. 1841.) From the *tincture* of the *root* (rhizomes) of *may-apple,* (podophyllum peltatum,—*Linn.*) *Dose.* 5 to 15 gr.; as a substitute for extract of jalap.

EXTRACT (May-lily). Syn. *Extractum Convallariæ,*—Lat. *Prep.* From the *flowers* or *roots* of the *lily of the valley* (convallaria majalis,—*Linn.*), as *extract of hops.* Aperient and stomachic. *Dose.* 15 gr. to ½ dr. Its action resembles that of aloes, but milder.

EXTRACT (Meadow Saffron). See *Extract of Colchicum.*

EXTRACT (Meat). Syn. *Extractum Carnis,*—Lat. *Prep.* (Liebig.) The *lean of recently killed meat* (chopped very small), 1 part; *cold water,* 8 parts; agitate it well together for 10 minutes, then heat it gradually to the boiling point, let it simmer gently for a few minutes, and strain through a hair sieve whilst still hot; lastly, evaporate to a soft mass. 1 *lb.* of meat yields barely 1 *oz.* See *Essence of Beef, Beef Tea, &c.*

EXTRACT (Mezereon,—Alcoholic.) Syn. *Mezereon Resin; Extractum Mezerei Alcoholicum, Resina Mezerei,*—Lat. *Prep.* 1. (Ph. Hamb.) By distilling off ⅞ths of the *tincture* made with *rectified spirit,* and filtering the residue, retaining what is left on the filter.

2. By the simple *distillation* of the *tincture.*

Obs. Green or brownish-green; insoluble in water. ½ oz. mezereon root-bark yielded 1 dr. of dry resin. (Squire.) 1 ℔ yielded 1½ oz. (Hamb. Disp.) It is chiefly used in preparing blistering ointments and plasters.

EXTRACT (Mezereon,—Ethereal). Syn. *Green Oil of Mezereon; Extractum Mezerei Æthereum,*—Lat. *Prep.* 1. (Guibourt.) From the *ethereal tincture.*

2. (Ph. Bor.) By digesting *alcoholic extract of mezereon* in *ether* for some days with agitation, reducing the tincture to 1-4th by careful distillation, and evaporaing the residuum by a gentle heat to the consistence of an extract.

Obs. Both the alcoholic and ethereal extract of mezereon must be kept in stoppered bottles. *Used* as an external irritant. (See *above.*)

EXTRACT (Milk). Syn. *Essence of Milk; Extractum Lactis, Essentia L.,*—Lat. *Prep.* (Plenck's Ph. 1804.) From *cow's milk* (skimmed) evaporated to dryness over a very slow fire, constantly stirring until reduced to a proper consistence. A better plan is to employ a current of warm dry air.

EXTRACT (Millefoil). Syn. *Extractum Millefolii, Ext. Achilleæ M.,*—Lat. *Prep.* From the *herb milfoil* or *yarrow* (achillea millefolium,—*Linn.*), as *extract of hops,* Ph. L. Astringent, tonic, and alterative. *Dose.* 10 gr. to ½ dr.

EXTRACT (Mimosa Bark). Syn. *Extractum Corticis Mimosæ,*— Lat. *Prep.* From the *bark* of several Australian species of acacia or mimosa (*acacia mollissima, a. decurrens, a. melanoxylon.*) It is chiefly imported from Van Diemen's Land. Astringent. Said to be superior to oak bark for tanning.

EXTRACT (Monesia). Syn. *Extractum Monesiæ, E. M. Purificatum,*—Lat. *Prep.* From *buranheim bark* (bark of *crysophyllum buranheim*)*;* or from *commercial monesia,* as *extract of catechu.* Astringent. *Dose.* 4 to 8 gr.

EXTRACT (Mugwort). Syn. *Extractum Artemisiæ,*—Lat. *Prep.* From the *tops* of *artemisia vulgaris* (Linn. ; common mugwort;) as *extract of box,* P. Cod. An active emmenagogue.

EXTRACT (Myrrh,—Aqueous). Syn. *Extractum Myrrhæ, Ext. M. Aquosum,*—Lat. *Prep.* 1. From the *strained decoction.*

2. (Ph. Bor.) As *extract of aloes* (Ph. Bor.), afterwards reducing it to fine powder. The formula of the Ph. Baden is similar. *Dose.* 6 to 15 gr. ; or more.

EXTRACT (Myrrh,—Alcoholic). Syn. *Resin of Myrrh ; Extractum Myrrhæ Alcoholicum, E. M. Resinosum,*—Lat. *Prep.* From the *tincture.* Tonic and stimulant. *Dose.* 5 to 10 gr. or more.

EXTRACT (Myrrh,—Compound). Syn. *Extractum Myrrhæ Compositum,* — Lat. *Prep.* (Swediaur.) *Myrrh,* 2 oz. ; *gum arabic* (in powder), 2 dr. ; triturate, add *water,* q. s. to form a thick emulsion, and add *extract of couch grass,* 4 oz. Much recommended in phthisis and uterine ulcerations. *Dose.* 1 to 2 dr. in water, twice or thrice daily.

EXTRACT (Nettles). Syn. *Extractum Urticæ,*—Lat. *Prep.* (P. Cod.) From the *juice of nettles* (urtica dioica,—*Linn.*), as *extract of aconite,* Ph. L. Antiscorbutic, diuretic, and narcotic.

EXTRACT (Nosegay). Syn. *Essence of Nosegay ; Extrait de Bouquet. Prep. Flowers of benzoin,* 1 dr. ; *essence of ambergris,* 2 fl. oz. ; *spirits of jasmine* and *extract* (esprit) *of violets,* of each, 1 pint ; *spirits of cassia, roses, orange flowers* and *gillyflowers,* of each, ½ pint ; mix. A delightful perfume.

EXTRACT (Nux Vomica.) Syn. *Extract of Koochla Nuts ; Extractum Nucis Vomicæ, Ext. N. V. Aquosum,*—Lat. *Prep.* (Ph. Bor.) From the *powdered nut,* as *extract of hops,* Ph. L. (nearly). *Dose.* 1 to 5 gr. (See *below.*)

EXTRACT (Nux Vomica,—Alcoholic). Syn. *Extractum Nucis Vomicæ,*—Ph. L. E. and D. *Ext. N. V. Alcoholicum, &c. Prep.* 1. (Ph. L.) *Koochla* or *poison nuts* (seed or fruit of *strychnos nux-vomica,*—Linn.), 8 oz.; *rectified spirit,* 3 pints ; expose them to steam until softened, then bruise, slice, and dry them, and macerate them in 2-3rds of the spirit for 7 days ; express the tincture, and repeat the maceration with the remaining 1-3rd of the spirit ; again express the liquid ; lastly, filter the mixed tinctures, distil off the greater part of the spirit, and complete the evaporation by a gentle heat. The formula of the P. Cod. is similar, but using *spirit,* sp. gr. 0·863 (= 41 o. p.)

2. (Ph. E.) The *sliced* and *dried nuts,* are to be ground in a coffee mill, and either exhausted by percolation with *rectified spirit,* or by boiling the powder in repeated portions of the menstruum. The formulæ of the Ph. Baden and U. S. are similar.

3. (Ph. D. 1826.) From a *tincture* of the *rasped nut* made with *proof spirit,* observing that the extract whilst thickening should be properly stirred.

Obs. This extract consists chiefly of impure *igasurate of strychnia,* and is exhibited in similar cases to that alkaloid. *Dose.* ½ gr. *gradually* and *cautiously* increased to 2 gr. It is very *poisonous.* On *the large scale,* the nuts are ground in a drug mill.

EXTRACT (Oak Bark). Syn. *Extractum Quercûs, E. Corticis Quercûs,*—Lat. *Prep.* (Ph. D. 1826.) From the *decoction.* Astringent. *Dose.* 10 gr. to ½ dr. Now seldom used.

EXTRACT (Opium.) Syn. *Aqueous Extract of Opium, Simple do. do.; Extractum Opii,*—Ph. L. and E. *Ext. Opii Aquosum,*—Ph. D. *Ext. O. Purificatum,*—Ph. L. 1836. *Opium Purificatum,*—Ph. L. 1788. *Ext. Thebaicum, Opium Colatum,*—Ph. L. 1721–1745. *Prep.* (Ph. L.) *Opium* (powdered), 1½ ℔.; *distilled water* (cold), 2½ pint; mix gradually and macerate for 24 hours, frequently stirring with a spatula ; (press), strain, and repeat the maceration for 24 hours with a fresh *quantity* (2½ pints) of *water;* lastly, evaporate the (mixed) strained liquors to a proper consistence. The formulæ of the Ph. E. D. and Baden, and P. Cod., are essentially the same.

2. (Ph. D. 1826.) As the last, but using *boilingwater*, and exposing the mixed liquors to the air for 2 days, before filtering and evaporating them. Inferior to the last.

3. (*Purified.*) The *extract* prepared with *cold water*, is evaporated to dryness, powdered, and re-dissolved in *cold water;* after 48 hours' exposure, and defecation, it is decanted from the dregs, filtered, and gently evaporated, as before. Superior to any other extract of opium made.

Obs. Good opium yields from 60 to 70% of its weight of extract, but much depends upon the variety used. *Dose.* ¼ gr. to 2 gr., as an anodyne, sedative, and hypnotic. It is less stimulant than ordinary opium. That prepared by the *third* formula, is indeed scarcely inferior in its action to the salts of morphia.

This extract is kept in both the *hard* and *soft* state, (*hard extract of opium, extractum opii durum; soft do. do., ext. o. molle.*) A solution of the *former*, in *distilled water*, with the addition of a *little spirit* to keep it, forms Battley's "*liquor opii sedativus,*" as we clearly showed some 14 or 15 years ago. The *second formula* is that adopted by the wholesale druggists.

EXTRACT (Opium,—Acetic). Syn. *Extractum Opii Aceticum,* — Lat. *Prep.* (Soubeiran.) *Opium,* 1 oz.; *distilled vinegar,* 1 quart; digest 2 days (with heat), decant, filter, and evaporate.

EXTRACT (Opium,—Alcoholic). Syn. *Extractum Opii Alcoholicum,*—Lat. *Prep.* (Ph. Antwerp.) From the *tincture.*

EXTRACT (Opium,—Aqueous). See *above.*

EXTRACT (Opium,—Aqueo-Alcoholic). Syn. *Ext. Opii Aquo-alcoholicum,*—Lat. *Prep.* (Taddei.) The *opium,* exhausted by *spirit,* is digested in *warm water,* and the infusion and tincture separately filtered, are mixed and evaporated.

EXTRACT (Opium, — De-narcotized). Syn. *Extractam Opii absque Narcotina,*—Lat. *Prep.* 1. (P. Cod.) The *aqueous extract* is reduced with *hot water* to the consistence of a syrup, and when cold this is mixed with 8 times its volume of *ether,* and the whole is frequently shaken for a day or two; the ethereal solution is then decanted, and the process repeated with *fresh ether,* as long as it dissolves anything. The original form of Robiquet is similar. Said to consist entirely of *impure muriate of morphia, gum* and *extractive.*

2. (M. Lamousin-Lamothe.) *Aqueous extract,* 4 parts; *resin,* 1 part; beat well together, add *boiling water,* 16 parts; boil to one-half, add *cold water,* 8 parts, filter, and evaporate.

EXTRACT (Opium,—by Fermentation). Syn. *Extractum Opii per Fermentationem,* —Lat. *Prep.* 1. *Opium* and *sugar,* of each, 4 *oz.; water,* 1 quart; rub together, and keep the mixture, loosely covered, in a warm situation (about 70° Fahr.), for 10 days or more; then add of *cold water,* 1 quart, and the next day, filter, and evaporate.

2. (Deyeux.) From an unstrained mixture of *opium,* 1 part, with *water,* 8 parts; and a *little yeast;* left for a week at a temperature of 68° to 77° Fahr., and then diluted, filtered, and evaporated. Some parties have recommended *quince juice* as the menstruum.

EXTRACT (Opium, — Roasted). Syn. *Extractum Opii Torrefacti,* — Lat. *Prep.* (Guibourt.) *Powdered opium* is heated on a flat dish over a *moderate fire,* with constant stirring, as long as fumes are given off; it is then exhausted by treating it *twice* with 6 times its weight of water, and the mixed liquor, after filtration, is evaporated.

EXTRACT (Opium, — Vinous). Syn. *Extractum Opii Vino Paratum,* — Lat. *Prep.* (P. Cod.) From *wine of opium.* The above extracts of opium (excepting the *alcoholic*) are regarded as less exciting than the other preparations of the drug. The *dose* of each, is similar to that of the aqueous extract. (See *above.*)

EXTRACT (Orange-peel). Syn. *Extractum Corticis Aurantii,*—Lat. *Prep.* 1. From the *thin yellow peel,* as *extract of madder.*

2. See *Aurantiine.*

EXTRACT (Ox-gall). Syn. *Inspissated Ox-gall; Fel Bovinum Spissatum, Extractum Fellis Bovini,*—Lat. *Prep.* (P. Cod.) From *ox-gall,* strained, and evaporated in a water bath. *Dose.* 5 to 15 gr.; in pills.

2. (Hunter Lane.) As the last, but reducing the gall to dryness, and then powdering it. It must be preserved in well-corked bottles. *Dose.* 3 to 12 gr.

EXTRACT (Pareira). Syn. *Extractum Pareiræ,*—Ph. L. & E. *Prep.* 1. (Ph. L.) From the *root* of *velvet leaf* or *pareira brava* (cissampelos pareira,—*Linn.*), as *extract of hops,* Ph. L.

2. (Ph. E.) As *extract of liquorice,* Ph. E. The P. Cod. formula is similar. Alterative, tonic, and diuretic. *Dose.* 10 gr. to ½ dr.; chiefly in affections of the bladder.

EXTRACT (Parsley). Syn. *Extractum Petroselini*,—Lat. *Prep.* (P. Cod.) From the root, as *extract of bistort*, P. Cod.

2. (M. Peraibe.) From the *fresh leaves*, as *extract of aconite.* Febrifuge and tonic. *Dose.* 5 to 10 gr.

EXTRACT (Pasque Flower). Syn. *Extractum Anemonis*,—Lat. *Prep.* (P. Cod.) From the *recent* or *dried flower*, as either of the *extracts of aconite*,—P. Cod. *Dose.* 1 to 4 gr.

Obs. Several species of anemone have been used in medicine, especially *anemone pratensis* and *a. pulsatilla*, (Linn.) According to Baron Stoerck, the former is resolvent, and is an effectual remedy in various chronic diseases, particularly in amaurosis, cataract, opacity of the cornea, nocturnal pains, suppressions, &c. ½ to 1 gr., combined with sugar of milk, has been highly recommended in hooping-cough.

EXTRACT (Patientia). Syn. *Extractum Patientiæ*,—Lat. *Prep.* From the *root* of *rumex patientia* or *garden patience* (occasionally called *patience dock*), as *extract of hops.* Aperient and stomachic. *Used* in double doses in lieu of extract of rhubarb.

EXTRACT (Paullinia). See *Extract of Guarana.*

EXTRACT (Peach Blossoms). *Prep.* From *essence of lemons*, 1 *oz.; pure balsam of Peru*, 2 *dr.; essence* (oil) *of bitter almonds*, 1 *dr.; rectified spirit*, 3 pints; *spirit of orange flowers*, 1 pint; *spirit of jasmin*, ¼ pint; mix. A pleasant and powerful perfume.

EXTRACT (Pellitory, — Ethereo-alcoholic). Syn. *Extractum Pyrethri, Ext. P. Æthereo-alcoholicum*,—Lat. *Prep.* (W. Procter.) *Alcohol* (rectified spirit), 1 pint; *ether*, ½ pint; mix, and pour it gradually on *root of pelitory*, 1 ℔, placed in a percolator; afterwards pour on *alcohol*, 1 pint, and subsequently, sufficient *dilute alcohol* (proof spirit) to displace 2½ pints of tincture, (*Essence of Pellitory, Tooth-ache essence;*) the latter is either suffered to evaporate spontaneously, or by a very gentle heat, until a soft extract is attained. *Used* to destroy the sensibility of the nerves of teeth, previous to plugging, and for toothache.

EXTRACT (Pepper). Syn. *Extractum Piperis, E. P. Nigri*,—Lat. *Prep.* From *decoction of black pepper* (bruised). Stimulant; stronger tasted than the berries, but less aromatic. *Dose.* 10 gr. to 1 dr.; in agues.

EXTRACT (Pepper,—Fluid). Syn. *Extractum Piperis Fluidum*, — Lat. *Prep.* (Ph. U. S.) From *black pepper*, as *fluid extract of cubebs*, P. U. S., separating the piperine by expression through a cloth, and keeping the fluid portion for use. (See *above.*)

EXTRACT (Pimpinella). Syn. *Extractum Pimpinellæ*,—Lat. *Prep.* From the *root of burnet saxifrage* (pimpinella saxifraga,—*Linn.*), as *extract of hops.* Astringent. *Dose.* 10 to 20 gr.

EXTRACT (Pinkroot). Syn. *Extract of Worm Grass, Ext. of Wormseed Root; Extractum Spigeliæ, E. S. Marilandicæ*,—Lat. *Prep.* From *Carolina pinkroot*, as *extract of box*, P. Cod. *Dose.* 5 to 20 gr.

EXTRACT (Pinkroot, — Fluid). Syn. *Essence of Pink Root, Liquor of do; Extractum Spigeliæ Fluidum*,—Lat. *Prep.* 1. *Pink root*, 1 *lb.; proof spirit*, 3 pints; make a tincture, evaporate to 10 fl. oz., add *sugar*, ¾ *lb.*, and *rectified spirit*, q. s. to make the whole measure exactly a pint. *Dose.* For a child, beginning with ½ a tea-spoonful. (See *above.*)

EXTRACT (Pinkroot, — Compound). Syn. *Compound Liquor of Pinkroot; Extractum Spigeliæ Fluidum Co.*, — Lat. *Prep.* 1. (Estlack.) *Carolina pinkroot* or *spigelia* (bruised), 4 oz.; *senna*, 3 oz.; *savine*, 1 dr.; pour on *boiling water*, 1 quart; when cold, add *rectified spirit*, ½ pint; digest 24 hours, express (or percolate), filter, evaporate to 12 fl. oz., in which dissolve, *manna*, 1 oz.; *sugar*, 8 oz. Every fl. oz. is equal to 2 dr. of pinkroot, and 1½ dr. of senna. *Dose.* For a child, ½ to 1 tea-spoonful; for an adult, a table-spoonful.

2. (W. Procter.) *Pinkroot*, 16 oz.; *senna*, 8 oz.; (both in coarse powder;) *dilute alcohol* (sp. gr. 0·935), 2 pints; macerate for 2 days, then proceed by displacement, adding *fresh spirit*, until 4 pints have passed through; filter, evaporate to 20 fl. oz., and add *carbonate of potassa*, 1 oz.; next add *oils of caraway* and *aniseed*, of each, ½ dr.; (previously triturated with) *powdered sugar*, 24 oz.; lastly, apply a *gentle* heat to dissolve the sugar.

3. (*Extractum Spigeliæ et Sennæ Fluidum*, —Ph. U. S.) As the last (nearly). *Dose.* As above. All the above preparations of pinkroot, are regarded as powerful and certain anthelmintics; particularly the last two.

EXTRACT (Pipsissewa). See *Extract of Winter-green.*

EXTRACT (Poison Oak). Syn. *Extractum Rhois Toxicodendri*,—Lat. *Prep.* (P. Cod.) From the *expressed juice* of the *leaves* of *rhus toxicodendron*, (Linn.) Narcotic, stimulant, and alterative. *Dose.* ½ gr.

to 1 gr., gradually increased; in chronic rheumatism, obstinate skin diseases, &c.

EXTRACT (Pomegranate). Syn. *Extractum Granati, E. G. Corticis G.,*—Lat. *Prep.* (Soubeiran, & P. Cod.) From the *root-bark of pomegranate*, as *extract of box.* In tape-worm. *Dose.* 10 to 20 gr.; followed by a purgative.

EXTRACT (Pomegranate-rind). Syn. *Extractum Granati, E. G. Corticis Fructûs,* — Lat. *Prep.* From the *decoction.* As the last.

EXTRACT (Poppies). Syn. *Extractum Papaveris,*—Ph. L. & E. *Ext. P. Albi,*—Lat. *Prep.* 1. (Ph. L.) *Bruised poppy-heads* (without the seeds), 15 oz.; *boiling distilled water,* 1 gall.; macerate 24 hours, boil to one-half, strain, and complete the evaporation.

2. (Ph. E.) As the last (nearly).

Obs. The medicinal action of extract of poppies, for the most part, resembles that of opium; but it is considerably weaker, and is generally regarded as less prone to produce headache and delirium. *Dose.* 2 to 12 gr. It is usually prepared by the large manufacturers, by exhausting the capsules, by coction with water; hence the inferior quality of the extract of the shops, which contains a considerable quantity of inert matter.

The principal consumption of this extract is among the brewers, brewers' druggists, and wine-merchants. For this purpose it is evaporated until it becomes hard on cooling, when it is formed into half-pound rolls, and covered with paper, like lead plaster. One of these rolls added to a hogshead of ale, stout, or sherry, materially increases the "headiness" or apparent strength of these beverages.

EXTRACT (Potato). Syn. *Extractum Solani Tuberosi,* — Lat. *Prep.* (Dr. J. Latham.) From the *stem* and *leaves* of the *potato plant,* as *extract of aconite,* Ph. L. Narcotic. *Dose.* 2 to 10 gr.

EXTRACT (Purging Flax). Syn. *Extractum Lini Carthartici,* — Lat. *Prep.* (Dr. B. Lane.) From the *dried herb,* as *extract of hops,* Ph. L. Aperient and diuretic. *Dose.* 5 to 10 gr. 14 *lb.* yielded 2¼ *lb.* of extract.

EXTRACT (Pyrola). See *Extract of Winter-green.*

EXTRACT (Quassia). Syn. *Extractum Quassiæ,* — Ph. E. *Ext. Q. Ligni, &c. Prep.* 1. From the *decoction of quassia chips. Product.* 5% to 6%.

2. (Ph. E.) From the *rasped wood,* as *extract of bistort,* P. Cod. Bitter and stomachic. *Dose.* 5 to 10 gr., or more.

Obs. This extract is almost universally prepared by coction, and is principally consumed by the brewers, who employ it as a substitute for hops. The bark is frequently substituted for the wood, but is considerably less bitter. The Ph. Baden has an extract prepared with spirit of 0·944.

EXTRACT (Quince Seeds). Syn. *Extractum Cydoniæ, Ext. C. Seminum. Prep.* From the *decoction.* Sucked as a lozenge, in hoarseness, &c.

EXTRACT (Ragwort). Syn. *Extractum Jacobææ,*— Lat. *Prep.* From the *fresh plant* (senecio jacobæa,—*Linn.*), as *extract of aconite.* In cholic pains, gonorrhœa, &c. *Dose.* 10 to 12 gr.

EXTRACT (Rhatany). Syn. *Extractum Rhataniæ; Ext. Krameriæ,*—Ph. E. *Prep.* 1. (Ph. E. Baden. & U. S.) From *dried rhatany root* (krameria triandria), as *extract of bistort,* P. Cod.

2. (Ph. Bor.) By two successive macerations in *boiling water* of 24 hours each, and evaporating at a temperature not exceeding 165° Fahr.

Obs. Extract of rhatany is astringent and tonic. *Dose.* 10 to 20 gr. A large quantity of this extract, of very inferior quality, is imported from Brazil, and other parts of South America. It is kept in two states, *hard* and *soft;* the former resembles kino, and is often sold for it; the latter is chiefly consumed by the *manufacturers* and "*improvers*" of port wine.

EXTRACT (Rhubarb). Syn. *Extractum Rhei,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Rhubarb* (in powder), 15 oz.; *proof spirit,* 1 pint; *distilled water,* 7 pints; macerate 4 days, strain, and set it aside that the fæces may subside; next decant the clear portion, strain, and evaporate to a proper consistence.

2. (Ph. E.) As *extract of cinchona,* Ph. L. (nearly.) "The extract is obtained of finer quality by evaporation in a vacuum with a gentle heat." The Baden formula is similar.

Obs. This extract is usually prepared by decoction from inferior and damaged rhubarb, picked out from the chests on purpose; hence the inferior quality of the extract of the shops. When made of *good* Turkey, or even East India rhubarb, it is a very valuable preparation. *Dose.* As a stomachic, 5 to 10 gr.; as a purgative, 10 gr. to ½ dr. It is seldom exhibited alone. *Product.* 50%.

EXTRACT (Rhubarb, — Fluid). Syn. *Liquor of Rhubarb, Essence of do.; Liquor Rhei, Extractum Rhei Fluidum,* — Lat. *Prep.* (W. Procter.) *Rhubarb* (in coarse powder), 8 oz.; mix it with an equal bulk of coarse sand, and moisten it with *dilute alcohol* (sp. gr. 0·935=13 u. p.) to form a pasty mass; in a short time introduce it into a percolator, shake it until uniformly settled, and cover it with cloth or paper; then pour on the rest of the spirit (the remainder of 2 pints) until the product has little odour or taste of the root; next gently evaporate the tincture to 5½ fl. oz., and add *sugar*, 5 oz.; when the whole should measure 8 fl. oz. *Dose.* 15 to 30 drops.

2. (Ph. U. S.) As the last, adding of *oils of fennel* and *anise*, of each, 4 drops; (dissolved in) *tincture of ginger*, 4 fl. dr.

EXTRACT (Rhubarb, — Compound). Syn. *Extractum Rhei Compositum, E. Panchymagogum*,—Lat. *Prep.* (Ph. Bor.) *Extract of rhubarb*, 3 dr.; *extract of aloes*, 1 dr., (softened with) *water*, 4 dr.; mix, and add of *soap of jalap*, 1 dr., (dissolved in) *proof spirit*, 4 dr.; lastly, evaporate to an extract, dry this in a warm place, and powder. Stomachic and purgative. *Dose.* 4 to 20 gr.

EXTRACT (Rue.) Syn. *Extractum Rutæ, E. Foliorum Rutæ*,—Ph. D. 1826. *Prep.* (Ph. D. & Ph. L. 1788.) From *rue leaves* (rutæ graveolens,—*Linn.*), as *extract of hops*, Ph. L.

2. (*Alcoholic*,—P. Cod.) As *alcoholic extract of aconite*, P. Cod. (nearly). The formula of the Ph. Wert. is similar.

Obs. This extract is stomachic, carminative, and emmenagogue. *Dose.* 10 to 20 gr., twice a day. It is usual to add a little of the essential oil to the extract, just before taking it out of the evaporating-pan, and when nearly cold. The first is the form adopted in trade in this country.

EXTRACT (Saffron). Syn. *Polychroite; Extractum Croci*,—Lat. *Prep.* 1. From *hay saffron*, as *extract of colocynth*, Ph. L.

2. (P. Cod.) From the *tincture*. Superior to the last.

Obs. The first is *used* chiefly as a colouring and flavouring substance by cooks, confectioners, wine and cordial brewers, &c. *Dose.* 5 to 15 gr.; as an excitant, antispasmodic and emmenagogue.

EXTRACT (Sarsaparilla). Syn. *Extractum Sarzæ*,—Ph. L. 1836 & E. *Ext. Sarsaparillæ*,—Ph. D. & Ph. L. 1824. *Extrait de Salsepareille*,—Fr. *Prep.* 1. (Ph. L. 1836.) From *sarsaparilla*, as *extract of hops*, Ph. L. The Ph. D. 1826, is similar. *Dose.* 10 gr. to 1 dr. *Product.* (From Jamaica sarsaparilla) 32§ to 36§.

2. (*Wholesale.*) See *Decoction of Sarsaparilla* (and *below*).

EXTRACT (Sarsaparilla),—Alcoholic). Syn. *Extractum Sarzæ Alcoholicum*,—Lat. *Prep.* 1. From a *tincture* of the *root-bark*, prepared with *proof spirit*, either by digestion or percolation.

2. (P. Cod., and Ph. U. S.) From *sarsaparilla root* (powdered), as *alcoholic extract of aconite*, P. Cod. Superior to the aqueous extract. *Dose.* 10 to 20 gr.

EXTRACT (Sarsaparilla,—Fluid). Syn. *Liquor of Sarsaparilla, Essence of do.; Liquor Sarzæ, Essentia Sarsaparillæ; Extractum Sarzæ Liquidum*,—Ph. L. *Ext. S. Fluidum*,—Ph. E. & D. *Ext. Sarsaparillæ F.*,—Ph. D. 1826. *Prep.* 1. (Ph. L.) *Sarsaparilla*, 3½ ℔; *distilled water*, 3 gall.; boil to 12 pints, pour off the liquor, and strain whilst hot; again boil the sarsaparilla in *water*, 2 gall., to one-half, and strain; evaporate the mixed liquors to 18 *fl. oz.*, and when cold, add of *rectified spirit*, 2 *fl. oz.* Each *fl. oz.* represents 2⅛ oz. of the *root* (nearly).

2. (Ph. E.) *Sarsaparilla*, 1 ℔; *boiling water*, 4 pints; digest 2 hours, then bruise the root, boil it for 2 hours, filter, and express the liquid; repeat the coction with *water*, 2 pints, as before; evaporate the mixed liquors to the consistence of a *thin syrup*, and, when cold enough, add of *rectified spirit*, q. s. to make up 16 *fl. oz.* Each *fl. oz.* represents 6 dr. of the *root*, and 6 *fl. oz.* of the decoction.

3. (Ph. D.) *Sarsaparilla*, 1 *lb.* (avoir.); proceed as before, and add of *rectified spirit*, q. s. to make the product up to 20 *fl. oz.* Strength, as the last (nearly). In the Ph. D. 1826, the decoction of *sarsaparilla*, 1 ℔ (troy), was ordered to be evaporated to 30 oz., which with the spirit (2 oz.) made the preparation only half the strength of the present one.

EXTRACT (Sarsaparilla,—Compound). Syn. *Extractum Sarzæ Compositum, Ext. Sarsaparillæ Comp.*,—Lat. *Prep.* There is no form for this preparation in the Pharmacopœias, but it is nevertheless in *immense demand*, from its great convenience in dispensing. The following formulæ are employed by one of the wholesale houses that does largest in this preparation:—

1. *Guaiacum shavings* (from which the small has been sifted), 30 *lb.; Italian juice*, 24 *lb.; mezereon root*, 6 *lb.;* are boiled with *water*, q. s., for 1 hour; the decoction is then drawn off, and the boiling repeated with *fresh water* a *second* and a *third* time; the mixed decoctions are allowed to deposit for 6 or 8 hours, or longer, and the clear portion decanted and strained through flannel; the liquid is now reduced

to the consistence of treacle, when *extract of sarsaparilla*, 9 *lb.* is added, and the evaporation conducted at a considerably lower temperature until near its completion, when the source of heat is removed, and the remaining evaporation conducted at the expense of that retained by the metal of the "pan;" when nearly cold, and just before removing the extract to the "pots" or "jars," *essential oil of sassafras*, 2 dr., dissolved in *rectified spirit*, 1 quart, is added, and quickly but completely stirred in. The *product* is a very showy article, if well managed, and weighs about 45 *lb.*, the precise quantity depending on the quality of the juice employed. It is labelled *Ext. Sarzæ Comp.*

2. As the *last*, but only using 15 *lb.* of juice, and that *Solazzi. Prod.* About 35 *lb.* It is labelled and sent out as "*Ext. Sarzæ Co. Opt.*"

3. By any of the forms given under *Compound decoction of Sarsaparilla*, either *common* or *concentrated*, by continuing the evaporation. *Dose.* Same as that of the simple extract.

EXTRACT (Sarsaparilla,—Fluid Compound). Syn. *Compound Liquor of Sarsaparilla. Prep.* 1. From any of the preceding formulæ by arresting the evaporation when the fluid has acquired the consistence of a *thin syrup*, and adding to each pint, when *cold, rectified spirit*, 4 fl. oz.

2. (*Alcoholic,*—W. Hodgson.) *Sarsaparilla* (bruised), 16 oz.; *liquorice root* (bruised), *guaiacum wood* (rasped), and *sassafras bark* (sliced), of each, 2 oz.; *mezereon* (sliced), 6 dr.; *spirit*, sp. gr. 0·935 (=13 u. p.), 7 pints; digest 14 days, express, filter, evaporate to 12 fl. oz., add of *sugar*, 8 oz., and as soon as this is dissolved, withdraw the heat. Stronger than the last. *Dose.* 1 fl. dr.

3. (*Ext. Sarsaparillæ Fluidum,*—Ph. U. S.) As the last (nearly).

EXTRACT (Sarsaparilla Root-bark). Syn. *Extractum Corticis Sarzæ,*—Lat. *Prep.* From the *decoction* or *tincture* of the *root-bark.* The cortical portion of sarsaparilla yields fully 50% of aqueous extract. "Five times as much as the meditullium." (Pope.)

Obs. Each of the above extracts of sarsaparilla (*simple, fluid,* and *compound*), when of good quality, dissolves in water, forming a deep reddish-brown solution, perfectly transparent, and depositing *little* sediment, even by standing some days. See *Sarsaparilla.*

EXTRACT (Savine). Syn. *Extractum Sabinæ, E. Foliorum S.,*—Lat. *Prep.* (Ph. L. 1788.) From the decoction of the *dried plant. Prep.* It is now seldom asked for. A little *essential oil of savine* is generally added in "finishing it off," to give it an odour of the recent herb. Some of the foreign Ph. have an *extract of savine* prepared like *extract of box*, P. Cod.

EXTRACT (Scammony, — Alcoholic). Syn. *Resin of Scammony; Resina Scammonii, Extractum Scammonii, E. S. Alcoholicum; E. sive Resina Scammonii,*—Ph. E. *Prep.* 1. From *powdered scammony*, exhausted with *proof spirit*, and the resulting tincture distilled until little but water passes over; the remaining water is then poured from the *resin*, which is next well-washed in *boiling water* and dried at a temperature below 240° Fahr. Brown; impure.

2. As the last, but using either *alcohol* of 90% or *ether*, and *animal* charcoal. White; pure.

Obs. Scammony resin is translucent, fusible, and combustible; and freely soluble in alcohol, ether, and oil of turpentine. It is frequently adulterated with *jalap-resin*, a fraud readily detected by its insolubility in the last two menstrua. *Dose.* 5 to 10 gr. "When pure or virgin scammony can be procured, it is an unnecessary preparation." (Pereira.)

EXTRACT (Scurvy-grass). Syn. *Extractum Cochleariæ,*—Lat. *Prep.* (P. Cod.) From the *clarified juice* of *fresh scurvy-grass*, by exposure to warm air. Antiscorbutic, stimulant, anti-rheumatic, and diaphoretic. *Dose.* 1 to 2 dr. The valuable principles of the juice are dissipated by much heat.

EXTRACT (Senega). Syn. *Extractum Senegæ,*—Lat. *Prep.* (P. Cod.) From *seneka* or *snake-root* (polygala senega,—*Linn.*), as *extract of box*, P. Cod.

EXTRACT (Senega,—Compound). Syn. *Extractum Senegæ Compositum, E. S. et Scillæ,*—Lat. *Prep.* (Ecky.) From equal parts of *squills* and *senega*, as the last, but by displacement. Both the above are stimulant, expectorant, sudorific, and diuretic. *Dose.* 1 to 12 gr.

EXTRACT (Senna). Syn. *Extractum Sennæ, Ext. S. Aquosum,*—Lat. *Prep.* 1. As *extract of colocynth*, Ph. L.

2. (P. Cod.) As *extract of bistort*, P. Cod.

3. (Ph. Bor.) From *senna leaves*, by maceration in *tepid water* (104° Fahr.) for 24 hours, and expression, and filtration; the operation is repeated with *fresh water*, and the strained liquors evaporated to a thick extract (at 149° to 157°Fahr.), which

is dissolved in *water*, 4 parts, the solution filtered, and again evaporated. *Dose.* 10 to 20 gr. It is principally used as a basis for purgative pills. When prepared by decoction it is nearly inert. A better extract is prepared from the common tincture made with proof spirit.

EXTRACT (Senna,—Alcoholic). Syn. *Extractum Sennæ Alcoholicum,*—Lat. *Prep.* (Guibourt). *Senna* (in powder), 1 part; *rectified spirit*, 5 parts; heat gradually to boiling, let it cool; in 24 hours, express, strain, and repeat the process with fresh spirit; lastly, distil and evaporate. Proof spirit answers for this purpose.

EXTRACT (Senna,—Fluid). Syn. *Extractum Sennæ Fluidum,* — Lat. *Prep.* (Ph. U. S.) *Senna* (in coarse powder), 2½ ℔; *spirit* (at or near proof), 64 fl. oz.; macerate 24 hours, then act by displacement, subsequently adding *weak spirit* (1 of rectified spirit to 3 of water) until 10 pints of tincture are obtained; evaporate to 1 pint, filter, add *sugar*, 20 oz.; and *oil of fennel*, 1 fl. dr.; (dissolved in) *compound spirit of ether*, 2 fl. dr. Every *fl. oz.* represents 1 oz. of senna.

EXTRACT (Smoke). Syn. *Extractum Fuliginis,* — Lat. *Prep.* 1. (Aqueous.) *Wood-soot*, 2 oz.; *water*, 1 pint; boil to 16 fl. oz., filter, and evaporate.

2. (Acetic). *Wood-smoke*, 2 oz.; *distilled vinegar* and *water*, of each, ½ pint; as the last. Formerly reputed antispasmodic, alterative, &c. *Dose.* 3 to 6 gr., two or three times a day; in dyspepsia, hysteria, cancer, scrofula, and various syphilitical affections.

EXTRACT (Snake-root). See *Extract of Senega.*

EXTRACT (Soapwort). Syn. *Extractum Saponariæ,*—Lat. *Prep.* (P. Cod. & Ph. Bad.) From the *dried roots* of *soapwort* (saponaria officinalis,—*Linn.*), as *extract of bistort*, P. Cod. Aperient and alterative. *Dose.* 15 gr. to ½ dr.

EXTRACT (Spruce). See *Essence of Spruce.*

EXTRACT (Squills). Syn. *Extractum Scillæ, Ext. S. Aquosum,*—Lat. *Prep.* 1. (Ph. Baden.) From *squills*, as *extract of colocynth*, Ph. L. (nearly).

2. (Ph. Bor.) From *squills*, as *extract of senna*, Ph. Bor. (nearly), but using *boiling water*, avoiding ebullition during the evaporation, and powdering the residuum. *Dose.* 1 to 5 gr. (See *below.*)

EXTRACT (Squills,—Alcoholic). Syn. *Extractum Scillæ Alcoholicum,*—Lat. *Prep.* (P. Cod.) From the *tincture* prepared with *proof spirit*, by distillation and evaporation. *Dose.* ½ to 3 gr., as an expectorant and diuretic, twice or thrice a day. In larger doses it is nauseant and emetic.

EXTRACT (Storax). Syn. *Extract Styracis,*—Ph. E. See *Strained Storax.*

EXTRACT (Stramonium). Syn. *Extract of Thorn-apple, Extractum Stramonii,*—Ph. L. & D. *Prep.* 1. (Ph. L.) *Seeds of thorn-apple* (datura stramonium,—*Linn.*), 15 oz.; *boiling distilled water*, 1 gall.; macerate for 4 hours in a vessel lightly covered, near the fire; afterwards take out the seeds, bruise them in a stone mortar, and return them to the liquor; then boil down to 4 pints, strain whilst hot, and evaporate. The Ph. D. is similar. *Product*, (about) 12%. Anodyne and narcotic. *Dose.* ¼ gr. to ½ gr., gradually increased, twice or thrice a day; in neuralgia, rheumatism, tic douloureux, spasmodic asthma, epilepsy, worms, &c.

2. (P. Cod. & Ph. U. S.) From the *expressed juice* of the *fresh leaves*, heated to boiling and filtered. The P. Cod. also orders it to be prepared as *extract of aconite*, Ph. L. Anodyne and narcotic. *Dose.* ½ gr. to 1 gr.

Obs. On the large scale, this extract is prepared by expressing the juice of the *fresh* herb, and boiling the remainder in water; the juice and decoction are then mixed, filtered and evaporated. 1½ cwt. of stramonium yielded 37 *lb.* of juice, and this, with the decoction, gave 31 *lb.* of extract. (Gray.)

EXTRACT (Stramonium, — Alcoholic). Syn. *Extractum Stramonii,*—Ph. E. *Ext. S. Alcoholicum,*—Lat. *Prep.* 1. (Ph. E. & Ph. U. S.) From the *seeds* (ground in a coffee mill), by percolation with *proof spirit. Product*, (about) 14%; 1 *lb.* yielded 2¼ *oz.* (Recluz.)

2. (P. Cod.) From the *leaves*, as *extract of aconite*, P. Cod. *Dose.* ¼ gr., gradually increased. (See *above.*)

EXTRACT (Succory). Syn. *Extractum Chicorii,*—Lat. *Prep.* (Guibourt.) From the *fresh root*, as *extract of aconite*, Ph. L. Aperient, deobstruent, and tonic. *Dose.* 10 gr. to ½ dr.

EXTRACT (Sweet Flag.) Syn. *Extractum Acori, Ext. Calami Aromatici,*—Lat. *Prep.* From the *rhizomes*, as *extract of rhubarb*, Ph. L. See *Acorus Calamus.*

EXTRACT (Tansy). Syn. *Extractum Tanaceti,*—Lat. *Prep.* 1. From the *herb* (tanacetum vulgare,—*Linn.*), as *extract of hop*, Ph. L.

2. (Giordano.) As *extract of horehound*, Ph. Lusitan.

Obs. This extract is said to be tonic, stomachic, anthelmintic, emmenagogue, and febrifuge. Dr. Clark says that in Scotland it was found to be serviceable in various cases of gout. The infusion is, however, preferable. *Dose.* 5 gr. to 20 gr.

EXTRACT. (Taraxacum). Syn. *Extract of Dandelion; Extractum Taraxaci,* Ph. L. &. E. *Ext. T. Herbæ et Radicis,* Ph. D. 1826. *Prep.* 1. (Ph. L.) From the *recent root of dandelion* (Leontodon taraxacum,—*Linn.*), as *extract of hop,* Ph. L. The formulæ of the Ph. E. &. U. S. are nearly similar.

2. (Ph. D.) From the *herb* and *root* as the other simple extracts (*extracta simpliciora*).

3. (P. Cod.) From the *expressed juice,* as *extract of stramonium,* P. Cod.

4. (Ph. Bor.) As *extract of senna,* Ph. Bor. (nearly).

5. (Ph. Baden.) By *displacement* with *cold water.*

6. (*Wholesale.*) From the *decoction.*

Obs. The extract of the shops is usually prepared by exhausting the root by coction with water. The products of the *first two* of the above formulæ, when recent, have a faint and agreeable odour, and a sweet, bitter taste; those of No. 3, 4, and 5, smell strongly of the recent root, have a pale and lively brownish yellow colour, and a bitter acidulous taste without any trace of sweetness; that of the last one is devoid of odour, and possesses a coffee-brown colour, and a sweetish, burnt taste, not much unlike a solution of burnt sugar. The medicinal virtue of this extract is greatest when the aroma and bitter taste of the recent root is well developed; and when sweet, its efficacy as a remedy is impaired. (Squire.)

Taraxacum root should be gathered during the winter months, when the quantity of the product is looked at; as then a given weight of the juice yields more extract; but in summer and autumn it possesses more bitterness and aroma. 4 *lb.* of juice from roots gathered in November and December yielded 1 *lb.* of extract, while it took from 6 to 9 *lb.* of juice from the root, gathered in spring or summer, to yield a like quantity. (Squire.) The *herb* yields by the evaporation of its expressed juice, about 5% of extract. According to Mr. Jacob Bell the average yield of 1 *cwt.* of root is about 7½ *lb.* (Pharm. Journ., x. 446.)

Good extract of taraxacum should be *wholly* soluble in water. *Dose.* 10 gr. to ½ dr.; as a resolvent, aperient and tonic in liver and stomach complaints, &c.

EXTRACT (Taraxacum,—Fluid). See *Liquor taraxaci.*

EXTRACT (Tea). Syn. *Extractum Theæ,*—Lat. *Prep.* 1. From an *infusion* of any of the *rougher kinds of black tea.* Astringent. Has been recommended in diarrhœa; formed into pills. *Dose.* 10 gr. to ½ dr. A hard black-looking substance, smelling and tasting faintly of tea, is imported under the same name from China.

2. (*Pidding's.*) The joint products of *distillation* and *infusion* combined. Proposed to be made in China, and exported as a condensed preparation of tea (*Essence of tea; Essentia theæ;*) to be used as a substitute for the leaves, in order to save the expense of freight, &c.

EXTRACT (Thorn-Apple). See *Extractum of Stramonium.*

EXTRACT (Tobacco). Syn. *Extractum Tabaci, Ext. Nicotianæ,* — Lat. *Prep.* (Chippendale.) From *decoction of tobacco.* Proposed as an external application in neuralgia, &c.

EXTRACT (Tobacco,—Alcoholic). Syn. *Extractum Tabaci Alcoholicum,* — Lat. *Prep.* (Ph. Bor.) *Tobacco leaves,* 1 ℔; *spirit* (sp. gr. 0·900), 2 ℔; digest in a warm place for some days, express strongly, and again digest in a mixture of *water* and *spirit* (0·900), of each, 1 ℔, for 24 hours; again press out the liquor, and evaporate the strained and mixed liquors in a vapour bath, at a temperature not exceeding 167° Fahr. (See *above.*)

EXTRACT (Tormentil). Syn. *Extractum Tormentillæ,* — Lat. *Prep.* (Ph. Amst.) From the *root* of *tormentilla erecta* (Linn.), as *extract of hops,* Ph. L. The Ph. Baden. directs its preparation by displacement with *cold water.* Astringent and febrifuge. *Dose.* 15 to 30 gr.; in diarrhœa. It was formerly regarded as a specific in syphilis. (Lindley.)

EXTRACT (Uva Ursi). See *Extract of Whortleberry.*

EXTRACT (Valerian). Syn. *Extractum Valerianæ,*—Lat. *Prep.* 1. From *valerian root,* as *extract of hop,* Ph. L.; but using a covered vessel.

2. (Ph. Bor. and Baden.) As *extract of cinchona,* Ph. L. (nearly), employing strong force in the expression of the liquor, and only evaporating to the consistence of syrup.

Obs. It is usual to add to this extract a *little* of the essential oil of valerian, dissolved in a small quantity of rectified spirit, just before removing it from the evaporating pan, and when nearly cold. Anti-spasmodic, and nervine. *Dose.* 10 gr. to ½ dr. In hysteria and spasmodic diseases. Valerian yields about 40% of soft extract.

EXTRACT (Valerian,—Alcoholic). Syn. *Extractum Valerianæ Alcoholicum,*—Lat. *Prep.* (P. Cod.) As *extract of box*, P. Cod.

EXTRACT (Valerian, — Fluid). Syn. *Extractum Valerianæ Fluidum,*—Lat. *Prep.* (Ph. U. S.) *Rectified spirit*, 12 fl. oz.; *ether*, 4 fl. oz.; mix, add of *valerian* (in coarse powder), 8 oz.; digest, and percolate, adding subsequently, *spirit* (at or near proof) until 16 fl. oz. of tincture have passed through; let this evaporate spontaneously, in a shallow vessel, until reduced to 5 fl. oz.; in the mean time, add *fresh spirit* to the mass in the percolator, until 10 fl. oz. more of tincture are obtained, which add to the above residuum of the evaporation, observing to dissolve any *oleo-resinous deposit* in a little *rectified spirit*, and to add it to the rest; lastly, filter, and add of *rectified spirit*, q. s. to make the whole measure 16 fl. oz.

EXTRACT (Vanilla). See *Liquors.*

EXTRACT (Wall Pellitory). Syn. *Extractum Parietariæ,*—Lat. *Prep.* From *fresh pellitory of the wall* (parietaria officinalis,—*Linn.*), as *extract of aconite*, Ph. L. Aperient, diuretic, and pectoral. *Dose.* 10 gr. to ½ dr.

EXTRACT (Walnuts). Syn. *Extractum Juglandis Immaturæ, Roob Diacaryon sine Melle,*—Lat. *Prep.* 1. From *unripe walnuts* (juglans regia, — *Linn.*), as *extract of aconite*, Ph. L.

2. From the *decoction* of the *green shells.* Vermifuge. *Dose.* 20 to 30 gr. in cinnamon water.

EXTRACT (Walnut Leaves). Syn. *Extractum Juglandis Foliorum,*—Lat. *Prep.* 1. From the *decoction* of *dried walnut leaves.*

2. (Soubeiran.) By displacement with *tepid water.* Diaphoretic and alterative. *Dose.* 2 to 4 gr. twice or thrice a day, in scrofula, scirrhus, &c.

EXTRACT (Walnut-leaves,—Alcoholic). Syn. *Extractum Juglandis Foliorum Alcoholicum,*—Lat. *Prep.* (Ph. Bor.) From *walnut leaves* (cut), as *alcoholic extract of tobacco*, Ph. Bor. (nearly).

EXTRACT (Water-dock). Syn. *Extractum Rumicis Aquatici,* — Lat. *Prep.* From the *root*, as *extract of hops*, Ph. L. Astringent and antiscorbutic. *Dose.* 15 gr. to 1 dr.; in skin diseases, &c.

EXTRACT (Whortleberry). Syn. *Extract of Bear's Whortleberry, Ext. of Bearberry; Extractum Uvæ Ursi,*—Ph. L. *Prep.* From the *dried leaves*, as *extract of hops*, Ph. L. *Dose.* 5 to 15 gr., twice or thrice a day, in chronic diseases of the bladder and kidneys, attended with increased secretion of mucus, without inflammation.

EXTRACT (Winter Cherry). Syn. *Extractum Alkekengi,*—Lat. *Prep.* From the *berries* of *physalis alkekengi*, (Linn.), as *extract of elder.* (See *above.*) Aperient, detergent, and diuretic. *Dose.* 2 to 4 dr.

EXTRACT (Winter-green). Syn. *Extractum Chimaphilæ, E. Pyrola,* — Lat. *Prep.* From the herb *winter-green, pyrola*, or *pipsissewa*, as *extract of hops*, Ph. L. *Dose.* 10 gr. to ½ dr.; in dropsy, scrofula, and chronic affections of the urinary organs.

EXTRACT (Wood Sorrel). Syn. *Extractum Acetosellæ.*—Lat. *Prep.* (Pideret.) From the *expressed juice of the fresh herb.* Acid, bitter, and antiscorbutic. *Dose.* 15 gr. to ½ dr.

EXTRACT (Worm Grass). See *Extract of Pinkroot.*

EXTRACT (Worm Seed, — Ethereal). Syn. *Extractum Cinæ Æthereum, E. Seminum C. Æ.,*—Lat. *Prep.* (Hamb. Cod. 1845.) *Worm seed*, 1 oz.; *ether*, 4 oz.; digest 3 or 4 days, press, filter, distil off 4-5ths, and evaporate the residuum to a proper consistence. *Prod.* 25% to 30%. Vermifuge. *Dose.* 3 to 10 gr., night and morning for 2 or 3 successive days, followed by a brisk purge.

EXTRACT (Wormwood). Syn. *Extractum Absinthii; Extractum Artemisiæ Absinthii,*—Ph. D. 1826. *Ext. Cacuminum A., &c. Prep.* 1. (Ph. D. 1826.) From the *dried flowering tops* of *wormwood*, as the other *simple extracts* (extracta simpliciora,—Ph. D.)

2. (Ph. Bor.) As *extract of rhatany*, Ph. Bor.

3. (P. Cod. & Ph. Baden.) By displacement by cold water.

Obs. Bitter stomachic, tonic, and vermifuge. *Dose.* 10 gr. to 20 gr., 2 or 3 times daily; in dyspepsia, loss of appetite, gout, &c. It is usual to add a few drops of the oil of wormwood to the extract before taking it from the pan.

EXTRACT (Wormwood, — Alcoholic). Syn. *Extractum Absinthii Alcoholicum,*—Lat. *Prep.* (Guibourt.) From a *tincture* prepared from the *dried tops of wormwood* boiled in *proof spirit.* More active than the last.

EXTRACT (Yew). Syn. *Extractum Taxi,*—Lat. *Prep.* 1. (Loder.) From the *inspissated juice* of the *fresh leaves of the yew* (taxus baccata,—*Linn.*) Its action on the circulation greatly resembles that of digitalis, but is more manageable. *Dose.* 1 to 7 gr.; in epilepsy, &c.

2. (*Alcoholic,*—Ph. Baden.) From the *dried leaves,* as alcoholic extract of aconite, Ph. Baden.

EXTRACTIVE. Syn. *Extractive Principle.* This substance was discovered by Fourcroy, and presumed by him to be the common basis of *all* extracts. It has since been proved by Chevreul and other chemists, to be a heterogenous compound, varying in composition with the plant from which it is extracted. Extractive has a brown colour, or one becoming so in the air, it speedily putrefies, and becomes oxidized, and is rendered insoluble by long exposure to air, and by repeated solutions and evaporations. In its unalerted state it is soluble in water, and in alcohol, is nearly insoluble in ether, and is precipitated from its solutions by the acids and metallic oxides. With alumina it forms the basis of several brown dyes. See *Extracts.*

EXTRACTS (Dried). See *below.*

EXTRACTS (of Flowers). See *Extraits.*

EXTRACTS (Fluid). Syn. *Extracta Fluida, Extracta Liquida,*—Lat. This name has been applied in *modern pharmacy* to various preparations differing materially from each other in their degree of fluidity and concentration. Some of these have been already noticed, and others will be found under one or other of their synonyms. Much confusion would be avoided by confining the name "fluid extract" to those preparations only which differ from the ordinary officinal extracts in being in the liquid form; whilst others of a like character, but of less consistence or concentration, might be conveniently classed under the general denomination of *liquors* (liquores). The various condensed preparations of vegetable substances, now common in trade, professedly several times stronger than the common decoctions, infusions, and tinctures, might be simply and advantageously distinguished by the addition of "*concentrated*" to their names. Tinctures made with *rectified spirit,* and of (say) at least 8 times the usual strength, might be appropriately termed "*essences.*" See *Decoctions, Essences, Extracts, Infusions, Solutions, Tinctures, &c.*

EXTRACTS (Hard). See *Extract,* (p. 419), *&c.*

EXTRACTS (Medicinal). See *above.*

EXTRACTS (in Powder). Syn. *Dried Extracts, Desiccated do., Pulverulent do., Saccharated Extracts; Extracta Pulverata, Ext. Sicca, Ext. cum Saccharo,*—Lat. *Prep.* 1. Ordinary *soft extract of the drug,* 4 parts; *white sugar,* (in powder), 1 part; mix, and dry by exposure in a warm situation; lastly, reduce the mass to powder, and if it weighs less than 4 parts, triturate it with more *powdered sugar* until *its weight* is equal to the *original weight* of the *extract* used in its preparation. The strength of the extract thus continues unchanged.

2. (Ph. Bor.) As the last, but using powdered *sugar of milk* in lieu of cane sugar.

3. (Gauger.) *Alcoholic extract,* 3 parts; *rectified spirit,* 1 part; are triturated together in a porcelain mortar until thoroughly incorporated, when *white sugar* (in powder), 15 oz., is *gradually* added, and the two *carefully* and *completely* blended together; the mixture is dried as before, and *more sugar* added until the whole weighs *exactly* 18 oz. *Six grains* represent *one grain* of the unprepared extract.

Obs. The above are admirable preparations, intended chiefly to render the perishable extracts of the narcotic plants (*extractica narcotica*) less liable to suffer by age. See *Extract of Aconite* (Saccharated), *&c.*

EXTRACTS (Soft). See *Extract* (p. 419), and *above.*

EXTRAITS (*Fr.*) Extracts. Among *perfumers,* these are mostly spirituous solutions of the essential oils or odorous principles of plants and other fragrant substances. The French commonly apply the term to any concentrated spirit, either simple or compound. In the shops of the Parisian perfumers upwards of 60 preparations of the kind are distinguished by this name. The *extracts* of *jasmine, jonquille, may-lily, orange blossoms, violets,* and other *like flowers* of delicate perfume, are obtained by agitating and digesting the *huiles* and *pommades* of the flowers with the *purest rectified spirit,* in the manner described under *Scented Spirits* (esprits). This process is repeated with *fresh oil* or *pommade* until the spirit is rendered sufficiently fragrant. The other *extracts* (both *simple* and *compound*) are made by the common methods of infusion and distillation. See *Essences, Extracts, Spirits, &c.,* (and *above.*)

EYE-DROPS (Marshall's). *Prep.* 1. *Nitrate of silver,* 2 gr.; *dilute nitric acid,* 2 drops; *pure soft* or *distilled water,* 1 fl. oz.; dissolve, add *powdered gum,* 15 gr., agitate until dissolved, and the next day decant the clear portion.

2. (Original.) *Lunar caustic* (fused nitrate of silver), 3 gr.; *juice of snails* and *water,* equal parts. See *Eye Waters.*

EYE SALVE (Smellome's). Syn. *Smellome's Eye-Ointment. Prep.* From *prepared verdigris* and *salad oil,* of each, ½ dr.; triturate well together, then add of *resin* *cerate*, 1 oz. See *Cerates* and *Ointments*.

EYE-WATERS (Dr. Wisdom's). *Prep.* From *bole*, 4 dr.; *white copperas* (sulphate of zinc), ½ dr.; *camphor*, 1 dr.; dissolved in *rectified spirit*, ½ fl. oz.; *water*, 1 quart; agitate for an hour, and the next day decant the clear, and filter. The above are quack nostrums. See *Waters.*

FACE AGUE. The common name for the intermittent form of facial neuralgia or tic douloureux. See *Neuralgia.*

FACE PAINTS. Syn. *Fards*,—Fr. See *Almond Bloom, Carmine, Pearl White, Rouge, &c.*

FAC SIMILE. See *Signatures.*

FACTITIOUS. Syn. *Factitius*,—Lat. Artificial; made by art, in distinction from that produced by nature. Numerous illustrations of the application of this word occur in the pages of the present work.

FÆCES. Excrement. In the *laboratory*, the "settling" or sediment deposited by a liquid. See *Defecation.*

FAINTING. Syn. *Swooning; Syncope.* A disease in which the respiration and circulation are apparently suspended for a time, or are extremely feeble. The *symptoms* are too well known to require description. The *causes* are supposed to be—diminished energy of the brain, and organic affections of the heart or neighbouring vessels. This has lead nosologists to divide *syncope* into two varieties:—

1. *Occasional*, (syncope occasionalis, s. accidentalis;) primitively induced by sudden and violent emotions of the mind, powerful odours, derangement of the stomach or bowels, constrained position of the body, tight-lacing, pressure, loss of blood, debility from disease, &c. This variety is frequently followed by vomiting, and, occasionally, by convulsions or epileptic fits. The *recovery* is accelerated by the horizontal position, *without* the head being the least elevated, by which the arterial blood is more vigorously thrown upon the brain, and thereby stimulates it to resume its usual functions. Pungent substances (*smelling-bottle, vinaigrette, &c.*) may be applied to the nostrils, and *cold water* sprinkled on the face and chest. In all cases the dress (*corset, waist-band, neck-cloth, &c.*) should be instantly loosened, and indeed this is the first assistance which should be given, either in syncope or apoplexy. As soon as the patient can swallow, a *little* brandy-and-water, or wine, or a few drops of *ether* or *spirit of sal volatile*, may be given.

2. *Cardiac*, (syncope cardiaca;) arising without any apparent cause, with violent palpitation during the intervals, and altogether of a more formidable character than the preceding. The *subsequent treatment* must here be directed to the cure or alleviation of the original disease.

FAINTS. The first and last runnings of the whiskey-still. The one is technically termed the *strong faints;* the other, the *weak faints.* They are both purified by rectification, &c. See *Distillation.*

FAITH. Dr. Pereira remarks, that "*faith* in the beneficial agency of remedies, and *confidence* in the skill of the medical attendant, are important adjuvants in the treatment of disease. To them both the physician and empiric owe part of their success."

FALLING SICKNESS. See *Epilepsy.*

FALLTRANCK. See *Swiss Vulnerary.*

FARCY. See *Glanders.*

FARDS. See *Face Paints.*

FARINA. See *Flour* and *Meal.*

FARINACEOUS FOOD. Several preparations of this character advertised in the papers or met with in the shops, are noticed under their respective heads. The following are others of the class:—

Baker's Alimentary Compound. *Fine flour* (pastrycook's), 2 parts; *finely ground rice*, 1 part.

Baster's Compound Farina. *Wheat flour*, 14 *oz.; white sugar*, 2 *oz.*

Braden's Farinaceous Food. Same as *Hard's.*

Bright's Nutritious Farina. *Rice flour* and *potato farina*, equal parts.

Bright's Breakfast Powder. *Chocolate*, 1 part; *nutritious farina* (Bright's) 2 parts.

Densham's Farinaceous Food. *Wheat flour*, 3 parts; *barley meal*, 1 part; the mixture is slightly baked, and again ground and sifted. Said to be slightly laxative.

Gardner's Alimentary Preparation. *Pure rice flour.*

Hard's Farinaceous Food. *Wheat flour*, slightly baked, and resifted.

Leath's Alimentary Farina. *Wheat flour* (baked), with some *sugar, Indian meal*, and *tapioca.* According to some it also contains *potato starch.*

Leath's Homœopathic Compound. As the last.

Maidman's Nutritious Farina. *Potato starch* tinged with *beet-root.*

Plumbe's Farinaceous Food. *South-sea arrow-root*, with about 1-3rd its weight of *pea flour.*

Prince of Wales's Food. Chiefly *potato-flour.*

Smith's Nursing Farina. Equal parts of *baked wheat flour* and *rice-flour.*

Obs. The same remarks apply to the above compounds as to arrow-root and jellies. Many of them being deficient in the nitrogenous elements of nutrition, and *all* of them nearly destitute of the mineral and saline matters which are absolutely necessary to the formation of the bones and tissues, and the support of the body in health, are consequently utterly unsuitable as an exclusive article of diet, especially for young children. Unfortunately, it has been too much the fashion of medical men of late years to recommend these compounds, and even to furnish testimonials as to their excellence (?), apparently relying *solely* on the representation of their proprietors or vendors. We deem it, however, to be a public duty to caution parents and nurses against their injudicious use. As mere adjuvants or auxiliaries, when the natural food supplied by the mother may be insufficient for the nutrition of the infant, some of them may doubtless be of value; but in all other cases, they should be largely combined with *pure cow's milk, beef tea, meat broths* or *gravies, eggs,* or other substances rich in the nitrogenous and saline elements of nutrition. Even with this reservation, those consisting chiefly of *potato* or *rice-flour,* and other like farinas, should be used with the greatest caution.

FARMING. See *Agriculture, Butter, Cheese, Manures, Soils, &c.*

FASTING. See *Abstinence.*

FAT. Syn. *Adeps,*—Lat. The *fat of animals* is a concrete oil contained in the cellular membrane of their bodies, more especially round the kidneys, in the folds of the omentum, at the base of the heart, upon the surface of the intestines, and among many of the muscles. Fat varies in consistence, colour, and odour, with the animal from which it is obtained. That of the *carnivora* is soft and rank-flavoured; that of the *ruminantia,* solid and nearly scentless. It is usually whitest and most copious in the well-fed young animal, and yellowish and more scanty in the old. That under the skin, and surrounding the kidneys (*suet*) is also more solid than that in the neighbourhood of the moveable viscera. In the *cetacea,* or *whale tribe,* the fatty secretion assumes the form of oil. These variations in consistency depend upon the relative quantity of *stearine* and *elaine* present in the fat.

TABLE *of the composition, and fusibility of certain fats, according to the researches of* Braconnot *and* others.[*]

Name.	*Composition.*		*Melting Point.*
	Elaine.	*Stearine.*	
Butter (Summer)	60	40[†]	Variable.
„ (Winter)	37	63	
Duck Fat . .	72	28	78° to 82° F.
Goose Fat . .	68	32	78° to 81° „
Hog's Lard . .	62	38	81° to 82° „
Mutton Suet .	26	74	98° to 105°
Ox Marrow-fat .	24	76	112° to 115°
Ox Suet . . .	25	75	97° to 104°

In *former times* the fats of many animals were employed in *pharmacy;* but, at present, those principally used are *lard* and *suet.* In *perfumery,* in addition to these, *beef-marrow* and *bear's grease,* are employed. For both these purposes the crude material is cut into small pieces, and freed as much as possible from all extraneous membranes; after which it is placed in a boiler with water, and heated until it is completely fused, when the whole is strained, and allowed to cool very slowly. By this means a cake of cleansed fat is obtained, which may be readily separated from any adhering water.

Fats and the *fat oils* are best PRESERVED by being run into glazed jars, and secluded from the action of the air. A little *benzoic acid* or *gum-benzoin,* dissolved in them by heat, will generally *prevent,* and in all cases, greatly *defer* the accession of *rancidity.* We introduced this method into the laboratory in our early days of manipulation, and ourselves, and others to whom we have made it known, have since employed it with undeviating advantage in the manufacture of *cerates, ointments,* and other preparations containing *fatty matter* or the *fixed oils.* It has recently been shown by Dr. Griesler, that *nitric ether,* and its *alcoholic solution,* act in the same manner. A few drops are not only sufficient to *prevent* rancidity, but, it is said, will even destroy the disagreeable odour of rancid fat. When heated to remove the alcohol, they immediately become bright, clear, and scentless. See ***Fixed Oils, Stearine,*** *tallow, &c.*

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[*] In this table *margarine* is included under *stearine.*

[†] According to Dumas, butter contains *no* stearine (properly so called).

FAT (Curriers'). *Fat* or *tallow* boiled until it is very hard and blackish when cold. *Used* for leather.

FATTY ACIDS. The *fatty-acid series* embraces all those compounds evincing acid properties, which are derived from the various fats. See *Butyric, Oleic,* and *Stearic Acid, &c.*

FATTENING. Until comparatively a recent date, the plan used to *fatten domestic animals,* was to prevent their taking exercise, and to gorge them with food. The excessive fat produced by these means was, however, found to be far from wholesome, and was less delicate than that arising in the natural way. This system was therefore gradually abandoned in favour of the present one, which consists in supplying the animal with abundance of wholesome food, and with the means of taking exercise, as far as the disposition or feelings dictate. Hence the farmers "in the most enlightened districts, such as Berwickshire, East Lothian, &c., instead of tying up their *fattening cattle* in stables like horses, and placing their food before them, put two or three together in small yards with sheds attached, in which they can run about, eat when they choose, and take shelter from the rain, or cold, or the sun, at pleasure, under the open shed. *Swine* are treated in the same manner, and also *spring lambs* that are fattened for the market. *Poultry* are no longer kept in coops and crammed, or *rabbits* in hutches; but the *former* are allowed to take exercise in fields sown with various herbs, and the *latter* are kept in a species of artificial warren, where they can take exercise by burrowing." (Loudon.)

FAYNARD'S POWDER. *Beech-wood charcoal,* reduced to an almost impalpable powder. *Used* to suppress hemorrhage.

FEAR, in general, is a depressing and debilitating passion, and sometimes acts prejudicially, but, more frequently, as a curative or preventive of disease. It is a well-known fact, that females who are the most faint-hearted and desponding during the period of their sex's trial, generally experience a more rapid convalescence than those who are more confident and resolute. During the late visitation of cholera in this metropolis, many instances came under our notice of parties being suddenly attacked, even whilst the song of revelry or triumph was on their lips, and dying in a few hours, whilst those around them, though living in fear and trembling for weeks lest they should "catch" the malady, and even sleeping in the room with the unburied corpses of their less fortunate relatives or friends, passed through the ordeal of the pestilence *unhurt.* Besides, fear induces temperance, cleanliness, and the adoption of other precautions, which tend powerfully to prevent disease. If the assertions so loudly made by interested parties to the contrary were true, why did the heaviest rate of mortality occur among the young and thoughtless—among children who knew no fear? Boerhaave, according to Pereira, is said to have prevented the occurrence of epileptic attacks (brought on by the sight of a person falling down in a fit in the sight of the hospital patients), by directing a red-hot iron to be applied to the person who should next be affected.

FEATHERS. *Ostrich feathers* are those most esteemed as articles of personal decoration, and *goose feathers,* for beds; but the feathers of other birds are commonly used for both purposes.

Feathers are *prepared* for *ornamental purposes* by SCOURING them with *white soap-and-water* (1 *oz.* to the *pint*), used hot; they are next well-rinsed in several successive portions of *pure water,* and after being drained and shaken, are, lastly, passed through *water slightly blued with pure indigo,* and dried out of the dust. When dry, the ribs are generally rubbed with a piece of glass, having a curved notch in it, for the purpose of increasing their PLIANCY, and the filaments are CURLED by drawing them between the edge of a blunt knife and the ball of the thumb of the hand which holds it.

Feathers are *bleached* either by exposure for 2 or 3 weeks, to the sun and dew, planted upright on the grass; or by *sulphuring* them.

Feathers are *dyed*—

Black. By immersion for 2 or 3 days in a bath (at first hot) of *logwood,* 8 parts; and *copperas* or *acetate of iron,* (about) 1 part.

Blue. With the *indigo vat.*

Brown. By any of the *brown dyes* for silk or woollen.

Crimson. A mordant of *alum,* followed by a hot bath of *brazil wood,* and afterwards by a weak one of *cudbear.*

Pink or *Rose.* With *safflower* and *lemon juice.*

Plum. The *red dye,* followed by an alkaline bath.

Red. A mordant of *alum,* followed by a hot *brazil-wood bath.*

Yellow. From an *alum mordant,* followed by a bath of *turmeric* or *weld.* Other shades may be obtained by a mixture of the above dyes.

Goose feathers for *beds* are generally "purified" by simply exposing them to the sun, or in a stove until *perfectly dry*, and then beating them to remove loose dirt. When carelessly collected and dirty, they are sometimes *first* "cleansed" with *lime water*, or better still, with a *weak solution of carbonate of soda*, or *water to which a little solution of chloride of lime* has been added; after which they are rinsed in *clean water*, and dried or stoved as before. *Old feathers* are "cleansed" or "purified" in the same way.

FEBRIFUGES. Syn. *Febrifuga.*—Lat. Substances or agents which cure or alleviate fever. The term is more particularly applied to medicines used against the ague, as bark and arsenious acid, and their preparations. The extreme value of *cold water*, as a drink in ardent fever, has been known in all ages. In 1723 Dr. Hancocke published a work entitled—'*Febrifugum Magnum*, or *Common Water* the *best Cure for Fevers, and probably for the Plague*,' which in a short time ran through several large editions, but appears to have been overlooked by the hydropaths of the present day.

FEBRIFUGE OIL. Syn. *Oleum Febrifugum*,—Lat. A liquid obtained by subliming a *mixture* of *antimony* and *sal ammoniac*, and allowing the resulting flowers to deliquesce in the air.

FEBRIFUGE POWDER. Syn. *Pulvis Febrifugus*,—Lat. An old compound of *tartar emetic* with about 12 or 15 times its weight of *powdered crab's eyes* (oculi cancrorum). *Helvetius's styptic* was formerly so called in Germany.

FECULA. Syn. *Fæcula*,—Lat. The peculiar matter which subsides from *cold water* which has been rendered milky by washing in it certain bruised or rasped vegetable substances, more especially the seeds of the cereals and leguminosa, and the tuberous or bulbous roots. It is present in most plants, and in those which yield it most plentifully, consists of nearly *pure starch*. In some cases it is associated with the green colouring matter (*chlorophile*) and the narcotic principles of the vegetables which yield it. The *green fecula* obtained by straining the expressed juices of the leaves and herbaceous parts of plants is of this character.

The *fecula* of all the *amylaceous roots*, *rhizomes*, and *tubers*, may be easily obtained, on the *small scale*, by rasping them, pressing, and working the pulp in *cold water*, and after straining the resulting milky liquid through a hair sieve, allowing it to settle. The sediment may be again washed by diffusion through clean *cold water*, and must be, lastly, collected, and dried out of the dust, and without artificial heat.

The *fecula* of *narcotic plants* for medicinal purposes, is obtained by allowing the *expressed juice* to repose for 24 hours, and then decanting the clear portion, and drying the residue. Sometimes heat is employed. See *Arrow-root*, *Starch*, *&c.*, (and *below*.)

FECULA (Hemlock). Syn. *Fæcula Conii*,—Lat. *Prep.* (Van Mons.) The *expressed juice of hemlock* is gently heated, and the *coagulum* collected, washed, dried, and pulverized. *Dose.* 5 to 20 gr.

FEET (The). To preserve the feet in a *proper condition*, they should be frequently soaked, and well washed in warm or tepid water. The *nails of the toes* should be pared to prevent their becoming inconveniently long, and from growing into the flesh. Many persons suffer severely from *tender feet.* This generally arises from the use of thin cotton or silk stockings, and boots or shoes, that are either too tight or stiff, or not sufficiently porous to permit of the escape of the perspiration. *Waterproof boots* and *shoes* which are also air-tight, (as those of *gutta percha* and *India rubber*,) are common causes of tender feet, and even of headaches, dyspepsia, and apoplexy. The best *treatment* of *tender feet* is the immediate adoption of *worsted* stockings or socks, and light easy shoes of buckskin, goatskin, or some other equally soft kind of leather. It is highly necessary for the preservation of health to preserve the *feet* DRY: persons who are, therefore, exposed to the wet, or who are frequently passengers through the public streets in bad weather, should regard sound and good boots and shoes as of the first importance. In fact, in a hygienic point of view, a *wet back* should be less shunned than *wet feet.* Many persons frequently experience *extreme coldness* and *numbness of the feet.* The best and most natural remedy for this is *active exercise* or friction, the former being always adopted when possible. In such cases the use of warm woollen stockings is absolutely necessary, and the *debilitated* and *aged* may advantageously keep them on throughout the night, or at all events until the feet acquire a comfortable degree of warmth. The *peculiar and disagreeable odour* which is evolved by the feet of some individuals in hot weather may be removed by the observance of *extreme cleanliness*, and by occasionally soaking the feet in warm water, to which a *small quantity* of *chloride of lime* or *sal ammoniac* has been added.

Distortion of the feet is not uncommon in childhood, being sometimes congenital, but as frequently the result of weakness or bad nursing. "A child with its feet turned inwards is called *varus;* when they are turned outwards it is styled *valgus.* The proper use of bandages, early applied, will generally correct these deformities; but if they be neglected in infancy they become incurable." (Med. Lex.) *Club foot,* of which there are several varieties, may also be frequently relieved by a simple surgical operation.

FELLIC ACID and *Fellinic Acid.* Products obtained from bile. (Brande.)

FELTING. This is a process by which various species of fur, hair, and wool, are blended into a compact texture, in many respects resembling cloth. It depends on the peculiar anatomical construction of these substances enabling them to interlace and intertwine with each other, by which they become permanently matted together. Felt was formerly chiefly employed for hats. It is now commonly used for mill-bands, filters, &c.; and when *varnished* or *japanned,* or saturated with *asphalte* or *bitumen,* as a durable substitute for japanned leather, and for *roofing.*

FENNEL. Syn. *Fœniculum,*—Ph. L. "The fruit" (seed) "of *fœniculum dulce*" (Ph. L.) or *sweet fennel.* The "oil distilled from the fruit," (*oil of fennel; oleum fœniculi;*) as well as a distilled water, (*fennel water; aqua fœniculi;*) are officinal in the Pharmacopœias. They are stimulant and carminative; but are now seldom employed.

FENUGREEK. The seeds of *trigonella fœnum græcum* (Linn.) Resolvent and stomachic. The *seeds* dye yellow; formerly roasted for coffee; now chiefly employed in veterinary medicine.

FERCULUM SAXONIA. *Prep.* (Barret.) *Barley flour,* 21 *oz.; sugar,* 7 *oz., cinnamon,* 1 *dr.*; mix, and bake them in an oven, enveloped in a *paste of wheat flour,* and placed in an earthen vessel. When baked, remove the crust, and when the whole is cold, reduce it to powder. A little is boiled with broth, &c., as thickening. Occasionally it is used separately, and is medicated with sarsaparilla, bark, &c.

FERMENT. Syn. *Fermentum.* — Lat. A substance which induces fermentation. Ferments are compounds whose decomposition proceeds simultaneously with that of the body undergoing metamorphosis. They all contain albuminous or azotized principles which in a moist state putrefy and suffer spontaneous decomposition. Ferments are either naturally present in the fermentable substance, as in the *juice of grapes;* or are added to it, as in the fermentation of worts, where *yeast* constitutes the ferment. See *Fermentation* and *Yeast.*

FERMENTATION. Syn. *Fermentatio,* —Lat. The spontaneous decomposition of the proximate principles of organic substances, under the joint influence of *warmth, air,* and *moisture,* and the reunion of their elements forming new compounds. Fermentation, according to Liebig, is nothing else but the *putrefaction* of a substance containing *no nitrogen;* or a metamorphosis, by which the elements of a *complex molecule,* group themselves, so as to form more *intimate* and *stable compounds.* It is excited by the contact of all bodies, the elements of which are in a state of active decomposition or fermentation. "In nitrogenized substances of a very complex constitution, putrefaction or fermentation is spontaneously established when water is present, and the temperature sufficiently high, and it continues till the original compounds are wholly destroyed. Substances destitute of nitrogen, on the contrary, require, in order to their undergoing this metamorphosis, the presence of a nitrogenized substance, *already in a state of putrefaction* (fermentation)." (Liebig.) The substances which promote this change are termed *ferments;* and among these, the principal are *gliadine, gluten, vegetable albumen,* and *all nitrogenous substances* in a state of spontaneous decomposition or fermentation. "It is imagined that when these substances, in the act of undergoing change, are brought into contact with neutral ternary compounds of small stability, as sugar, the molecular disturbance of the body, already in a state of decomposition, may be, as it were, propagated to the other, and bring about the destruction of the equilibrium of forces to which it owes its being. The complex body, under these circumstances, breaks up into simpler products, which possess greater permanence." (Fownes.) *Yeast,* the ferment most commonly employed for inducing the vinous fermentation, is such a substance in an active state of putrefaction, and whose atoms are in continual motion. *Putrefying animal* substances are equally capable of exciting the same action. "If we add to a solution of pure sugar an albuminous substance, a caseous or fleshy matter, the development of yeast, becomes manifest, and an additionel quantity of it is found at the end of the operation. Thus with nourishment, ferment engenders ferment. It is for this reason that a little *fermenting must,* added to a body of *fresh grape-juice,* excites fermentation in the whole mass. These effects are not confined to alcoholic (vinous) fermentation. The smallest portion of *sour milk,* of *sour dough,* or *sour juice of beet-root,* of *putrefied flesh* or *blood,* occasion like alterations in *fresh* milk, dough, juice of beet-root, flesh, and blood. But further, and which is a very curious circumstance, if we put into a liquid containing any fermenting substance, another in a sound state, the latter would suffer decomposition under the influence of the former. If we place *urea* in the presence of *beer-yeast* it experiences *no change;* while, if we add it to *sugar-water* in a fermenting state, the urea is converted into *carbonate of ammonia.* We thus possess two modes of decomposition; the one *direct,* the other *indirect.*" (Ure.)

It is only in complex organic molecules of a higher order that fermentation or putrefaction takes place. The immediate cause of fermentation in such bodies as are not sufficiently complicated to undergo this change by the mere action of water and caloric, is most rationally presumed to arise from immediate contact with the atoms of those bodies, which are undergoing this change. Thus, the motion, or conflict of the elements of the body in a state of decomposition, as those of *yeast* when employed to excite the *vinous fermentation,* destroys the equilibrium of the atoms of the sugar, and these grouping themselves according to their special attractions, enter into new combinations, and form new compounds. The charcoal (carbon) of the sugar partly unites itself to the oxygen, forming *carbonic acid,* and partly to the hydrogen, forming *alcohol.* A similar kind of decomposition and interchange of elements take place in all organic substances during the state of fermentation; the proportions of the elements liberated, and the compounds formed by their reunion, varying, of course, according to the precise composition of such substances.

Fermentation or *putrefaction* differs from *eremacausis* or *decay,* in being limited to changes occurring in and beneath the surface of water, the effect being a mere transposition of elements, or a metamorphosis of the organic body. *Eremacausis,* on the other hand, refers to the decomposition of moist organic matter, when freely exposed to the air, by the oxygen of which it is gradually burned and destroyed, without any sensible elevation of temperature. Although the presence of oxygen is essential to the commencement of this change, whenever fermentation is freely established, it is no longer necessary, as it proceeds without the aid of any other substance external to the decomposing body, unless it be water or its elements. Every case of *putrefaction* or *fermentation* therefore commences with *decay;* and if the decay or its cause, namely, the absorption of oxygen, be prevented, no putrefaction occurs. The entire absence of the exciting causes,—*warmth, air,* and *moisture,*—leaves even those substances which under ordinary circumstances are most liable to change, in a state in which they may remain for an almost indefinite period without perceptible alteration. Thus, animal substances in a frozen or dry state, do not undergo decomposition, nor does a solution of sugar, or the juice of grapes (*must*), when perfectly excluded from the air; but on the mere exposure of these substances to warmth, moisture, or atmospheric air, putrefaction or fermentation immediately commences. Remove the cork from the bottle of capillaire on the parlour sideboard, or pierce the skin of one of the grapes on the dessert table with a needle, and these bodies, which would have otherwise suffered no change for weeks, or even months, will soon exhibit symptoms of spontaneous decomposition. The knowledge of this fact has been practically applied to the preservation of animal and vegetable substances for food. Even the most putrescible of these may be preserved for an unlimited period by enclosure in metallic cases, or glass bottles, from which the air has been *completely* removed and excluded.

The important duties which *fermentation* or *putrefaction* performs in the economy of our globe, and in several of the arts of life and civilization, have long rendered the development of its principles an object of the highest interest and importance both in a scientific and practical point of view. In its most extended sense, this subtile process of nature, though occasionally productive of injurious effects, may be regarded as one of the most necessary and beneficial with which we are acquainted. Like the labours of a scavenger, it speedily removes from the surface of our globe those matters which would otherwise remain for some time without undergoing decomposition. It either dissipates in air, or reduces to more fixed and useful forms of matter, those organic substances, which, by their presence, would prove noxious, or, at all events, useless to the animal and vegetable kingdoms. It is the giant power that cleans the Augean stable of nature, at the same time that it provides some of the most esteemed articles of utility and luxury for the well-being and enjoyment of man.

Chemists have distinguished fermentation into different varieties, which, in general, are named after the more important products of its action. Of late years, the number of these varieties has been greatly increased by the extension of the term to several operations besides those formerly included under it. Most of those mentioned by previous writers are noticed in the present work. See *Acetification, Bread, Putrefaction, Brewing, Mucilaginous, Saccharine,* and *Vinous Fermentation, &c.*

FERN (Male). Syn. *Male Shield Fern, Blunt do. do.; Filix Mas, Radix Filicis,*—Lat. The *root* (rhizoma) of the *aspidium filix mas* (polypodium filix mas,—*Linn.*) or *male fern.* It is bitter, astringent, and vermifuge. *Dose.* 1 to 3 dr., in powder, or made into a decoction, repeated for 3 or 4 days, and followed by a purge. It is chiefly given in tape-worm. In Switzerland it is deemed almost infallible, but has proved less successful in these countries. See *Oils.*

FER REDUIT. See *Iron* (Quevenne's.)

FERRIC ACID. Syn. *Acidum Ferricum,*—Lat. A peculiar compound of iron and oxygen, discovered by Fremy, obtained in combination with potassa (*ferrate of potassa, perferrate of do.*), from which it has never been separated.

Prep. 1. (Fremy.)—*a.* From a mixture of the *peroxides of iron* and *potassium,* ignited together.

b. From a mixture of *potassa* and *oxide of iron,* as last.

c. By projecting *nitre* on *iron in fine powder,* and heated to redness in a crucible.

2. (J. D. Smith.) By exposing a mixture of *peroxide of iron,* 1 part; and *nitre* (dry), 4 parts; (both in fine powder;) to a full red heat.

3. (Trommsdorff.) From *iron filings,* 2 dr.; *nitre,* 4 dr.; (both in fine powder;) mixed together, and placed in an 8 or 10 *oz.* crucible, heated to a glowing red, and still standing on red hot coals; when combination takes place on one side, shown by the evolution of light and white fumes, it is removed from the fire, and as soon as the deflagration of the mixture has ceased, the mass is scraped out on a *cold* plate, by means of an iron spatula, and at once crushed to pieces and bottled.

Prop., &c. The product is a dark reddish-black mass, forming a superb cherry-red solution with water, which quickly undergoes decomposition, depositing sesquioxide of iron, and evolving pure oxygen. It is the substance employed by Dr. Payerne to keep up the vitality of the air in diving-bells, unconnected with the atmosphere. For this purpose, it is only necessary to drop a piece occasionally into a vessel of water. According to Dr. Ure, the preparation succeeds best when a large crucible, capable of holding about a pint, is heated so strongly that the bottom, and a couple of inches above it, appear faintly but distinctly red. The weight of the mixture (*Trommsdorff's*) should be about 300 gr., and should be "thrown at once upon the side of the crucible."

FERRIC-CITRATE and *Ferrocitrate.* See *Ammonio-citrate of Iron.*

FERRIDCYANIDES. Syn. *Ferric-cyanides, Ferri-cyanides; Ferridcyanates, Ferridcyanurets, &c.* Compounds of ferridcyanogen with the bases. The principal of these is the *ferridcyanide of potassium* or *red prussiate of potash.* The *ferridcyanides* of *ammonium,* and the *alkalies* and *alkaline earths* are soluble; those of the *non-alkaline metals,* insoluble. See *Hydroferridcyanic Acid.*

FERRIDCYANOGEN. Syn. *Ferri-cyanogen, Ferric-cyanogen.* The peculiar salt-radical which exists in "*red prussiate of potash.*" It is isomeric with ferrocyanogen, from which it differs in capacity of saturation (being tribasic), and in the behaviour of its compounds with solutions of the metals. It is formed by treating *ferrocyanide of potassium* with *chlorine,* but has not been isolated. It unites with hydrogen, forming a tribasic acid, termed hydroferridcyanic acid. See *Ferridcyanide of Potassium* and *Hydroferridcyanic Acid.*

FERROCHYAZIC ACID. See *Hydroferrocyanic Acid.*

FERROCYANIC ACID. As the last.

FERROCYANIDE. Syn. *Ferrocyanate, Ferrocyanuret, Hydroferrocyanate, Prussiate; Ferrocyanidum, Ferrocyanuretum, &c.,*—Lat. A compound of ferrocyanogen with a metal. The principal substance of this kind is the *ferrocyanide of potassium* or *yellow prussiate of potash.* See the *respective bases* (and *below.*)

FERROCYANIDE OF AMMONIUM. Syn. *Ferrocyanate of Ammonia, Prussiate of do.; Ammoniæ Ferrocyanas, Ammonii*

Ferrocyanidum,—Lat. *Prep.* Digest *ferrocyanide of lead* in a solution of *sesquicarbonate of ammonia*, at a gentle heat, filter, evaporate, and crystallize.

FERROCYANIDE OF COPPER. Syn. *Prussiate of Copper; Cupri Ferrocyanidum*,—Lat. *Prep.* From a *solution of a cupreous salt* (as *blue vitriol*), precipitated with a *solution of yellow prussiate of potash;* the powder which falls being carefully collected, washed, and dried. It has a beautiful reddish brown-colour, and is sometimes used as a pigment.

FERROCYANOGEN. Syn. *Ferrocyanogenium*,—Lat. A bibasic salt radical, composed of cyanogen, or its elements, and iron. Its compounds are the *ferrocyanides.* See the *respective bases*, and *Hydroferrocyanic Acid.*

FERRO-SESQUICYANIC ACID. See *Hydroferrocyanic Acid.*

FERRO-TARTRATES. See *Iron.*

FERRUGO. Rust of iron. See *Hydrated Sesquioxide of Iron.*

FEVER. Syn. *Febris, Pyrexia*,—Lat. The name of an extensive and important class of diseases, one of the most general symptoms of which is an increased heat of the body. Fevers have been divided by nosologists into *intermittents* (intermittentes), *remittents* (remittentes), and *continued fevers* (continuæ). The first of these are generally known by the name of *agues;* the second differ from agues in there being one or more marked exacerbations and remissions of the symptoms, every 24 hours, but without any entire intermission; and the last have been divided into *inflammatory fever* (synocha), *putrid* or *low fever* (typhus), and the common *continued* or *mixed fever* (synochus), which commences with symptoms allied to those of ordinary inflammatory fever, but terminates with those of typhus. The terms *hectic, nervous, bilious, inflammatory, &c.*, have also been applied to particular varieties of *fever;* and names indicative of certain cutaneous appearances connected with them have been given to others; as *scarlet* fever, *yellow* fever, &c.

The usual *symptoms* of incipient fever (*febrile symptoms*) are—chilliness (varying from a simple shiver to a sensation of cold water running down the back), a quick pulse, hot and dry skin or flushing, languor, often evinced by yawning, depression of spirits, alternate fits of shivering and heat, hurried and uneasy respiration, flying pains in various parts of the body, as the head, back, and loins; loss of appetite, nausea or vomiting, dry mouth, furred tongue, costiveness, urine small in quantity, and usually of a deep colour, &c. When any of these symptoms appear, their progress may often be arrested by the timely exhibition of an emetic, followed by a saline purgative, and diaphoretics; at the same time promoting the action of these remedies by a low diet and drinking *copiously* of diluents, and carefully avoiding animal food, spirits, fermented liquors, or anything at all stimulant. Whenever symptoms of fever become established, medical advice should be sought and implicitly followed. In parts where it cannot be obtained the treatment recommended under *Ague, Inflammatory Fever, Remittent Fever*, and *Typhus* may be followed with advantage.

In *visiting* or *attending persons* labouring under fevers, it is advisable to avoid immediate contact with them or their clothing, or standing near them in such a position as to inhale their breath, or the effluvia evolved (in some cases) by their bodies; and when remaining for some time in the apartment, it is preferable to sit or stand near the fireplace, or between the window and door, as such parts of the room are generally better ventilated than the other portions. The greatest purifier of the atmosphere of a sick chamber is a *good fire*, because it occasions a continual current of the impure air up the chimney, and a corresponding influx of fresh air from without. *Chloride of lime*, or *chloride of zinc*, or their solutions, are also good purifiers. The *first*, however, should not be used in quantity, as the evolved chlorine, might in that case, impede the respiration of the patient. It is also advisable to avoid entering the room of a patient labouring under *contagious diseases* of any class, when the stomach is empty, or the spirits depressed; and it has been recommended to clear the mouth of the saliva immediately after quitting the chamber. See *Ablution, &c.*

FEVER POWDER. See *Antimony* and *Powders.*

FIBRE. Syn. *Fibra*,—Lat. The filamentous textures of animal and vegetable bodies. Many of them are used in the arts. See *Catgut, Lignine, &c.*

FIBRINE. A peculiar proteine substance, forming the coagulable portion of fresh-drawn blood, and the principal constituent of the muscular or fleshy parts of animals. It also occurs in vegetable juices, the gluten of wheat, and in the seeds of the cereals generally. It is eminently nutritious, and capable of yielding in the animal body, albumen, caseine, and the tissues derived from them. (Liebig.) It is a modification of proteine, and as such, contains in itself the elements of all the softer portions of animals, and is hence capable of supporting life without the addition of any other aliment. This is what no other substances but albumen and caseine (also modifications of proteine) can do.

Fibrine is easily obtained in a nearly pure state, by agitating or beating *newly drawn blood* with a small bundle of twigs, when it attaches itself to the latter under the form of long reddish filaments, which become white when worked with the hands in a stream of *cold water*. It may also be procured by washing the *coagulum of blood*, tied up in a cloth, in *cold water*, until *all* the soluble portions are removed. A small quantity of fat, which it still contains, may be removed by digesting it in *ether*.

Pure fibrine occurs as long, white, elastic filaments, which are tasteless, inodorous, and insoluble in both hot and cold water. Wetted with acetic acid, it forms, after a time, a transparent jelly, which is slowly soluble in pure water. Very dilute solutions of the caustic alkalies dissolve it completely, and the new solution greatly resembles liquid albumen. Dried by a gentle heat it loses about 80% of water.

According to M. Mulder, dried fibrin, besides the elements common to most animal substances, *contains,—phosphorus*, 0·3%; *sulphur*, 1·2%; and its ash or incombustible portion, varying from 0·7% to 2·5%, consists chiefly of *phosphate of lime*.

FIG. Syn. *Ficus*,—Ph. L. E. & D. *Carica*, *Caricæ Fructus*,—Lat. Figs (*fici*) are the "dried fruit" of "*ficus carica*" (Linn.) or *common fig-tree*. They are demulcent, emollient, laxative, and pectoral. *Roasted* and *boiled figs* are occasionally employed as poultices to gum boils, and other affections of the mouth.

FILBERTS. Syn. *Filberds*. The fruit of the cultivated *hazel* or *nut-tree* (corylus avellana,—*Linn.*) Filberts are distinguished from common nuts by their lengthened figure and larger size. The best are imported from Spain.

FILES. The manufacture of these articles do not come within the limits of this work. It may, however, be useful to mention that *files*, *floats*, and *rasps*, which "cut dull" from age, dirt, or being much worn, are greatly improved by being kept wet, or immersed in water for some hours, or even for a day or two. The reason of this is evident.

FILICINE. Syn. *Filicina*, *Filicia*. An alkaloid found by Batso, associated with a peculiar acid (*filicic acid; acidum filiceum;*) in the rhizomes of male shield-fern (*aspidium filix mas*).

FILTER. Syn. *Filtrum*,—Lat. An instrument or apparatus for straining or filtering liquids. See *Filtration.*

FILTERING POWDERS. *Prep.* 1. *Fuller's earth* washed, dried without heat, and reduced to coarse powder.

2. From *pipe clay* or *potter's clay*, as the last. Both the above are used to *filter* and *bleach oils*.

3. From *clay* or *fuller's earth*, 1 part; *fine silicious sand*, 2 parts; the two are separately washed, after which they are drained, and mixed together, and dried, as before. *Used* for *glutinous oils*.

4. *Granulated animal charcoal*, sifted and fanned from the dust. *Used* to filter and *bleach syrups* and *vegetable solutions*.

Obs. Filtering powders are prepared of several degrees of coarseness, and should be chosen with reference to the degree of fluidity of the liquid to be filtered through them. In no case should they be reduced to *fine powder*, as not only is the process of filtration thereby rendered unnecessarily tedious, but in some cases (as when charcoal dust is mixed with glutinous vegetable solutions and syrups), the filtrate carries off a portion of the powder, which can afterwards be separated from it only with considerable difficulty. See *Charcoal*, *Filtration*, *Oils*, *&c*.

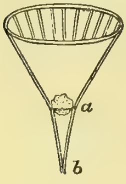
FILTRATION. Syn. *Filtratio*,—Lat. The separation of liquids from substances mechanically suspended in them, by passing them through the pores of media sufficiently fine to retain or keep back the solid matter. *Filtration* is one of the most common and useful of the chemico-mechanical operations of the arts, and its successful performance in an *economical* and *expeditious manner*, is therefore a matter of the highest importance in the laboratory, and, indeed, in almost every branch of human skill and industry in which liquids are employed. Simple in principle, and *apparently* easily performed, it is, nevertheless, one of those operations which require no less of care, than of tact and experience to conduct it with certainty and success. The losses sustained in the laboratory, by defective manipulation in this particular, often exceed those arising from ignorance and accidents in every other department conducted in it.

Filtration is usually *resorted to* for the purpose of freeing liquids from feculence, dirt, and other foreign matter, and for obtaining them in a clear or transparent state; but, in some cases, it has for its object the collection of the suspended substances, as precipitates, &c., and in others, both these intentions are combined. The word *filtration* is absolutely synonymous with *straining*, but, in the *language of the laboratory*, it is usually applied to the operation of rendering liquids transparent, or nearly so, by passing them through *fine* media, as *filtering paper*, *sand*, and the like; whilst the term *straining* is employed to designate the mere separation of the grosser portion, by means of *coarse* media, as *flannel, horse-hair cloth, &c.*, through which they flow with considerable rapidity. *Filtration* is distinguished from *clarification* by its mere mechanical action, whereas the *latter* operates by depuration, or the subsidence of the suspended substances or fæces, arising from their gravity being naturally greater than the fluid with which they are mixed, or being rendered so by the application of heat, or by the addition of some foreign substance.

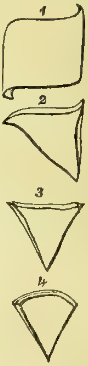
The *apparatus*, *vessels*, or *media*, employed for filtration, are called FILTERS, and are technically distinguished from *strainers* by the superior fineness of their pores.

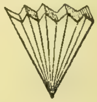
Both *strainers* and *filters* act on the same *principles* as the *common sieve* on *powders;* they all, in like manner, retain or hold back the *coarser matter*, and permit the *liquid*, or *smaller* and *more attenuated particles* to pass through. The term *medium* (plural *media*) is applied to the substance or substances through the pores of which the liquid percolates.

The *forms of filters*, and the *substances of which they are composed*, are various, and depend upon the nature of the liquids for which they are intended. On the SMALL SCALE, *funnels* of *tin, zinc, copper, Wedgwood ware, earthenware, glass*, or *porcelain*, are commonly employed as the containing vessels. (See *Engr.*) The *filtering medium* may be any substance of a sufficiently spongy or porous nature to allow of the free percolation of the liquid, and whose pores are, at the same time, sufficiently small to render it limpid or transparent. *Unsized paper, flannel, linen, calico, cotton wool, felt, sand, coarsely-powdered charcoal, porous stone*, or *earthenware*, and numerous other substances of a similar kind, are employed for this purpose.



For many liquids that *filter easily*, and in which the suspended matter is of a coarse and porous nature, it is often sufficient merely to place a little *cotton wool* or *tow*, or a *small piece of sponge*, in the neck of the funnel, as at (*a*) in the above engr.; but such an apparatus, from the small extent of the filtering surface, acts either slowly or imperfectly, and soon gets choked up. *Filters* of *unsized paper* are well suited for all liquids that are not of a *corrosive* or *viscid nature*, and are universally employed for filtering *small quantities of liquids* in the laboratory. A piece of the paper is taken of a size proportionate to the quantity of the liquid to be filtered, and is first doubled from corner to corner into a triangle (see *engr.*), which is again doubled into a smaller triangle, and the angular portion of the margin being rounded off with a pair of scissors, it constitutes a paper cone, which is placed on a funnel of proportionate capacity, and is then nearly filled with the liquid. A piece of paper so cut, when laid flat upon a table, should be nearly circular. Another method of forming a paper filter, preferred by some persons, is to double the paper once, as above (see fig. 2), and then to fold it in a similar way to a fan, observing so to open it and lay it on the funnel, that a sufficient interval be left between the two, to permit of the free passage of the filtered liquid on its descent towards the receiver. (See *Engr.*)

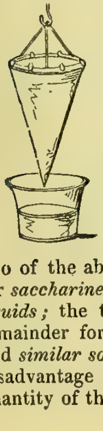




In reference to *funnels* it may be remarked, that to promote the object last referred to, they should be deeply ribbed on the *inside*, or *small rods* of *wood* or *glass*, or *pieces of straw*, or *quills*, should be placed between them and the paper. The neck or tubular part of the *funnel* should, in like manner, be deeply ribbed or fluted, on the outside, to permit of the free passage of the air, when it is placed in a narrow-mouthed bottle or receiver. When this is not the case, filtration proceeds but slowly, and the filtered liquid is apt to be driven up the outside of the neck of the funnel by the confined air, and to be continually hissing and flowing over the mouth of the vessel. The *breadth of a funnel*, to filter well, should be about *three fourths* of its *height*, reckoning from the throat (*a*). When *deeper*, the paper is liable to be continually ruptured from the pressure of the superincumbent fluid; and, when *shallower*, filtration proceeds slowly, and an unnecessarily large surface of the liquid is exposed to the atmosphere, and is lost by evaporation. To *lessen this* as much as possible, the upper edge of the glass is frequently ground perfectly smooth, and a piece of smooth plate-glass is laid thereon. When *paper filters* are of *large dimensions*, or for *aqueous fluids* that rapidly soften the texture of the paper, or for collecting *heavy powders*, or *metallic precipitates*, it is usual to support them on *linen* or *calico*, to prevent their breaking. This is best done by folding the cloth up with the paper, and cutting the filter out of the two, in the same way as would be done with doubled paper, observing so to place it in the funnel that the paper and calico may remain close together, especially towards the bottom.

The *filtration* of *small quantities* of *liquid*, as in chemical experiments, may often be conveniently performed by merely placing the paper on the circular top of a recipient (see *engr.*); or on a ring of glass or earthenware laid on the top of any suitable vessel. A filter of this kind that will hold one fluid ounce, will filter many ounces of some liquids in an hour.

Good *filtering paper* should contain no soluble matter, and should not give more than $\frac{1}{250}$ to $\frac{1}{230}$ of its weight of ashes. The soluble matter may be removed by washing it, first, with *very dilute hydrochloric acid*, and secondly, with distilled water.



For *filtering* a *larger quantity of a liquid* than can be conveniently managed with a *funnel*, and also for substances that are either too *viscid* or too much *loaded with feculence* to allow them to pass freely through paper, conical bags made of *flannel*, *felt*, *tweeled cotton cloth* or *Canton flannel*, *linen* or *calico*, and suspended to iron hooks by rings or tapes, are commonly employed. The first two of the above substances are preferable for *saccharine*, *mucilaginous*, and *acidulous liquids;* the third for *oily ones;* and the remainder for *tinctures*, *weak alkaline lyes*, and *similar solutions*. These bags have the disadvantage of sucking up a considerable quantity of the fluid poured into them, and are therefore objectionable, except for large quantities, or when they are to be continued in actual use as filters for some time. On the *large scale*, a number of them are usually worked together, and are generally inclosed in cases to prevent evaporation, and to exclude dirt from the filtered liquor that trickles down their sides. These arrangements will be noticed further on.

A *simple mode* of *filtering aqueous fluids*, which are *not injured by exposure to the air*, is to draw them off from one vessel to another, by means of a number of threads of loosely twisted cotton or worsted, arranged in the form of a syphon. (See *Engr.*) The little cotton rope at once performs the operations of decantation and filtration. This method is often convenient for sucking off the water from a small quantity of a precipitate.

When *solid substances*, as *porous stone* or *earthenware*, are used as the media for filtration, vessels of *metal*, *wood*, or *stone-ware* are employed to contain them and the supernatant liquid. In these cases, the filtering medium is usually arranged as a shelf or diaphragm, and divides the vessel into two compartments; the upper one being intended to contain the dirty liquid, and the under one to receive the same when filtered. Such an apparatus is set in operation by merely filling the upper chamber, and may at any time be readily cleaned out by reversing it, and passing clean water through it in an opposite direction. Small arrangements of this kind, intended to be screwed on to the water supply-pipe by either end, and which answer the purpose intended in the most satisfactory manner, have been recently manufactured and vended under the name of "*reversible*" or "*self-cleaning filters.*" When pulverulent substances, as *sand, coarsely powdered charcoal, &c.*, are employed, a similar arrangement is followed; but in this case, the shelf or diaphragm must consist of any convenient substance pierced with numerous holes, over which must be placed, first a *stratum of coarse pebbles*, next some of a *finer description*, and on this a proper quantity of the *sand*, *charcoal*, or *other medium*. Over the whole should be placed another *layer of pebbles*, or a board or plate of *metal* or *earthenware*, pierced with a number of holes, to allow the liquid to be poured into the filter without disturbing its arrangement. Apparatus of this kind of a permanent description, and arranged for filtering large quantities of liquids, are properly denominated "*filtering machines.*"

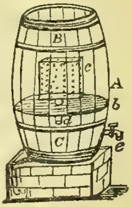
Among the liquids usually submitted to filtration, the following may be mentioned as the principal—*water, oils, syrups, tinctures, vegetable juices, infusions, and decoctions.*

The *water of our wells* is presented by nature ready filtered to the hand of man, and often exhibits an admirable degree of transparency and purity. It acquires this state by percolating through the mineral strata of the earth, which deprive it of the organic matter it derives from the soil and subsoil, but, at the same time, it dissolves a portion of the saline and earthy media through which it passes, and hence acquires that peculiar "hardness" which is constantly found in spring water. On the large scale, this natural system of filtration has been imitated by some of the commercial companies that supply our cities and towns with water. Extensive beds of sand and gravel have been employed, with variable success, as the filtering media, and were it not that filters gradually lose their porosity by the accumulation of the retained matter in their pores, such a method would be excellent. But the great expense of such filters precludes the possibility of frequently cleaning or renewing them, by which means they can alone be kept in an efficient state.

A *filter* which possesses the advantages of being easily and cheaply cleaned when dirty, and which *purifies water* in an *almost perfect manner*, and with immense rapidity, may be formed by placing a *stratum of sponge* between *two perforated metallic plates*, united by a central screw, and arranged in such a manner as to permit of the sponge being *compressed* to any required degree. Water, under gentle pressure, flows with such rapidity through the pores of compressed sponge, that it is said, that a few square feet of this substance will *perfectly filter* several millions of gallons of water daily. This method of filtration has been made the subject of a patent, and has been favorably noticed by the legislature.

A *few barrels* or *hogsheads of water* may be *easily filtered daily*, by the arrangement represented in the engraving.

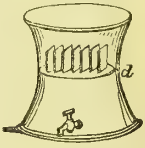
It is evident that when water is poured into the upper portion *B*, of a vessel so arranged, it will sink through the filter *c*, and pipe *d*, into the lower chamber *C*, and this filtration will go on as long as the supply continues, and water is drawn from the cock *e*. By uniting the cock *e* with a tank or casks, and by keeping the upper portion *B* always full by means of a ball-cock, a considerable quantity of water may be thus filtered. The advantage of this plan is, that the filter *c* can be always readily got at, and easily cleaned or renewed.



A, A common water-pipe or cask.

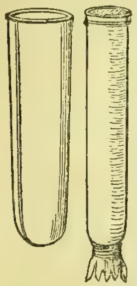
b, A false bottom, fitting in perfectly water-tight.

c, A perforated wooden or metallic vessel or box, covered with a bag of felt or other filtering substance, (not shown in the engraving.) *d*, A small tube, fitting water-tight into the false bottom, and uniting the *interior* of the filter with the lower portion of the cask.



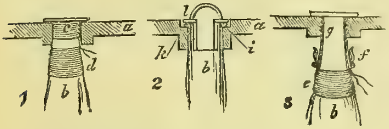
For *filtering water* on the *small scale*, and for domestic use, *alcarazzas* or *porous earthenware*, *filtering-stone*, and *layers* of *sand* and *charcoal*, *&c.*, already referred to, are commonly employed as filtering media. The filtering power of the first two may be greatly increased by adopting the arrangement represented in the margin, which consists in making the diaphragm of the shape of a disc (*d*), supporting plates of the same material, the whole forming but *one* piece. The *platylithic water-filters*, which are formed of porous stone cut on this plan, present 200 to 300 square inches of filtering surface, and may be purchased for a few shillings each. They are perhaps the best portable filters made; they impart great brilliancy to the water, and filter with extraordinary rapidity. The *portable artificial filters*, set up in *stone-ware*, that are commonly sold in the shops, contain a *stratum of sand*, or *coarsely-powdered charcoal;* before, however, having access to this, the water has to pass through a *sponge*, to remove the coarser portion of the impurities. An excellent *filter* of this class, and one less likely to get out of order, and more easily managed, perhaps, than any other, is that made by Mr. Lipscombe, of Temple Bar. As any person may satisfy himself, before purchasing one, it is capable of converting the filthy water of the Thames into a pellucid liquid, rivalling in brilliancy that of a crystal fountain.

Oils are *filtered*, on the *small scale*, through cotton-wool, or unsized paper, arranged in a funnel; and on the *large scale*, through long bags, made of tweeled cotton-cloth (*Canton flannel*). These bags are usually made about 12 or 15 inches in diameter, and from 4 to 8 feet long, (see *engr.*,) and are inclosed in bottomless casings, or bags, of coarse canvass, about 5 to 6 or 8 inches in diameter, for the purpose of condensing a great extent of filtering surface into the smallest possible space. A number of these double bags (from 1 to 50 or 60) are connected with corresponding holes in the bottom of a *block-tin*, or *tinned-copper cistern*, into which the oil to be filtered is poured. The mode in which these bags are fastened to the cistern is of the utmost importance, as on the joint being close and secure depends the integrity of the apparatus. Three methods of doing this are figured in the engraving, which, with the references, will explain themselves, the same letters referring to the same parts of each.



Filtering-bag of cotton cloth.

Cotton filtering-bag, "*creased*," or inclosed in its canvass envelope, ready for fixing.



a, Bottom of cistern.
b, Filtering bag.
c, Screw of the conical nozzle fitting into the cistern.
d, Binding cord connecting the bag and nozzle.
e, Binding cord connecting bag and lower nozzle.
f, Bayonet-catch, connecting the lower portion of the nozzle fastened to the bag with the upper and fixed part, *g*.
i, The thick hem at the top of the bag, (purposely made large by inclosing a piece of thick cord therein,) resting on the shoulders, *k*.
l, A metallic cylinder, loosely fitting the hole in the cistern, and over which the top of the bag is drawn, before being put into its place; when fitted, as in the engraving, it retains the hem *i* securely in its place above the shoulder *k*.

The *second* of the above arrangements is the least expensive, and certainly the most convenient in practice; and when the cylinder *l* fits the hole closely, (allowing for the bag,) is as safe, or safer, than an ordinary screw.

The *bags* are surrounded by a wooden screen fitted up with doors for the purpose of keeping off the dust; and the bottom of the apartment is furnished with large steam-pipes, by which a proper temperature may be kept up in cold weather. The use of heat should, however, never be had recourse to, when it can be avoided, as although it vastly increases the rate of filtration, the oil so filtered is more apt to become opaque in cold weather, than when the process is conducted at the natural temperature of the atmosphere. This is particularly the case with *castor oil*, and *sperm oil.* In the United States of America, where the latter is consumed in enormous quantities for illumination, the best is always "*winter strained*," as it is popularly called. In practice, it is more convenient to have a number of small cisterns at work, (say 50 or 100 galls. each,) than one or two larger ones; as any accident that may occur is more easily remedied, and that without stopping the whole operation.

When *cotton-cloth bags* are employed without being *creased*, or inclosed in others of canvass, they should not be longer than about 3 or 4 feet, and not wider than about 5 or 6 inches when filled. When larger they are dangerous.

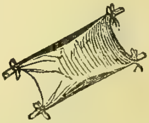
A convenient method of filtering a *single cask of oil*, is to insert the pipe of a *two-way patent filter* into the cork-hole, by which means the whole will be filtered as drawn off, without any trouble on the part of the operator. This filter consists of a *porous bag* stretched over a *perforated metallic vessel*, nearly the shape and size of the exterior casing, and its edge is tightly screwed between the sides and bottom of the latter, so as to be quite water-tight. The cock communicates with the *interior* of the perforated plate and filter, and the supply-pipe with the *exterior*. By this means the interior chamber, which occupies $\frac{5}{8}$ths of the vessel, rapidly fills with filtered oil, and continues full as long as any liquor remains in the cask. This arrangement is also well adapted to the *filtration* of *wines*, *beer*, *cordials*, *porter*, and *various other liquors*. It is unequalled in simplicity and usefulness. The same filter may be removed from cask to cask, with the facility of a common cock.

The filtration of syrups is now generally effected on the *large scale* by passing them through the "*creased bag filter*" just described. On the *small scale*, as employed by *confectioners* and *druggists*, they are usually passed through *conical* *flannel bags.* (See page 457.) The filtration of *thick syrups* is, however, attended with some difficulty, and it is therefore a good plan to filter them in a somewhat dilute state, and afterwards to reduce them to a proper consistence by evaporation in clean vessels of tinned copper, by steam heat. Syrups, when filtered in a heated state, run well for a time, but the pores of the fabric rapidly get choked, from the thickening of the syrup and partial crystallization of the sugar, occasioned by the evaporation of the aqueous portion from the surface of the bag. This may be partially prevented by inclosing the bag in a metallic casing. On the whole, *clarification* is preferable for syrups to *filtration*, on the *small scale.* They need only be well beaten up while *cold* with a *little white of egg*, and then heated; a scum rises which must be removed as soon as it becomes consistent, and the skimming continued until the liquid becomes clear. Any floating portions of scum that may have escaped notice are easily removed by running the syrup through a *coarse* flannel strainer, whilst hot. The most extensive application of the process of filtration in the arts is in the refining of sugars.

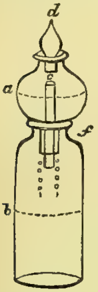
Tinctures and *dilute spirits* are usually filtered, on the *small scale*, through *bibulous* or *unsized paper* placed on a funnel; and on the *large scale*, through *thin* and *fine-cotton* bags. In general, however, tinctures clarify themselves by the subsidence of the suspended matter, when allowed to repose for a few days. Hence it is the bottoms alone that require filtering; the supernatant clear portion need only be run through a small *hair sieve*, a *piece of tow* or *cotton* placed in the throat of a funnel, or some other *coarse medium*, to remove any floating substances, as pieces of straw, &c. *Spirits* which are *largely loaded with essential oil*, as those of aniseed, &c., run rapidly through paper or calico, but usually require the addition of a *spoonful* or *two* of *magnesia* before they will flow *quite* clear. When possible, *tinctures*, *spirits*, and all *similar volatile fluids*, are better and more economically cleared by subsidence or clarification, than by filtration, as, in the latter way, a portion is lost by evaporation, and the strength of the liquid is thereby altered.

Vegetable juices should be allowed to deposit their feculous portion before filtration. The supernatant liquid will then be often found quite clear. It is only when this is not the case, that filtration should be had recourse. A *small* quantity may be filtered through *coarse* or *woollen filtering paper*, supported on a piece of *coarse calico* placed on a funnel; when the *quantity is large*, one of the conical bags, before described, should be employed. The *bottoms* from which the clear portion has been decanted, should be placed on a separate filter, or else not added until the whole of the other portion has drained through. *Vegetable juices* are often rendered clear, by simply heating them to about 180° or 200° Fahr, by which their albumen is coagulated; they are also frequently *clarified* by the addition of a *little white of egg* and *heat*, in the same way as syrups. Many of them (as those of *hemlock*, *henbane*, *aconite*, *&c.*) are greatly injured by heat, and must consequently be filtered, or only simply decanted after repose. In all cases they should be exposed to the air as little as possible, as they rapidly suffer decomposition.

Vegetable infusions and *decoctions* may be cleared by defecation followed by filtration. The conical bags of flannel before described are usually employed for this purpose. When the liquid is to be evaporated to an extract they are commonly suspended by a hook over the evaporating pan. A convenient method of straining these fluids practised in the laboratory, is to stretch a *square of flannel* on a *frame* or "*horse*," securing it at the corners by pieces of string, (see *engr.*) Such a frame laid across the mouth of a pan, is more easily fed with fresh liquid than a bag, whose mouth is 40 or 50 inches higher. The same purpose, for *small quantities* of liquid, is effected by laying the flannel across the mouth of a coarse hair sieve. The *concentrated infusions* and *decoctions*, being usually weak tinctures, may be filtered in the same way as the latter. (See *tinctures*, above.) Many *vegetable solutions*, that from the *viscidity* of the suspended matter can scarcely be filtered, may be readily *clarified with white of egg* in *the cold*, or pass the *filter rapidly*, if a *very small quantity* of *acetic*, *tartaric*, *sulphuric*, or *other strong acid*, is previously added. (See *Brewing*, p. 169.)



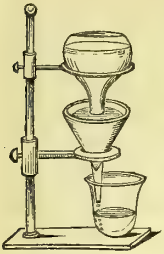
Corrosive liquids, as the *strong acids*, are filtered through *powdered glass*, or *siliceous sand*, supported on *pebbles* in the throat of a glass funnel, or through *asbestos* placed in the same manner. *Charcoal* has also been employed for the same purpose, but is not fit for some acids. *Strong caustic alkaline lyes* are also filtered through *powdered glass* or *sand. Weak alkaline lyes* may be filtered through *fine calico,* stretched across the mouth of a funnel. Many corrosive liquids, as *liquor of potassa, &c.,* require to be excluded from the air during filtration. The simplest apparatus that can be employed for this purpose is that figured in the margin:—(*a*) is a globular bottle fitted with the ground stopper (*d*), and having a perforated neck (*f*) ground to the bottle (*b*); (*c*) is a small tube, wrapped round with as much *asbestos, linen,* or *calico* as is required to make it fit the under-neck of the bottle through which it passes. The tube (*c*) may also be fixed by placing *pebbles* and *powdered glass* or *sand* round it, as before mentioned. For use, the solution to be filtered is poured into the bottle (*a*) nearly as high as the top of the tube (*c*), and the stopper is replaced. The liquid then descends into (*b*), and a similar quantity of air passes up the tube into (*a*). The *liquor of potassa* (Ph. L.) may be always obtained fine by depuration in close vessels, when the sediment of lime only need be filtered, which may be effected with *calico* fixed across the mouth of a funnel.



When *precipitates,* or the *suspended matter* in a liquid, is the object of the filtration, the filter should be of such a nature that the powder may be easily separated from it, when dry, and that with the least loss possible. *Linen filters* are for this reason preferable for large quantities, and *smooth bibulous paper* for small ones. The powder should be washed down the sides of the filter, and collected, by means of a *small stream of water* in one spot at the bottom, assisting the operation with a camel-hair pencil; and, when the whole is dry, it should be swept off the paper or cloth with a similar pencil or brush, and not removed by a knife, as is commonly done, when it can be possibly avoided.

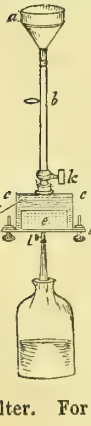
The "*first runnings*" of liquid from a filter are commonly foul, and are pumped back or returned until the fluid runs perfectly limpid and transparent, when it is "turned into" the "*filtered liquor cistern*" or proper receiver. In many cases the liquid does not readily become transparent by simply passing through the filter; hence has arisen the use of *filtering powders,* or substances which rapidly choke up the pores of the media in a sufficient degree to make the fluid pass clear. (See *Filtering Powder.*) In the employment of these powders, care should be taken that they are not in too fine a state of division, nor used in larger quantities than are absolutely necessary, as they are apt to choke up the filter, and to absorb a large quantity of the liquid. The *less* filtering powder used, the *more rapid* will be the progress of the filtration, and the longer will be the period during which the apparatus will continue in effective action. For some liquids these substances are employed for the double purpose of *decolouring* or *whitening,* as well as rendering them transparent. In such cases, it is preferable, first to pass the fluid through a layer of the substance in coarse powder, from which it will "run" but slightly contaminated into the filter; or, if the powder is mixed with the whole body of the liquid, as in bleaching *almond oil, &c.,* to pass the mixture through some coarser medium, to remove the cruder portion before allowing it to run into the filter. *Another plan* is, after long agitation and subsequent repose, to decant the clearer portion from the grosser sediment, and to employ separate filters for the two. *Granulated animal charcoal* is used, according to the *first* method, to *decolour syrups, oils, &c.;* and *filtering powder* by the *second* and *third,* to remove a portion of the *colour,* and to *clarify castor* and other *oils.* The common plan of mixing *large quantities* of filtering powder with *castor oil,* and throwing the whole into the filter, as adopted by the druggists, is injudicious. When *simple filtration* is required, it is better to use *little* or *no powder,* and to continue returning the oil that "runs" through, until, by the swelling of the fibres of the filter bags, it flows quite clear. By this plan the same filters may be used for a long period of time (for many years), and will continue to work well; whilst, by the usual method, they rapidly decline in power, and soon deliver their contents slowly, and after a short time, scarcely at all.

It is often of great advantage to render a filter "*self-acting,*" or to construct it in such a way that it may "*feed itself,*" so that it may continue full and at work, without the constant attention of the operator. On the *small scale,* this may be readily effected on the principle of the common fountain lamp (see *engr.*), and on the *large scale,* by placing the vessel containing the unfiltered liquid on a higher level than the filter, and by having the end of the supply-pipe fitted with a ball-cock, to keep the liquid in the filter constantly at the same height.



The *rapidity of filtration* depends upon the—*porosity of the filtering medium* — the *extent of the filtering surface* — the *relative viscidity* or *mobility of the filtering liquid,* — the *pressure* or *force by which the liquid is impelled through the pores of the filter,* and—the *porosity and fineness of the substances it holds in suspension.* The most efficient filter is produced, when the first two or the first three are so graduated to the others, that the liquid filters rapidly, and is at the same time rendered perfectly transparent.

In the common method of filtration no *pressure* is exerted beyond that of the weight of the column of the liquid resting on the filtering medium, but in some cases additional pressure is employed. This is had recourse to for the purpose of producing a more rapid filtration, and more especially for filtering liquids that, from their viscidity, will scarcely pass through the pores of substances sufficiently fine to remove their impurities in the ordinary way.



One of the *easiest means* of employing *pressure in filtration* is to increase the height of the column of the filtering liquid. From the peculiar properties of fluids, by which they transmit pressure in an equal degree in all directions, this column need not be of equal diameter throughout, but may be conveniently contracted to the size of a small pipe, as in the accompanying engraving, which represents a small filter on this construction at work. (*a*) is the funnel or reservoir of foul liquid; (*b*) a small pipe conveying the liquid to the filter; (*c c*) a chamber, of which the upper portion (*d*) is filled with the descending liquid, and the lower portion (*e*) with the filtering media; (*i i*) are screws by which the bottom plate is fastened on; which plate is removed to clean out or renew the filter. For use, the cocks (*k*) and (*l*) are closed, and the liquid poured into the funnel (*a*); the cock (*k*) is next opened, and, in a few minutes after, the cock (*l*), when an uninterrupted flow of filtered liquor will be obtained as long as any fluid remains in the funnel (*a*), and the tube (*b*). The length of the tube determines the degree of pressure. Care must be taken first to pass the foul liquid through a hair sieve, or some other strainer, to remove any substance that might choke up the pipe (*b*).

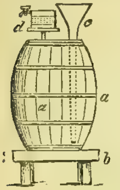
Another method of employing *pressure in filtration,* is the withdrawal of the air from the receiving vessel, as in the *vacuum filter,* by which a pressure of about 14½ *lb.* to the square inch becomes exerted on the surface of the liquid by the atmosphere. The vacuum in the receiving vessel may be produced by the air-pump or by steam. See *Refrigeration.*

A *commoner method* of *applying pressure* than either of those already mentioned is to condense the air over the surface of the liquid by means of a *forcing-pump,* or by *steam.*

On the SMALL SCALE, pressure may be applied to filtration by means of a syphon, whose shorter leg has its mouth blown into the shape of a bell or funnel, over which *filtering paper* or *fine calico* may be stretched.

The *application of pressure to filtration* is not *always advantageous,* and beyond a certain limit, is generally attended with inconvenience, if not with absolute disadvantage. It is found in practice that fluids *under pressure* take a longer period to run clear than *without pressure,* and that ruptures of the media more frequently take place in the *former* case, or with pressure, than in the *latter.* Great pressure is in *no* case advantageous.

The filters already noticed are those that act by the fluid *descending* through the media; but in some cases, the reverse method is employed, and the liquid *filters upwards,* instead of downwards. These are called *ascending filters,* and are often preferable to those on the descending principle, because, the suspended matters that require removal by filtration usually sink, and thus a portion escapes being forced into the pores of the filter. They are also more convenient, when pressure is employed. Their construction depends upon the same principles as the common filter, and merely requires that the feeding vessel should be higher than the upper surface of the filtering media. *Oils* are conveniently filtered in this way, because of their little specific gravity. By fixing a small filter on this principle into the head of a cask, and pouring in water through a funnel, whose neck reaches nearly to the bottom of the cask, the oil will float up and pass the filter, leaving the sediment behind. In cold weather, hot water may be employed.



a, Cask of oil. *b*, Stand. *c*, Funnel for water. *d*, Filter.

In some cases, the upward and downward systems of filtration are united in the same apparatus, and this plan is advantageous where the space for operating is limited. For this purpose, it is merely necessary to connect the *bottom* of an *ascending filter* with the *top* of a *descending one*, or the reverse; the proper pressure being in either case applied. See *Clarification*, *Defecation*, *Finings*, *&c.*

FINING. See *Clarification*, *Filtration*, *&c.*

FININGS. Substances used by publicans, brewers, wine-merchants, &c., to clarify their liquors.

Prep. 1. (Brewer's Finings; Cooper's do.) *Isinglass* (finely shredded), 1 *lb.;* and *sour beer* or *cider*, or *vinegar*, 3 or 4 pints; are macerated together, and more of the *sour liquor* added, as the isinglass swells, until about a gallon has been used, agitation with a *whisk* or a small bundle of twigs being occasionally had recourse to, for the purpose of promoting the solution. As soon as the whole of the isinglass is dissolved, the mixture is reduced to the consistence of *thin syrup*, with *weak, mild beer*, or *cider*, or *any other liquid* that the finings are intended for. The whole is next strained through a tammy cloth or a hair sieve, and at once reduced to a proper state of dilution, by the addition of more liquor. *Product.* 6½ to 7 gall. "A pound of *good isinglass* will make about 12 gall. of finings." (Ure.) *Used* to clarify fermented liquors, especially beer. 1 to 1½ pint is the usual dose for a *barrel* of *ale* or *porter;* and a quart for a *hogshead* of *cider* or *wine.*

2. (Spirit Finings.) — *a. Alum* (ord. cryst.), 1 *lb.;* powder, and divide it into 12 equal portions, which are to be separately wrapped in *blue paper*, and marked No. 1. Next take of *carbonate of soda* (sesquicarbonate of the shops), 6 *oz.;* divide this as the last, wrap it in *white paper*, and mark each parcel No. 2. Keeps dry anywhere.

b. From *alum*, 1 *lb.; salt of tartar* (dry), ¼ *lb.;* proceed as before. The *white papers* containing the salt of tartar, must be kept in a dry well-corked wide-mouthed bottle or jar. Both of the last two are *used* to clarify *gin* and *cordials.* The contents of one of the *blue papers* are dissolved in about a pint of *hot water*, and the resulting solution is well "rummaged up" with the liquor. A solution of the contents of one of the *white papers* in about ½ pint of *hot water*, is then added, and the agitation continued for some minutes longer; after which the cask is "bunged" close, and the whole allowed to repose until the next day. This is sufficient for a barrel (say 30 to 36 gall.), but many persons use double the quantity. The effect is not only to *clarify*, but also to "*blanch*" the liquor.

Obs. Good liquors, either *fermented* or *spirituous*, need no artificial "fining," as they always clarify themselves by repose. With those, however, which are "out of condition," or of inferior quality, it is often necessary, as without such a proceeding, they remain unsaleable. This is particularly the case with malt liquors. "Attempts to clarify it in the cask seldom fail to do harm. The only thing that can be used with advantage for fining *foul* or *muddy beer*, is *isinglass.*" (Ure.) The disadvantages resulting from the *artificial clarification* of *fermented liquors* are—that they do not afterwards "stand well on draught," that much of the conservative astringent matter which they contain is precipitated with the "finings," that their piquancy and flavour is more or less diminished, and that they are more than usually liable to become flat and vapid, whether in cask or bottle. The larger the proportion of "finings" used, the more marked are their injurious effects, and the shorter the interval which elapses before the accession of the several symptoms referred to. We have seen the most disastrous consequences follow the injudicious use of "finings," more especially in respect to those liquors in which a certain amount of piquancy, astringency, and briskness, is an essential condition. In one instance which came under our notice, upwards of 30 barrels of "underground" (a very strong old ale) was thus reduced in value to less than 1-3rd its original cost; and in another, a large bottled stock of the "finest old Burton" was found to be utterly unsaleable. In both cases the "spoiled liquor" was got rid of by mixing it in, and selling it with 3*d.* and 4*d.* beer.

Liquors which "refuse" to "*fine*" or become clear, when treated with "finings" in the usual manner, are called "*stubborn*" by coopers and cellarmen. See *Brewing* (p. 169), *Cordials, Gin, Malt Liquors, Wines, &c.*

FIRE. The calamities resulting from this destructive agent, are of such frequent occurrence, as to justly claim a notice of the subject here. The *causes* of fires are numerous, and of a varied character, and, in most instances, difficult to determine, because it is the interest of those concerned, to suppress all evidence connected with the matter. *Accident,* that convenient word given to the imaginary hack to which so many fires are referred, if truthfully interpreted, will, in general, be found to be equivalent to *carelessness, recklessness,* or *guilt.* We believe that there are few fires which have happened that might not have been prevented by the exercise of *common prudence,* and that a vast number have been caused by direct *negligence,* arising from sheer *laziness* and *indifference,* to use no harsher terms. As familiar instances, may be mentioned—*allowing sparks* to *fall on the ground* and remain there, *without extinguishing them;* carrying a *naked candle into rooms containing inflammable substances; smoking carelessly* and in *dangerous places,* as workshops, warehouses, on shipboard, &c.; *keeping instantaneous light matches* in *improper places,* and *neglecting* to *pick those up* that may *happen to fall on the ground, &c., &c.* The list might easily be extended, but we believe every reflecting reader can do so for himself. The great increase in the number of fires since the introduction of *congreve matches,* and the almost general use of tobacco, cannot fail to have attracted the attention of every one.

Prev. This consists of the exercise of those ordinary precautions which the good sense of every careful and trustworthy man, be he taskmaster or servant, cannot fail to suggest. It would be useless to enumerate them.

Fires might often be readily extinguished when first discovered by the timely application of a few buckets of water. When an apartment is found to be on fire, the door, chimney, and windows should be immediately closed, if possible, and only opened for the purpose of projecting water on the flames. By this means, the supply of air will be cut off, and rapid combustion prevented. The same applies to the lower doors and windows of a house (especially the shop window), which are often injudiciously kept open or removed, under the pretence of rendering assistance. The neglect of this precaution has often caused a mere smouldering fire, that might have been easily put out, to burst into an inextinguishable mass of flame.

It has been proposed at various times to make certain additions to the *water* used for the purpose of extinguishing fires, in order to render its action *more certain* and *effective.* It is found that *sal ammoniac* (5 *oz.* to the *gall.*) exerts this property in a remarkable degree. The action of water so prepared has been known for ages, but has recently been ostentatiously put forth as "Dr. Clanny's *Solution.*" Several other articles, as *common salt, pearlash,* and *kitchen soda,* act in the same way, though less effectively. A few buckets of such water will speedily arrest the progress of a fire before it has much extended itself. Such a plan is easily applied, by adding the saline matter to the buckets of water, which are either used by hand, or to feed the engine for the first few minutes of its working. When, however, a fire has made much progress, the action of such substances becomes scarcely perceptible. See *Fire Annihilator, &c.*

Chimneys on *fire* are readily extinguished in several ways, without having recourse to throwing water down them from the top, by which much damage is frequently done to the furniture in the rooms. One of the *simplest methods* is, to cautiously scatter a handful of *flowers of sulphur* over the *dullest part* of the burning coals, the mephitic vapours arising from which being incapable of supporting combustion, rapidly extinguish the flames. *Another method* is, to *shut* the *doors* and *windows,* and to *stop up* the *bottom of the chimney* with a piece of *wet carpet* or *blanket,* throwing a *little water* or *flowers of sulphur,* or even *common salt,* on the fire immediately before doing so. By this means the draught is stopped, and the burning soot extinguished for want of air. In most of the first-class houses recently erected, "*fire-place shutters*" are provided, which when *partly* drawn down act as powerful bellows or "*blowers;*" and which when *wholly* drawn down, so as to touch the hearth-stone, entirely close up the fire-place, and instantly extinguish the combustion of the fuel in the grate, or that of the soot in the chimney. This simple arrangement, the advantages of which we pointed out in a former edition, renders fires in chimneys of little moment, as it is only necessary to draw down the shutter to put them out. If a chimney is stopped at top, instead of at the bottom, the whole of the smoke must, of necessity, be driven into the apartment.

Escape from apartments on fire may be best effected by creeping on the hands and knees. In this way the window or door may be reached. It is found that the atmosphere of a room so full of smoke as to produce suffocation to a person *standing upright*, may generally be *safely breathed*, on nearly a *level with the floor.* In the course of an inquest held a short time since, Mr. Wakley, the coroner, observed, that a *damp cloth*, or *handkerchief*, tied over the *mouth* and *nostrils*, or *still better* over the *whole face and head*, would enable a person to effect a passage through the densest smoke, and, in many cases, to *escape* from buildings on fire, when otherwise it would be *impracticable.* Should descent by the staircase be found impossible, then the window should be immediately sought, and a *ladder* or *fire-escape* waited for. In the absence of either, if the danger is imminent, a rope should be made by tying the sheets and blankets of the bed together, one end of which should be firmly secured to a chair or table, or preferably to one of the bedposts, and with this apparatus descent should be cautiously attempted. Jumping out of the window should be avoided, as persons who have not been brought up as clowns or harlequins, run just as much danger in performing such an exploit, as they do by remaining in the burning building. When it is impossible to escape from a burning building by the stairs or windows, retreat may be sometimes secured by a trap-door opening on to the roof, or by a sky-light; when, unless it be an isolated house, the roof of one of the adjoining buildings may probably be gained with safety.

Fire-escapes of various kinds have been employed of late years in the metropolis, and have proved of the greatest value in rescuing persons from burning buildings. At the late extensive fire on Thames Bank, we had the pleasure of being present when one of these machines, from the Horse-ferry Road Station, was applied by William Hudson, its gallant conductor, to a third-story window, under the most trying circumstances, and with perfect success. The danger and importance of such a service deserved a corresponding reward and acknowledgment, which, however, we are given to understand, was either forgotten or neglected. *Of domestic fire-escapes*, that invented by Capt. Manby is, perhaps, the best.

It is said that there is no instance on record of a person being burnt to death in a dwelling-house in *Edinburgh*, where the houses are usually high; yet in *London*, where fire-engines and fire-escapes are provided in greater numbers, deaths are *very frequent* from this cause. The reason of this difference is, that in the former city, the stairs are all made of *stone*, by which means a road of escape is secured.

The *clothes* of *females and children*, when on fire, may be most readily extinguished by rolling the sufferer in the carpet, hearth-rug, table-cover, a great-coat, cloak, or any other woollen article at hand. If this be expertly done, the flames may be rapidly put out. Should assistance not be at hand, the person whose clothes are on fire should throw herself on the ground, and roll the carpet round her, as before described; or if such a thing is not in the room, she should endeavour to extinguish the flames with her hands, and by rapidly rolling over and over on the floor. In this way the fire will be stifled, or at least the combustion will proceed so slowly that less personal injury will be experienced before assistance arrives. The advantage of assuming the horizontal position is manifest from the fact, that *nine* times out of *ten* it is the lower parts of the dresses of females that first catch fire. For the mode of rendering *muslin* and other inflammable articles of ladies' apparel *fire-proof*, see *Incombustible Fabrics, &c.*

The *extinction* of *fires on board ships* by means of *carbonic acid gas*, was some years since suggested to the Admiralty by Mr. J. R. Hancorn. He proposes that a simple and economical apparatus should be attached to every decked vessel, capable of supplying this gas, which is a well-known *non-supporter* of combustion, and will *extinguish fire at the very instant of coming in contact* with the burning matter. *Chalk* with *sulphuric acid* diluted with water, (vinegar, or any other acid will do,) yields 44% of the gas: hence, a *ton of chalk*, and a *fourth part of that quantity of sulphuric acid* will be found sufficient to extinguish any fire on board a ship. Mr. Hancorn also proposed this as a method of destroying vermin in ships, such as *rats* and *cockroaches*, for which purpose it is more easily applied and more effectual than that usually adopted. This plan was rejected by the Admiralty from a fear that the destructive action of the gas might extend to the crew as well as the fire. But "it surely is possible by mechanical means to expel the gas before again entering the ship's hold. At any rate, the grand point would be obtained of extinguishing the fire—though the crew might have only the *deck* to stand on." (Chemist, 1844.)

It is often *difficult* to *get horses* out of buildings on fire, but it is said that they will readily come out, if, after being blindfolded, the saddle and bridle, or the harness, &c., to which they are accustomed, are thrown over them as usual.

FIRE ANNIHILATOR (Phillips's). This is essentially a *gaseous fire engine*, and is likely, as soon as prejudice and rival interests will permit, to entirely supersede the common and ineffective water engines of the present day. Its effects are not merely surprising, but absolutely startling, and must be seen to be believed, and comprehended to be fully admired. "The fiercest flame, the most terrific conflagration, the most intense heat, are as easily subdued by the power of the *Annihilator*, as a farthing rushlight is capable of being put out by an extinguisher." "We have no hesitation in declaring that, no matter how open or exposed the situation may be, the *Annihilator* will certainly and safely extinguish the most extensive fire, if applied in reasonable time, and in quantity proportioned to the urgency and extent of the mischief going on." (Chem., 1, 1853.) The public exhibitions and trials of this instrument, fully justify these strong remarks in its favour, and we hope soon to see its general adoption in all public establishments and large buildings.

The *composition* with which the Fire Annihilator is *charged*, is a mixture of *dried ferrocyanide of potassium*, *sugar*, and *chlorate of potassa.* It is set in action by a blow on a glass vessel containing *oil of vitriol*, which, being fractured, permits the acid to flow over the "charge," when the *anti-combustion* gas is liberated, and rushes forth with great impetuosity.

Notwithstanding our confidence in the value of the above invention, we must record the fact of our having been, with others, forgetful of the presence of two of these instruments, on the occasion of the breaking out of a fire, some time since, in one of the most extensive works in the immediate neighbourhood of the City Road. No one on the premises recollected the fact of their presence in the Board room until after the fire had been subdued. This oversight, may, however, surely be pardoned, when we state, that we saw the works of the Fire Annihilator Co., at Battersea, burnt down some two years since, with loss of life, although, of course, there were plenty of Annihilators on the premises. None, however, were used on the occasion by those who had the charge of the building.

FIRE DAMP. See *Carburetted Hydrogen.*

FIRE EATING. The power of *resisting* the *action of fire* is imparted to the skin by frequently washing it with *diluted sulphuric acid*, until the part becomes sufficiently callous. It is said that the following mixture is very efficacious:—*dilute sulphuric acid*, 3 parts; *sal ammoniac*, 1 part; *juice of onions*, 2 parts; mix. The appearance of *smoke issuing from the mouth* is produced by skilfully retaining a quantity of *fine flour* or *calcined magnesia* in it, and puffing out a small quantity occasionally.

It is found that the unprepared finger may be dipped into a stream of *molten iron* or other metal, with absolute impunity. This depends on the same principle which occasions water to freeze in a white hot crucible, and will be explained further on.

FIRE ENGINE (Gaseous). See *Fire Annihilator.*

FIRE (Greek). This compound, so often mentioned in the history of the wars between the Christians and Saracens during the Middle Ages, is said to have had *naphtha* for its principal ingredient. (Dr. M'Culloch.) Other authorities assert that it consisted of a *mixture* of *asphaltum* or pitch, *nitre*, and *sulphur.*

FIRE-PROOFING. See *Incombustibility.*

FIRE (St. Anthony's). See *Erysipelas.*

FIRE-WORKS. See *Pyrotechny*, (and *below.*)

FIRES (Coloured). These may be termed, not inaptly, the chefs-d'œuvre of the pyrotechnist's art, since, on their excellence, the attractions of most other varieties of fireworks depend. The following forms, under judicious management, yield coloured fires of remarkable beauty:—

1. Blue Fire. *Prep.*—*a.* From *metallic antimony*, 1 part; *sulphur*, 2 parts; *nitre*, 5 parts.

b. From *realgar*, 2 parts; *charcoal*, 3 parts; *chlorate of potassa*, 5 parts; *sulphur*, 13 parts; *nitrate of baryta*, 77 parts.

c. (Mr. A. Bird.) *Charcoal* and *orpiment*, of each, 1 part; *black sulphuret of antimony*, 16 parts; *nitre*, 48 parts; *sulphur*, 64 parts.

d. (Fownes.) *Tersulphide of antimony*, 1 part; *sulphur*, 2 parts; *dry nitre*, 6 parts. This is the composition used for the *Bengal* or *blue signal light*, employed at sea.

e. (Prof. Marchand.) *Sulphur*, *sulphate of potassa*, and *ammonio-sulphate of copper*, of each, 15 parts; *nitre*, 27 parts; *chlorate of potassa*, 28 parts. For theatrical illuminations. This may be rendered either lighter or darker coloured, by lessening or increasing the quantities of the sulphate of potassa and ammonio-sulphate of copper.

f. (*Light Blue,*—Marchand.) *Sulphur,* 16 parts; *calcined alum,* 23 parts; *chlorate of potassa,* 61 parts.

g. (*Dark Blue,*—Marchand.) *Calcined alum* and *carbonate of copper,* of each, 12 parts; *sulphur,* 16 parts; *chlorate of potassa,* 60 parts.

h. (Marsh.) *Sulphate of copper,* 7 parts; *sulphur,* 24 parts; *chlorate of potassa,* 69 parts.

i. (Ruggieri.) *Nitre,* 2 parts; *sulphur* and *zinc,* of each, 3 parts; *gunpowder,* 4 parts.

k. From *sulphur,* 1 part; *dried verdigris,* 2 parts; *chlorate of potassa,* 9 parts.

2. CRIMSON FIRE. *Prep.—a.* (Marsh.) *Chlorate of potassa,* 4¼ parts; *charcoal* (alder *or* willow), 5¾ parts; *sulphur,* 22½ parts; *nitrate of strontia,* 67½ parts. For pots.

b. (Marsh.) *Charcoal,* 4¼ parts; *sulphuret of antimony,* 5½ parts; *chlorate of potassa,* 17¼ parts; *sulphur,* 18 parts; *nitrate of strontia,* 55 parts. For boxes and stars.

c. (Marchand.) *Sulphur,* 16 parts; *chalk* (dry), 23 parts; *chlorate of potassa,* 61 parts. Turns on the purple.

3. GREEN FIRE. *Prep.—a.* From *charcoal* and *nitrate of baryta,* equal parts. *Used* in ghost scenes.

b. From *metallic arsenic,* 2 parts; *charcoal,* 3 parts; *chlorate of potassa,* 5 parts; *sulphur,* 13 parts; *nitrate of baryta,* 77 parts. Very beautiful, particularly when burnt before a reflector.

c. (Mr. A. Bird.) *Charcoal* and *black sulphuret of antimony,* of each, 2 parts; *chlorate of potassa,* 5 parts; *sulphur,* 6 parts; *nitrate of baryta,* 80 parts.

d. (Fownes.) *Lamp black,* 1 part; *chlorate of potassa,* 4 parts; *sulphur,* 6 parts; *dry nitrate of baryta,* 18 parts.

e. (Marchand.) *Boracic acid,* 10 parts; *sulphur,* 17 parts; *chlorate of potassa,* 73 parts. Very beautiful.

f. (Marchand.) *Chlorate of potassa,* 18 parts; *sulphur,* 22 parts; *nitrate of baryta,* 60 parts. For theatrical illuminations.

g. (*Light Green,*—Marchand.) *Sulphur,* 16 parts; *carbonate of baryta,* 24 parts; *chlorate of potassa,* 60 parts. Extremely delicate.

h. (Marsh.) *Charcoal* and *sulphuret of arsenic,* of each, 1¾ part; *sulphur,* 10½ parts; *chlorate of potassa,* 23¼ parts; *nitrate of baryta,* 62½ parts. For pots or stars.

4. LILAC FIRE. *Prep.—a.* (Marsh.) *Black oxide of copper,* 6 parts; *dry chalk,* 20 parts; *sulphur,* 25 parts; *chlorate of potassa,* 49 parts. For pans.

b. (Marsh.) From *black oxide of copper,* 3 parts; *dried chalk,* 22 parts; *sulphur,* 25 parts; *chlorate of potassa,* 50 parts. For stars.

5. ORANGE FIRE. See *Red Fire.*

6. PINK FIRE. *Prep.* (Marchand). *Charcoal,* 1 part; *chalk* and *sulphur,* of each, 20 parts; *chlorate of potassa,* 27 parts; *nitre,* 32 parts. For theatrical illuminations. See *Rose-red Fire.*

7. PURPLE FIRE. *Prep. — a.* From *lamp black, realgar,* and *nitre,* of each, 1 part; *sulphur,* 2 parts; *chlorate of potassa,* 5 parts; *fused nitrate of strontia,* 16 parts.

b. (Marsh.) *Sulphuret of antimony,* 2¾ parts; *black oxide of copper,* 10 parts; *sulphur* and *nitrate of potassa,* of each, 22¾ parts; *chlorate of potassa,* 42 parts. For pans.

c. (Marsh.) *Sulphate of copper,* 9¾ parts; *sulphur,* 13 parts; *chlorate of potassa,* 77¼ parts. For stars.

d. From *sulphur,* 1 part; *black oxide of copper,* 8 parts; *chlorate of potassa,* 16 parts.

8. RED FIRE. *Prep.—a.* From *sulphur, sulphuret of antimony,* and *nitre,* of each, 1 part; *dried nitrate of strontia,* 5 parts.

b. (Mr. A. Bird.) *Charcoal,* 1 part; *black sulphuret of antimony,* 4 parts; *chlorate of potassa,* 5 parts; *sulphur,* 13 parts; *dried nitrate of strontia,* 40 parts.

c. (Fownes.) *Lamp black,* 2 parts; *chlorate of potassa,* 8 parts; *sulphur,* 9 parts; *dried nitrate of strontia,* 32 parts.

d. (Marchand.) *Sulphur,* 16 parts; *carbonate of strontia,* 23 parts; *chlorate of potassa,* 61 parts.

e. (Marchand.) *Chlorate of potassa,* 20 parts; *sulphur,* 24 parts; *nitrate of strontia,* 56 parts. For theatrical illuminations.

f. (Marsh.) *Coal dust,* 2 parts; *gunpowder,* 6 parts; *sulphur,* 20 parts; *dried nitrate of strontia,* 72 parts.

g. (Ruggieri.) *Sulphuret of antimony,* 4 parts; *chlorate of potassa,* 5 parts; *sulphur,* 13 parts; *fused nitrate of strontia,* 40 parts. A little *charcoal* or *lamp black* makes it burn quicker.

h. (*Orange Red,*—Marchand.) *Sulphur,* 14 parts; *chalk,* 34 parts; *chlorate of potassa,* 52 parts.

i. (*Purple Red,*—Marchand.) *Sulphur,* 16 parts; *chalk,* 23 parts; *chlorate of potassa,* 61 parts.

k. (*Rose-red,*— Marchand.) *Sulphur,* 16 parts; *dried chloride of calcium,* 23 parts; *chlorate of potassa,* 61 parts. See *Pink Fire.*

l. From *charcoal,* 2 parts; *chlorate of potassa,* 5 parts; *sulphur,* 13 parts; *dried nitrate of strontia,* 40 parts.

9. Violet Fire. *Prep.—a.* From *charcoal,* 8 parts; *sulphur,* 10 parts; *metallic copper,* 15 parts; *chlorate of potassa,* 30 parts.

b. (*Dark Violet,*—Marchand.) *Alum* and *carbonate of potassa,* of each, 12 parts; *sulphur,* 16 parts; *chlorate of potassa,* 60 parts.

c. (*Pale Violet,*—Marchand.) *Sulphur,* 14 parts; *alum* and *carbonate of potassa,* 16 parts; *chlorate of potassa,* 54 parts.

10. White Fire. *Prep.—a.* From *nitre,* 60 parts; *sulphur,* 20 parts; *black antimony,* 10 parts; *meal powder,* 6 parts; *powdered camphor,* 4 parts. For either pans or stars.

b. (Mr. A. Bird.) *White arsenic,* 1 part; *charcoal,* 2 parts; *black antimony,* 16 parts; *nitre,* 48 parts; *sulphur,* 64 parts.

c. (Marchand.) *Charcoal,* 2 parts; *sulphur,* 22 parts; *nitre,* 76 parts. For theatrical illuminations.

d. (Marchand.) *Gunpowder,* 15 parts; *sulphur,* 21 parts; *nitre,* 64 parts. As the last.

e. (Marsh.) *Gunpowder,* 12½ parts; *zinc filings,* 18 parts; *sulphur,* 23 parts; *nitre,* 46½ parts. For pans.

f. (Marsh.) *Zinc dust* or *filings,* 15 parts; *sulphur,* 28 parts; *nitre,* 57 parts. For stars.

g. (Ruggieri.) *Sulphur,* 13¼ parts; *sulphuret of antimony,* 17¼ parts; *nitre,* 48 parts.

h. (Ruggieri.) From *realgar,* 2 parts; *sulphur,* 7 parts; *nitre,* 24 parts.

i. (Ruggieri.) *Charcoal,* 1 part; *sulphur,* 24 parts; *nitre,* 75 parts.

k. (Ruggieri.) *Iron* or *zinc borings,* 25 parts; *gunpowder,* 100 parts.

11. Yellow Fire. *Prep.—a.* From *sulphur,* 16 parts; dried *carbonate of soda,* 23 parts; *chlorate of potassa,* 61 parts.

b. (Marchand.) *Gunpowder,* 14 parts; *sulphur,* 16 parts; *dried soda,* 20 parts; *nitre,* 50 parts.

c. (Marchand.) *Charcoal,* 1½ part; *sulphur,* 17½ parts; *dried soda,* 20 parts; *nitre,* 61 parts.

d. (Marsh.) *Charcoal,* 6 parts; *sulphur,* 19½ parts; *nitrate of soda* (pure and dry), 74½ parts. For pans. Very beautiful.

Obs. The ingredients in the above compounds are to be separately reduced to powder, and sifted through lawn, after which they should be kept in well-corked wide-mouth bottles until the time of mixing them for use. The *chlorate of potassa,* more especially, must be *separately* treated, and *cautiously* handled, in order to prevent the possibility of explosion, from friction, whilst it is in contact with combustible matter. The requisite quantity of each of the ingredients being weighed out and placed on a clean sheet of white paper, the whole is to be thoroughly, but carefully mixed together, with a "light hand," by means of a bone or wooden knife. The compound is next "lightly" packed into *small cups* or *pans*, for illuminations; or into *small pill-boxes*, for stars and trains, a little *priming* and *quick-match* being lastly attached to each. To *ensure success* the several ingredients must be *dry* and *commercially pure,* and though reduced to the state of an uniform powder, care must be taken that they are not absolutely "dusty," or too finely pulverized. The *nitrate of strontia, alum, saltpetre, carbonate of soda, &c.,* before being weighed, require to be gently heated in an iron pot or pan, until they fall to powder, and lose their hygrometric moisture, or water of crystallization. To ensure the perfect admixture of the ingredients, the whole, after they have been stirred together on paper, as before directed, may be passed through a *hair* or *perforated zinc* or *brass sieve.* Further, as "coloured fires" rapidly deteriorate by "keeping," and even sometimes inflame spontaneously, to *prevent disappointment* and *accidents,* they should not be prepared long before they will be required for use; and should be stored in some situation in which their spontaneous combustion would be productive of no after consequences.

Of the above formulæ, those bearing the name of the late lamented Mr. Marsh, of Woolwich, more especially deserve the attention of the pyrotechnist. These, by kind permission, we were enabled to give the reader in our last Edition. We have since been grieved to see these formulæ appropriated and republished by certain parties who live on the industry and brains of others, without the least acknowledgment by them of the source from which they had stolen them.

FISH. Syn. *Pisces,*—Lat. *Fishes* form the *fourth class* of vertebrate animals (*vertebrata*) in the Cuvierian arrangement of the animal kingdom, and in the variety of their genera and species, are second only to the *insecta;* whilst in prolificness and number, they probably exceed all other animated beings that reach a size equal to that of even the smallest member of their prodigious race. Besides their value to man as food, they furnish him with *oil*, *whalebone*, *ambergris*, and various other articles of utility and luxury, and provide, either directly or indirectly, an inexhaustible supply of manure for the fertilization of his fields. As *food*, fish are undoubtedly wholesome and nutritious, although less so than the flesh of animals, or the grains of the cereals. Of all the various substances used as aliments by man, fish are, however, the most liable to run into a state of putrefaction, and should therefore be only eaten when perfectly fresh, or, if not recently taken, then only when they are in a state of good preservation by any of the ordinary methods employed for the purpose. Those that are the whitest and most flaky when cooked, as *cod*, *flounders*, *haddock*, *hake*, *soles*, *turbot*, *whiting*, *&c.*, are the most easily digested; and those abounding in oily matter, as *eels*, *herrings*, *mackerel*, *salmon*, *&c.*, are most nutritious, though the most likely to offend the stomach. *Salt-water fish* have been said to be more wholesome than *river fish*, but without sufficient reason. *Salted fish* are hard of digestion, unless when carefully cooked, and well masticated. The *frequent use of fish* as an *aliment* is said to promote the sexual feelings, but not the increase of population, unless a sufficiency of other food is taken at the same time. Skin diseases are also said to be more common among those who live continually on fish than among those who abstain from it; but this probably arises from their use being unaccompanied by a proper quantity of fresh vegetables or fruit, both of which are scarcer on the sea-coast than further inland. As one of the components of a mixed diet, the value of fish is indisputable. Acid sauces and pickles are the proper additions to fish, from their power of retarding the progress of putrefaction, and of correcting the relaxing tendency of large quantities of oil and butter.

Comp. Fish consist of about 80% of *water*, 14% of *albumen* and *fibrine*, and 6% of *gelatine;* making about 20% of *nutritive matter*. (Brande.)

Artif. Propag. Perhaps no animal multiplies so fast as fish. The *tench* produces 38,000 eggs; the *mackerel*, 546,000; the *cod-fish*, 1,357,000. The *herring* also produces vast numbers. If only 2000 of any one of these came to perfection, there would be, in the second year, 12,000,000; in the third, 2,000,000,000. To protect the spawn and the young animal until it becomes able to take care of itself, is, therefore, to ensure the production of millions of fishes; but how any of the less powerful and rapacious fish now happen to escape their enemies, natural and artificial, seems even more wonderful than their powers of production. The artificial propagation of fish consists chiefly in introducing the adult fish to the locality, at the proper season, and affording the protection alluded to. Sometimes the spawn is collected in tubs or cisterns, and artificially impregnated by gently pressing the male fish in the hand, so as to discharge the milt immediately over it. The vessels, after a short interval, are removed to the breeding pond.

Mr. Shaw appears to have been the first to show that the *parr* and *smelt* are only stages of the salmon; and to prove that, by the construction of side ponds, with a small stream running over them, with sufficient water to keep them covered (but not too deep), so as to favour the development of the spawn with as much rapidity as possible, the desired end can be accomplished. The small fish will thus be preserved from their larger enemies until they have an opportunity of shifting better for themselves; and vast supplies will be afforded to the sea, to return either to the same spot, or most certainly to the same river, in another year.

The grisle, or young salmon, of from 2½ to 3 *lb.* weight, has been sent to market, the spawn from which they have come having only been deposited in the preceding October or November—three months of this to be allowed for hatching—and often a longer period. A grisle weighing 6 *lb.* in the month of February, after spawning, has, on its return from the sea in September, weighed 13 *lb.;* and it is said that a salmon fry of April will in June weigh fully 4 *lb.*, and in August fully 6 *lb.*

The artificial propagation of fish has been taken up with vigour by the French government. A committee of savans, with a proper staff under them, have been appointed for the purpose. *Salmon*, *perch*, *tench*, and even *lobsters*, are now domesticated,—so far, at least, as being bred and reared out of the reach of their numerous enemies. Rivers and lakes, in which there were formerly no fish, or none of the more esteemed species or varieties, now literally teem with them.

Choice, *&c.* "The flesh of any fish is always in the highest perfection, or in season, as it is called, during the period of the ripening of the milt and roe. After the fish has deposited the spawn, the flesh becomes soft, and loses a great deal of its peculiar flavour. This is owing to the disappearance of the oil or fat from the flesh, it having been expended in the function of reproduction." (Fleming's Phil. of Zoology.) Fish should be dressed as soon after being caught as possible, as much of their peculiar delicacy and flavour is lost by keeping, even for a few hours. *Turbot* and *salmon* are said by the fishmongers to be improved in flavour when 2 or 3 days old, but this is surely a mistake, as the former, when dressed immediately after being caught, possesses a fine creamy taste which it afterwards loses; whilst the latter, by the loss of a *single tide*, loses a portion of the fine white curd which is previously found between the flakes, and by longer keeping, this curd, with the larger flakes, disappear altogether. In the eyes of some epicures the richness is, however, increased by this change. *Mackerel* and some other fish suffer so much from keeping only a few hours that they become quite unwholesome. *Herrings* offer a remarkable example of the advantage of dressing fish as fresh as possible. When cooked soon after being caught, they possess considerable delicacy and flavour, but after being kept for only a few hours, the oil separates from the flesh, and they become soft, greasy, and strong-flavoured.

In the *choice* of *every kind of fish*, stiffness, brightness of the eyes, and redness of the gills may be regarded as invariable signs of freshness. A peculiar elasticity will also be perceived in fish recently caught; little or no permanent impression being made by the ordinary pressure of the fingers, from the flesh immediately rising when the pressure is withdrawn. Fresh fish also lie in a partly *curled position*, and never *quite straight*, as is the case when they have been kept for some time. *Thickness* and *fleshiness* are deemed marks of the good condition of all fish.

Pres. See *Food* and *Putrefaction.*

On the proper *cleaning of fish* preparatory to dressing it, depends much of its delicacy and flavour. Ordinary cooks seldom do this *well*, from not slitting the fish sufficiently open to permit the inside to be *thoroughly* washed, and seldom using sufficient water. The superior flavour of fish cleaned by the fishmongers arises from their performing the operation more completely, and from the large quantity of water they employ about them. The *flavour* of all fish is improved by adding a *little salt* or *vinegar* to the last water in which they are washed. The *sound, milt,* and *roe* should be carefully cleaned and preserved.

Fish is preferably "*dressed*" by simply *boiling, broiling,* or *frying* it; in fact, the finer kinds of fish are often injured by the excessive interference of the cook. When *boiled,* "all large fish, with the skin whole, must be placed on the fire in *cold water;* if crimped, or cut into slices or pieces, in *boiling water;* if whole, it must not be covered with more than two or three inches of water, or the skin will crack, and not only spoil the appearance of the fish, but will diminish the gelatine and gluten it contains, and instead of eating firm and full of flavour, it will be soft and woolly, especially if over-boiled." (Soyer.) As soon as a scum rises from boiling, it should be removed by the skimmer. The addition of a *little salt* or *vinegar* to the water improves the flavour of most fish, and renders the flesh firmer. The proportions should be "two tea-spoonfuls of salt to every quart of water." "If the fish be whole, as soon as it begins to boil, remove the cover on one side, and let it simmer gently until done." (Soyer.) A fish is known to be sufficiently dressed by the flesh in the thicker parts separating easily from the bone. "If a large fish, I generally try it by gently pushing a wooden skewer through the thickest part; if it goes in easily, it is done." (Soyer.) When this is the case it should be removed from the kettle, as by soaking in the water fish loses its firmness, and becomes soddened. *Sole, skate,* and *mackerel* are usually put into boiling water, whether whole or sliced. *Fish* for *broiling,* should be well washed in *strong vinegar,* wiped dry with a towel, and floured before placing them on the gridiron; and the bars of the latter should be *hot,* and well buttered. (Rundell.) *Fish* for *frying* should be prepared as for broiling, and the *butter, oil,* or *lard,* should be allowed to boil for a minute or two, before putting them into the frying pan. The latter should be perfectly smooth and bright, and the butter or oil in *abundance,* to prevent the fish sticking to it and burning. As the fish are cooked solely by the heat of the melted fat, to fry them in the highest perfection, there should be enough of it to cover them. Butter or oil is the best for the purpose. To avoid loss, the contents of the frying pan, after the fish is removed, should be poured into a clean jelly-jar or basin, and reserved for another occasion. The fish being removed from the pan, the superfluous fat should be drained from them, preparatory to "serving them." When fish is divided into *fillets* or *cutlets* before being cooked, it is usual to take out the bones, and to dress it with *force-meat*, &c.

In *serving fish* of the finer kinds, *no other additions* are required, than *melted butter* and the *ordinary fish sauces* and *pickles.* The dishes are commonly *garnished* with *raw parsley*, for the sake of appearance, but *boiled parsley*, chopped small, should accompany it. All kinds of fish should be *served* on a napkin.

Caution. It sometimes happens that a fish-bone accidentally swallowed remains in the œsophagus, and occasions serious inconvenience; in fact, instances have been known where so much irritation has arisen that death has followed. In such cases it is advisable, as soon as possible, to take of *tartar emetic*, 4 gr., dissolved in *warm water*, ½ pint; and immediately afterwards, the *whites of six eggs.* The coagulated mass will not remain in the stomach more than two or three minutes, and the remedy has been known to "remove no less than 24 pins at once."

FISH GLUE. See *Glue* and *Isinglass.*

FISH PONDS. Formerly these were almost exclusively employed for the breeding and fattening of fresh-water fish only, except on the sea-coast, where the water could be conveniently renewed by the influx and efflux of the tides. At present the breeding of fish is extended to numerous varieties. (See *above.*) The successful management of fish in ponds, consists, chiefly, in as close an imitation as possible of the ordinary conditions connected with them in the natural state. *Carp* is the favorite fish of English breeders.

FISH SKIN. Syn. *Shark Skin.* The skin of the *spotted dog-fish* or *rough hound* (chien de mer,—Fr.), stretched, and dried. *Used* for polishing wood and ivory. Several other varieties of fish-skin are employed in the arts. The dressed skin (*galuchat*) of the *rousette* (raia sephen) is transparent, and is very beautiful. Cemented on green paper, and rubbed down and polished, it is used as veneer for fancy boxes. The skins of several varieties of *squalus* are also used for both the above purposes. See *Shagreen.*

FISH-SKIN DISEASE. Syn. *Ichthyosis*,—Lat. An affection of the skin which derives its name from the surface of the cuticle suggesting the idea of the scaly skin of a serpent or fish. It is distinguished from lepra and psoriasis, by the absence of deciduous exfoliations, distinct or partial patches, and the constitutional disorder which more or less accompany those diseases. It is generally confined to patches in the arm-pits, and on the breast or chest, but sometimes attacks the face. The *treatment* consists in the frequent use of the warm or vapour bath and friction, the due regulation of the diet, and attention to such other matters as tend to improve the general health. "The easiest mode of removing the scales, is to pick off carefully with the nails, whilst the part is immersed in hot water." (Dr. Willan.) In some cases this disease assumes another form (*ichthyosis cornea*), when it is accompanied with the production of excrescences of an indurated character somewhat like spikes or even horns. When it assumes the appearance of the first of these, it is popularly called the *porcupine disease*, from the supposed resemblance to porcupine's quills. Under the latter form, several very extraordinary examples have occurred in females of advanced age. "Instances of *porcupine men* and *porcupine boys* are not uncommon at country fairs." (Eras. Wilson.) The only treatment of the last is excision, and the *entire* eradication of the cyst or morbid secreting surface.

FISTULA. This name is given by surgeons to a deep, narrow, sinuous ulcer, having only a small external opening, and usually showing a great indisposition to heal. A sinus of this kind by the side of the rectum is called "*fistula in ano*;" when it occurs in the perinæum, it is called "*fistula in perinæo.*" The last is generally the result of neglected or mistreated stricture. An ulcerated opening in the lachrymal sac is termed *fistula lachrymalis.* Their treatment is purely surgical.

FIVE GEMS. In ancient medicine and among the superstitious at less remote periods, various medicinal and magical virtues were attributed to gems and precious stones. The Persians believed that wine drank out of an amethystine cup would not intoxicate, and the *five gems* (cornelian, emerald, garnet, hyacinth, and sapphire) were, by others, reputed cordial.

FIVE HERBS. See *Species.*

FIXATURE. Syn. *Bandoline, Clysphitique, Eau Collante, Fixateur.* This consists of any of the simple vegetable mucilages, combined with a little spirit, to preserve it, and with a little perfume, to render it more agreeable.

Prep. 1. From *carrageen, Irish*, or *pearl moss*, soaked in *cold water* for an hour or two, and after being drained, and pressed dry in a clean napkin, dissolved by boiling in *soft water*, q. s. The decoction is strained through cambric, and when nearly cold is mixed with about ⅓rd or ¼th of its volume of *eau de Cologne* or other *scented spirit*, with the further addition of a few drops (5 or 6) of *oil of cloves*. Sometimes a little brandy is added to the mucilage, and when it is intended for *present* use, as is common with home manufacturers, the spirit is frequently omitted altogether. ¼ *oz.* of the *prepared moss* is *fully* enough for ¾ pint of strained decoction, if rightly managed.

2. From *quince seed* boiled in *water*, as the last. ¼ *oz.* yields *nearly* ¾ pint of strained decoction.

3. Pale *gum arabic* (picked), 1½ *oz.; rose water*, 2 *fl. oz.; pure water*, 3 fl. oz.; dissolve.

4. *Gum arabic*, 3¼ *oz.; water*, ½ pint; dissolve, and drop in *eau de Cologne*, gradually, until the cloudiness at first occasioned, ceases to be removed by agitation; the next day decant the clear portion. All of the above are very superior, and keep well.

5. (Redwood.) *Gum tragacanth*, 1½ dr.; *water*, 7 oz.; *proof spirit*, 3 oz.; *otto of roses*, 10 drops; macerate 24 hours, and strain.

6. *Malt*, 7 *oz.; hot water* (that will barely permit the finger to be held in it without pain), ½ pint; infuse in a covered jug or basin, *gently* press out the liquid, and as soon as cold, add of *proof spirit* (or brandy or Cologne water), 2½ *fl. oz.*, and strain.

Obs. Bandoline is used by ladies, and by hairdressers for stiffening the hair, and to make it curl firmly and remain in place. It is applied either by moistening the fingers and passing the hair through them, or by means of a small sponge. *Mild beer* has a similar effect, and we remember, in our juvenile days, having seen the female members of our family apply it to this purpose. See *Pommades*.

FIXED AIR. See *Carbonic Acid*.

FIXED OILS. See *Fat & Oils*.

FLAKE WHITE. See *White Pigments*.

FLAME. See *Light* (Artificial).

FLAMES (Coloured). These are employed for in-door illuminations, or what are often erroneously called *artificial fireworks*. They are generally produced by the combustion of *alcohol* or *rectified spirit* holding certain salts in solution. In this way a *green colour* is communicated by boracic acid or chloride of copper; a *red one* by the nitrates of iron, lime, or strontia; a *violet*, by potassa and its salts; and a *yellow*, by nitrate of soda. See *Fires* (Coloured) and *Pyrotechny*.

FLANNEL. It has been shown by the experiments of Count Rumford that the conducting power of the different materials employed for clothing varies considerably. A thermometer surrounded with *cotton wool*, and heated by immersion in boiling water, took 1046 seconds to lose 135° Fahr., when plunged into a bath of melting ice; but, under the same circumstances, when *sheep's wool* was employed, 1118 seconds elapsed before a like sinking of the thermometer took place, (Phil. Trans. 1792;) thus showing the greater conducting powder of the former, and consequently the superiority of the latter substance for the manufacture of warm clothing. But the chief advantage of wool as an article of under-clothing, depends less upon its actual power of conducting heat than its peculiar texture. *Flannel* acts as a gentle stimulus on the skin, and exercises the most beneficial action, by keeping the pores clean, and in a state most favorable to perspiration. This action is a species of friction similar in character, although inferior in degree, to that of the common *flesh-brush*, or *horse-hair glove*, so long advantageously employed as a skin stimulant. Flannel has also the advantage of absorbing the perspiration as soon as emitted, and allowing its watery portion to pass off into the atmosphere almost as soon as formed, but this is not the case with cotton and linen fabrics. The different effects of flannel and linen are particularly perceptible during brisk exercise. When the body is covered with the former, though perspiration be necessarily increased, the perspired matter freely passes off through the flannel, and the skin remains dry and warm. If the same exercise be taken in linen shirts, perspiration, as in the former case, is indeed also increased, but the perspired matter, instead of being dispersed into the atmosphere, remains upon the linen, and not only clogs the pores of the skin, but gives a disagreeable sensation. From this property of flannel, persons who wear it next the skin seldom catch cold from changes of temperature, even though perspiring profusely; but in similar cases, when linen or calico shirts are worn, chilliness immediately comes on, following by "*sniffling, sneezing*, and *cough*," and all the other symptoms of *severe catarrh*.

The *common objections* raised against the use of flannel are founded on vulgar prejudices, ignorance, obstinacy, or bravado, and are undeserving of the notice of sensible people. In a fickle and moist climate like that of England, *every* person should wear a robe of flannel next the skin, or at all events a waistcoat of flannel reaching below the loins; and this should not be discarded as soon as the cold weather has passed, but its use should be continued all the year round; for in reality, flannel is, if possible, even more required in summer than in winter, because persons perspire more freely in hot than in cold weather, and are consequently more susceptible of cold, while at that period of the year their clothing is less capable of protecting them from the effects of sudden changes of temperature and draughts of cold air, moisture, &c. Females, children, persons of delicate constitutions, and all others who from their habits of body or life, perspire freely, or are much exposed, should wear flannel.

In *washing flannels*, it is recommended that they should be only put into *warm water*, by which method their colour will be preserved, and they will be prevented from shrinking. See *Cold, Dress, Hygiène, &c.*

FLASH. *Prep.* From *burnt-sugar colouring*, 1 gall.; *fluid extract of capsicum* or *essence of Cayenne*, ¾ pint, or enough to give a strong fiery taste. *Used* to colour spirits, and to give them a false strength. It is made by the brewers' druggists, and labelled "*isinglass and burnt sugar.*"

FLASKS. The late lamented and ingenious Mr. Fownes, suggested the employment of *Florence oil-flasks* as cheap substitutes for retorts, receivers, digesters, and some other vessels used for chemical purposes. His plan was to cut the neck smoothly round with a hot iron, and softening it in the flame of a good argand gas-lamp, to turn over the edge so as to form a lip, or border. The neck will then bear a tight-fitting cork without splitting.

FLATNESS. See *Malt Liquors* and *Wines.*

FLATULENCE. Syn. *Flatulency; Wind.* A morbid collection of gas in the stomach and bowels. Its most common cause is indigestion. When the natural fluids of the stomach are secreted in a healthy state, they exercise an antiseptic and digestive action on the food, by which it is speedily reduced to a magma that is little liable to spontaneous change whilst in the body; but when the reverse is the case, fermentation soon commences, and the stomach and associated viscera become distended with gas, and all the well-known symptoms of flatulency are developed in rapid succession. The quantity of gas thus accumulated in the primæ viæ, is often enormous. An ordinary apple during fermentation yields about 600 times its bulk of gas, and many vegetables yield much more. (Dr. Hales.) It is, therefore, not at all surprising that so much inconvenience should be felt when the food, instead of being digested and assimilated, runs into the state of active fermentation.

The *treatment* of *flatulency* consists mainly in the selection of proper articles of food. *Oleraceous vegetables, peas, beans, under-dressed potatoes,* and *indigestible fruits* should be especially avoided, as well as the use of large quantities of *weak* or *warm* liquids. The diet should consist principally of *animal food*, carefully, but not over-cooked, with a sufficient quantity of good *mealy potatoes* (mashed, *not* whole), and good *wheaten meal-bread*, moderately seasoned with *common salt* and *spices.* The most suitable beverages are *toast-and-water*, and a *little good brandy* largely diluted with water. The healthy tone of the stomach may be re-established by the proper use of tonics, bitters, and mild aperients.

To relieve the *fit of flatulency*, carminatives and aromatics, as *mustard, peppermint, ginger, cinnamon, lavender*, and the *peppers*, may be had recourse to. A glass of *peppermint cordial*, or of *brandy* strongly flavoured with *peppermint* or *ginger*, is a popular and efficient remedy. A few drops (15 *to* 30) of *ether*, with a little *tincture of capsicum* or *spirit of sal volatile*, seldom fail to give relief. See *Indigestion.*

FLAVOURING SUBSTANCES. See *Essences, Oils* (Volatile), *Spices, Wines, &c.*

FLAX. See *Linseed* and *Oils.*

FLEA. This troublesome little animal is the *pulex irritans*, of Linnæus, and belongs to the *suctoria*, or fourth order of the *insecta.* Its food is the living blood of animals. Its favorite haunts are our warm under-clothing, and its most productive breeding-places are in the "flue" which careless servants allow to accumulate underneath our beds. Cold, light, perfumes, and ventilation, are inimical to its propagation. We are assured by a living entomologist that an effectual method of speedily getting rid of these insects is to wage a war of extermination against the small blackish-coloured ones, a few of which only, are to be found in every colony.

The *pulex irritans*, diminutive, troublesome, bloodthirsty, and proscribed though it be, is a marvel of activity, vigilance, and muscular power. Like the larger animals it may be domesticated, and educated, and then exhibits a degree of docility and sagacity which is truly surprising. *Learned fleas* were formerly exhibited in London. A friend of the writer, who, perhaps, has more time on his hands than wit, is particularly successful in educating fleas. We have seen them, arrayed in their minute golden belts and helmets, disport on his hand at order, or yoked in harness drag carriages many times their own size and weight. He informs us that the first step in his system is to anoint the medial line of the back with a little thick mucilage or varnish. In some cases he at once puts on a belt of gold or silver foil.

FLESH. Syn. *Caro,*—Lat. The muscular substance of animals; the softer, solid portions of the body, as distinguished from the bones and fluids. See *Fibrine, Food, Proteine, &c.*

FLESH-BRUSH. The use of this simple instrument is extremely advantageous in exciting the cutaneous circulation, and may be adopted to any extent short of actual irritation. Those which have the bristles set on a leather back are esteemed the best. The *flesh-glove* or *hair flesh-rubber,* is a useful modification of the common flesh-brush. Those manufactured by Messrs. Savory & Moore, in imitation of the *Indian kheesah* or *mitten,* are superior to all others. In the absence of both flesh-brush and glove, a rough towel wound round the hand is no bad substitute. See *Friction.*

FLIES. The common house-fly (*musca domestica,*) causes considerable annoyance to the person in hot weather, as well as damage to handsome furniture, especially to picture frames, gilding, and the like. The best way to exterminate them, is said to be to expose on a plate one or other of the following mixtures:—

1. *Black pepper,* 1 tea-spoonful; *brown sugar,* 2 do.; *cream,* 4 do.

2. Strong *decoction of quassia,* thickened with *moist sugar.*

Obs. Flies (*blow-fly; musca vomitoria;*) and other insects, may be kept from attacking meat by dusting it over with *black pepper, powdered ginger,* or any other *spice,* or by skewering a piece of paper to it on which a drop or two of *creasote* has been poured. The spices may be readily washed off with water before dressing the meat.

It is a fact not generally known, that *flies will not pass through* a *netting* made of fine silk, thread, or wire, even though the meshes may be an inch apart, unless there is a window or light behind it. This affords us a ready means of excluding these insects from all our apartments which have windows only on one side of them, without keeping the latter closed. It is merely necessary to have an ornamental netting stretched across the opening, when although flies may abound on the outside, none will venture into the rooms so protected. If, however, there is a window on the other side of the room, they will fly through the netting immediately.

FLIP. See *Egg Flip.*

FLOUNDERS are a wholesale species of fish, found in both our seas and rivers; those from the latter are preferred. See *Bills of Fare* and *Fish.*

FLOUR. Syn. *Farina,*—Lat. The finely ground and "dressed" meal of bread corn, and of the seeds of some of the leguminosa. That known specifically as *flour* in this country is obtained from the winter and spring varieties of *triticum vulgare* (triticum hybernum and t. æstivum,—*Linn.*)

Var., &c. Of these there are several, depending chiefly on the amount of bran which they contain, and the relative fineness of the sieves through which they are passed:—

Fine Wheat Flour, Pastry Flour; Farina, F. Tritici, F. Seminis Tritici. The finest flour, obtained from the meal produced in the first grinding of wheat between sharp stones, by means of a sieve of 64 wires to the inch. *Used* for pastry.

Middlings. The remainder of the flour of the first grinding obtained by means of a slightly coarser sieve. *Used* for making household bread, but is mostly reground for the next variety.

Seconds. The finest part of the flour, obtained by regrinding "middlings" between blunt stones. *Used* by the bakers for their finest wheaten bread.

Pollard. The coarse flour, from which the seconds has been sifted. *Used* for making sea biscuits and gingerbread, and to fatten poultry and hogs.

Country Household Flour. This is usually ground only once, and sifted to $\frac{4}{5}$ths of the weight of the wheat.

Ammunition Flour is ground and sifted to $\frac{1960}{2280}$, or nearly $\frac{5}{6}$ths the weight of the wheat.

According to Mr. Accum, thirty-two pecks of wheat in the London mills yield of *flour,* 38½ parts; *pollard,* 8 parts; and *bran* (furfur tritici), 12 parts; the bulk of the wheat being doubled by grinding.

According to Mr. Hard, miller, of Dartford, quoted by Dr. Pereira, the wheat having been ground in the usual way, is allowed to remain in the state of meal for some time before "dressing," which removes the heat caused by the process, and enables the miller to obtain more flour, and the baker a better quality, than if "dressed" immediately it is ground.

"The *process* of *dressing* is by a wire cylinder containing a certain number of sheets of different texture or fineness, which cylinder contains eight hair brushes attached to a spindle passing through the centre of the cylinder, and laid out so as to gently touch the wire. This cylinder is fed by a 'shoe' with the meal; then the 'flour' and 'offal,' after passing through the wire in this way, are divided by wooden partitions fixed close to the outside of the cylinder." "The produce of the wheat-meal dressed through the wire machine consists of—1, *Flour;*—2, *White Stuff*, or *Boxings*, or *Sharps;* — 3, *Fine Pollard;* — 4, *Coarse Pollard*, or *Horse Pollard;*—5, *Bran.* The 2d product (*i. e.* the *white stuff*) is then submitted to another 'dressing' through a fine cloth machine, and produces—1, *Fine Middlings*, for biscuits;—2, *Toppings*, or *Specks;*—3, *Dustings;* — 4, *Best Pollard, Turkey Middlings*, or *Coarse Middlings.*"

TABLE *of the Produce of One Quarter of Wheat* (= 504 *lb.*) By Mr. HARD.

Flour	392 *lb.*
Biscuit or fine middlings	10 ,,
Toppings or specks . .	8 ,,
Best pollard, Turkey do., or twenty-penny . .	15 ,,
Fine pollard	18 ,,
Bran and coarse pollard	50 ,,
Loss by evaporation and waste	11 ,,
	504 ,,

Comp. According to Vauquelin, *French wheat flour* contains about 10% of *water*, 11% of *gluten*, 71% of *starch*, 5% of *sugar*, and 3% of *gum;* and the *water of the dough* amounts to about 50%. The quantity of the *bran* in wheat, ranges under 2%.

Pur. This article of food is very frequently adulterated both by the miller and the baker, as has been before alluded to in the article on *Bread.* The principal physical characteristics of wheat flour of good quality, are the following:—it has a dull white colour, somewhat inclining to yellow; —it exhibits no trace of bran, even when pressed smooth with the hand, or with a polished surface;—its cohesiveness is so great, that on being squeezed in the hand, the lump is some time before it loses its shape;—it has a homogeneous appearance, and does not lose more than from 6% to 12% by being carefully dried in a stove. The smaller the loss in this way, the finer is its quality, other matters being equal, and the more economical in use. (See *below.*)

Tests. 1. *Liquor of ammonia* turns *pure* wheat-flour *yellow;* but if *any other corn* has been ground with it, *pale brown;* or if PEAS or BEANS have been ground with it, a still *darker brown.*

2. *Liquor of potassa*, containing about 12% of caustic alkali, dissolves *pure* wheat-flour almost completely; but when it is adulterated with the flour of the *leguminous seeds* (BEANS, PEAS, &c.), the cellulose of these substances remains undissolved, and its hexagonal tissue is readily identified under the microscope. Mineral substances (CHALK, PLASTER OF PARIS, BONE DUST, &c.) are also insoluble in this test, and appear as a heavy white sediment.

3. *Boiling water* poured on the sample, causes the evolution of the peculiar odour of PEA OR BEAN FLOUR when these substances are present. Bread made with such flour, evolves a like odour on being toasted.

4. Pure *hydrochloric acid* poured on POTATO FLOUR, or on wheat flour adulterated with it, develops a smell of rushes; it also dissolves STARCH, but changes the colour of *pure* wheat flour to a *deep violet.*

5. *Nitric acid* turns *wheat flour* of an *orange-yellow colour*, but forms a stiff and tenacious jelly with POTATO FECULA, the colour of which it does not alter.

6. A portion of the suspected sample submitted to dry distillation in a stoneware retort, and the distillate collected in a receiver containing a little water, the latter is found to remain *perfectly neutral* if the wheat flour is *pure*, but acquires a distinctly *alkaline reaction* when BEANS, PULSE, or PEA MEAL is present. (Rodrigues.)

7. Triturate 300 *gr. of the sample* with an equal weight of *clean siliceous sand*, and after 5 minutes form a homogeneous paste with *water;* afterwards further adding *more water*, until about 2 *fl. oz.* have been used. The filtered liquid treated with an equal quantity of a strong and pure *aqueous solution of iodine*, develops a *pink colour* which gradually disappears, when the specimen examined consists of *pure* wheat flour; but assumes a *deep purple colour*, which disappears much more slowly, if the flour is adulterated with even 10% of FECULA or POTATO FLOUR. This test succeeds not only with flour and meal, but also with *macaroni, vermicelli, &c.* (M. Chevallier.)

8. The milky liquid holding the *starch* in suspension (see *Anal.*, below,) is poured into a small conical glass, and left at rest for some time; the clear liquid is then decanted, and any remaining water carefully sucked up with a pipette, and the whole left for some time, in order that the deposit may harden. The upper gray layer is next removed with a teaspoon, and the harder and stiffer second layer left undisturbed until it becomes quite solid by drying. When in this state, it may be upset in the form of a cone, upon a lump of dry plaster. The FECULA or POTATO STARCH (if any is present) being heavier than that of wheat, forms the apex of the cone, and its quantity may be estimated in the following manner:—The operator cuts from the apex of the little cone above mentioned, a slice, which he triturates only for a short time in an *agate mortar* (one of *glass*, or *porcelain*, or *wedgewood-ware*, will not do), and he tests that with *aqueous solution of iodine.* If it turns *blue*, it is FECULA. Another slice is treated in the same manner, until the operator comes to the wheat starch, which, in the present instance, is not affected by the aqueous solution of iodine. This difference of behaviour of the two species of starch with iodine, is due to the friction of the pestle and mortar, which is sufficient to divide or tear the envelopes of the particles of the potato starch, which then become blue, when treated by solution of iodine. The particles of wheat starch, on the contrary, are not disaggregated by that treatment, and being therefore protected by their envelope, are not acted upon by solution of iodine, or, at most, assume only a brown tinge. (M. Robine.)

9. Wheat flour adulterated with PLASTER OF PARIS, GROUND BONES, CHALK, and POTATO FLOUR, has a higher specific gravity than a sample of the pure flour. This may be readily ascertained by any person, by filling a small vessel with some pure flour, and then with the given sample. "A vessel which will contain 1 *lb.* of wheat flour will contain 1½ *lb.* of fecula" (*potato flour*), and hence "the proportion of this adulteration may be easily estimated." (Ure.)

10. If to a sample of wheat flour, is added a *solution of potassa*, containing about 1¾% of the pure alkali, the granules of POTATO FARINA, or of BEAN MEAL, or PEA MEAL present (if any) will acquire 4 or 5 times their original volume, whilst those of the *pure* wheat starch will be scarcely affected by it. This change is very perceptible under a microscope of small power. 2 parts of *liquor of potassa* (Ph. L.) and 5 parts of *distilled water*, form a mixture that answers for the above purpose.

11. By means of the *microscope* the admixture of the CHEAPER FECULAS and MEALS with *wheat flour* is readily detected by the characteristic appearance of the starch-grains; and when the adulteration exceeds 9% or 10%, its extent may be readily estimated with considerable accuracy. As the range of adulteration is generally from 12% to 27%, this method is applicable in the greater number of cases.

12. See *Bread* (Adult. & Exam.), pp. 160-1.

Anal. The value of wheat flour as an aliment depends upon the quantity of *gluten*, *sugar*, *starch*, and *phosphate of lime*, which it contains; and its superiority over the flour of the grains of the other cereals, is referred to its containing a larger proportion of the first and last of these substances than they do. The *qualitative analysis of flour* is very simple, and may be easily made by persons unacquainted with chemistry, by attending to the instructions below:—

a. Make 1000 gr. of *the sample* into a dough with a *little water*, let it rest an hour, and then *gently* knead it in *successive waters*, until the starchy particles are perfectly removed. Collect the portion (GLUTEN) left in the hand, drain off the water, place it on a piece of filtering or blotting paper, several times doubled, and set it aside.

b. Mix the several waters employed in the preceding process, and set them aside in a tall vessel, to deposit the suspended portion (STARCH). After a sufficient time, pour off the clear liquid, and throw the *whole* of the sediment on a *weighed* paper filter, placed in a funnel, observing to remove the portion adhering to the bottom of the vessel by means of a little clean water, that none may be lost.

c. Evaporate the decanted liquid, as well as what runs from the filter, until it becomes *curdy*, then filter it through a piece of *weighed blotting paper*, and preserve the sediment (ALBUMEN); next evaporate the residuum to the consistence of a syrup, agitate it with 10 times its weight of *alcohol*, and filter, observing to wash the paper filter clean with a *little alcohol*, after the solution has passed through it. The substance on the paper is PHOSPHATE OF LIME and GUM, and must be set aside. By subsequent digestion in *water*, filtration, and evaporation, the two may be obtained separately.

d. Evaporate or distil off the spirit form the solution and washings as above; the residuum is SUGAR.

e. Dry the substances educed as above, by a *gentle* heat, and weigh them. The weight of the *albumen* may be taken with that of the *gluten,* as it possesses about the same nutritive value, and also because it has been asserted by some persons that the former substance is in reality gluten, and not albumen. By dividing the given weights by 10, the per centage value of the sample is obtained. The pieces of filtering paper employed should be carefully dried and weighed before using them, and the same degree of heat should be employed for this purpose as that to which they will be afterwards exposed in the drying of the substances resulting from the operations.

Obs. The above method of ascertaining the actual value of any sample of flour as an article of food, though not strictly accurate, approximates sufficiently to the truth for all practical purposes, and is well adapted to the wants of the baker and large purchaser. In many cases it will only be necessary to perform the first part of the process, (*a*,) which will give the *per centage* of the most important constituent of the flour; the rest being of minor consequence.

In addition to what has been already stated in the article on *Bread,* it may be useful to mention, that a pound of the *best flour,* from thoroughly dried wheat, will take 10 *fl. oz.* of *water* to form it into *ordinary dough,* or 9 *fl. oz.* to form it into *bread dough.* Under the *old parliamentary acts,* a sack of flour (280 *lb.*) was presumed to produce 80 loaves (*quartern* or *quarter-peck*), the weight of which, within 48 hours after being baked, was to be 4 *lb.* 5½ *oz.* each. At the *present time* fully 92 loaves, weighing 4 *lb.* each, are produced by the London bakers from one *sack of flour,* when honest weight is given; but as the latter is rarely the case, and the bread is frequently "slack" or "under-baked," and thus contains more water than good bread ought to do, a much larger product is commonly obtained. The *dough loses* about $\frac{1}{7}$th of its weight in *baking,* if in batches; but fully $\frac{1}{6}$th, if baked in small loaves and placed in the oven separately. The *best bread* contains about $\frac{11}{46}$ths of its weight of *added water;* and *common bread,* often *much more* than $\frac{1}{4}$th. The proportion of water in the *London bread* has greatly increased during the last few years, owing to the introduction of the fraudulent plan of making the dough with *rice jelly* or *moss jelly.* (See p. 162.) This is the reason why the bread of some bakers suffers such a loss of weight in a few hours after being taken from the oven. A 4 *lb.* loaf of bread purchased some short time since from a baker living within 100 miles of the Lower Marsh, Lambeth, after remaining on the sideboard of a sitting-room for 24 hours, was found to have lost no less than 6½ *oz.* by evaporation, and in two days longer, its interior cells were covered with green mould, and the whole was unfit for food. The bakers, aware of these facts, are particularly careful not to bake more bread than they can dispose of whilst "new," and are in the habit of refusing to weigh their bread before selling it, when it is more than 10 or 12 hours old, although they are liable to be "fined" for such a refusal.

FLOUR (Baked). Syn. *Farina tosta, F. tritici tosta. Prep.* From *wheat flour,* carefully baked in a "slack" oven, until it acquires a pale-buff hue. Astringent; used to make food for infants troubled with diarrhœa. See *Farinaceous Food.*

FLOUR (Barley,—Prepared). Syn. *Farina Hordei Preparata,*—Lat. *Prep.* (Ph. Bor.) From *barley flour,* compressed into a tin cylinder until the vessel is 2-3rds full, which is then suspended at the upper part of a still 2-3rds filled with *water,* and after the "head" is fitted on, the water is kept boiling for 30 hours (2 days of 15 hours each). Lastly, the upper layer being removed, the rest is reduced to powder, and kept in a dry place.

FLOUR (Boiled). Syn. *Triticina; Farina Preparata,*—Lat. *Prep.* From *fine flour,* tied up in a linen cloth as tight as possible, and after it has been frequently dipped into *cold water,* the outside of the cloth is dredged over with flour, until a crust is formed round it, to prevent the water soaking into it, whilst boiling; it is then boiled for a long time, and when cold, it is divided into small oblong pieces. For *use,* it is reduced to powder, either by grinding or grating it, and is then prepared like arrow-root. It forms a good diet for children, in diarrhœa, &c.; and as it may be easily prepared at home, it has the advantage of being free from adulteration.

FLOUR (Jones' Patent). *Prep.* From *kiln-dried flour,* 1 *cwt.*; *tartaric acid,* 10½ *oz.;* mix thoroughly; after 2 or 3 days, add of *bicarbonate of soda,* 12 *oz.; lump sugar,* ½ *lb.; common salt,* 1½ *lb.;* mix, and pass the compound through the "dressing machine." It is necessary that the whole of the ingredients should be *perfectly dry,* and separately reduced to fine powder before adding them to the flour. By simply mixing it with *cold water*, and at once baking it, it produces light porous bread.

Obs. We have already had occasion, more than once, to pay a passing tribute to the excellence and usefulness of *Jones' Patent Flour.* (See pp. 164, 185, &c.) It is, indeed, invaluable in every household, as furnishing the means of producing, with great economy, and extemporaneously, not merely *cakes*, *puddings*, *pastry*, and *fancy-bread*, but the staff of life itself, *household bread*, of a purity, flavour, and lightness, seldom, if ever, met with in that purchased of the bakers. We have long employed this flour exclusively in our kitchen, and therefore speak from experience, and not from hearsay, of its value. The economy of its use is evident, as it can only be made of the *finest kiln-dried* flour. If made with ordinary flour it will not keep. This accounts for it taking *more water* to make it into dough than the best flour purchased at the bakers; whilst it acts both as a safeguard against adulteration, and a guarantee of superior quality to the purchaser. Unfortunately, prejudice and ignorance, and still more, apathetic indifference to hygiene on the part of the public, together with the opposition of rival interests, has prevented the "patent flour" coming into such general use, as its merits deserve. Englishmen appear to prefer "*alumed bread*" and "*narcotized porter*," with headaches, dyspepsia, and antibilious pills, to *pure beer* and *pure bread*, with a clear head and a vigorous digestion.

The Editor of the Lancet has justly declared "*Jones' Patent Flour*" to be "the greatest invention of the age." To this we may add, that its exclusive use in this country would save to the nation no less a quantity than 2 millions of quarters of corn per year, which are now dissipated in carbonic acid gas, or lost through defective manipulation by the common process of making bread.

FLOUR (Sewell's Patent).—*a.* (No. 1.) *Flour*, 1 sack (280 *lb.*); *hydrochloric acid* (sp. gr. 1·14), 45 *oz.;* mix, by adding the acid in a "spray."—*b.* (No. 2.) To the last, add (expertly) *bicarbonate of soda*, 39 *oz.;* mix thoroughly, and pass the whole through a sieve or "dressing machine."

Obs. This flour is used as the last, to which, however, it is inferior in quality. No. 1, will keep 5 weeks. No. 2, will keep a month. (*Jones' flour* will keep good in a *dry place* for years.) If No. 1 is alone employed for the dough, to each pound of the flour, 63 gr. of *bicarbonate of soda*, with *salt*, q. s., must be added. The patentee claims for his invention the merit of the *soda* and *acid* being converted into *culinary salt* in the process of mixing up the flour and baking the dough. See *Bread* (Unfermented).

FLOWERS. Syn. *Flores*,—Lat. These beautiful and fragrant ornaments of our gardens, and our dwellings, are too highly esteemed by all classes of the community to require anything in favour of their cultivation to be said here. Our remarks will, therefore, chiefly refer to their collection, improvement, and preservation.

"*Full*" or "*Double flowers*," or those in which the internal organs become petals, are so much more beautiful than the "*single flowers*" of the corresponding species and varieties, that their production, with tolerable ease and certainty, has long been a desideratum with both the professional and amateur florist. Various plans have been proposed having this object in view, among which are the following:—1. The use of the *best seed only*, but not before it is *at least* 3 or 4 *years old.*—2. The selection of the *outer row of seed* only, and its careful *preservation intact* for *at least* 2 *seasons before sowing it.* We are assured that this method is particularly successful with dahlias.—3. The *removal* of the plants to a *shady situation* as soon as the flower-buds begin to develope themselves, and stinting them with water and nourishment for a few weeks. In this method a few only of the buds are permitted to mature; the rest being snipped off with a pair of scissors as early as possible.—4. The use of *small pots* and a *scanty supply of water* until the flowers are partly developed, when *water* is supplied in abundance, with or without the addition of a little *liquid* manure.

To *hasten* the "*blooming*" *of flowers* it is a common practice with the gardeners to grow them in as *small pots* as is *consistent with their healthy existence*, and carefully to avoid transplanting them to larger pots, for several weeks before their usual time of blossoming. A plant on the point of flowering, if transferred to a larger pot and a richer soil, immediately commences making roots and leaves, whilst the embryo flowers either wholly decay, or their development is checked until the usual season of their production has passed over.

The *following liquid* has been used with great advantage to promote the *vigorous growth* and the *early flowering* of plants:—*Sulphate* or *nitrate of ammonia*, 4 *oz.; nitrate of potassa*, 2 *oz.; sugar*, 1 *oz.; hot water*, 1 pint; dissolve and keep it in a well-corked bottle. *For use,* put 8 or 10 drops of this liquid into the water of a hyacinth glass or jar, for *bulbous-rooted plants,* changing the water every 10 or 12 days. For *flowering plants* in *pots,* a few drops must be added to the water employed for them. The preference should be given to *rain water* for this purpose. A similar fluid is sold by Mr. Potter, under the name of "*liquid guano.*"

Flowers may be *preserved* in a *fresh state* for a considerable time, by keeping them in a *moist atmosphere.* When growing on the parent stem, the large amount of evaporation from the surface of their leaves, is compensated for by an equivalent proportion of moisture supplied by the roots; but when they are plucked, the evaporation from the surface continues, while the supply of moisture is cut off. To supply, in part, this loss of moisture by evaporation, has arisen the almost universal practice of placing flowers in water; but their mutilated stems possess a far inferior power of sucking up fluids to that of the roots, and thus their decay is only deferred for a time. To preserve them more effectually, or at least to render their existence less ephemeral, we may surround them with a moist atmosphere, by which the loss of water from the surface of their leaves will be reduced to the smallest possible amount. "It is now eighteen years ago since we first saw, in the drawing-room of a gentleman, in the hot dry weather of the dog-days, flowers preserved day after day in all their freshness by the following simple contrivance:—A *flat dish of porcelain* had *water* poured into it. In the water a *vase of flowers* was set; over the whole a *bell-glass* was placed, with its rim in the water. This was a '*Ward's case*' in principle, although different in its construction. The air that surrounded the flowers being confined beneath the bell-glass, was kept constantly moist with the water that rose into it in the form of vapour. As fast as the water was condensed it ran down the sides of the bell-glass back into the dish; and if means had been taken to inclose the water on the outside of the bell-glass, so as to prevent its evaporating into the air of the sitting-room, the atmosphere around the flowers would have remained continually damp. We recommend those who love to see plenty of fresh flowers in their sitting-rooms in dry weather to adopt this method. The experiment can be tried by inserting a *tumbler* over a *rose-bud* in a *saucer of water.*" (Gardener's Chron.)

Another method by which some flowers may be preserved for many months, is to carefully dip them, as soon as gathered, in perfectly limpid *gum water,* and after allowing them to drain for 2 or 3 minutes, to set them upright, or arrange them in the usual manner in an empty vase. The gum gradually forms a transparent coating on the surface of the petals and stems, and preserves their figure and colour long after they have become dry and crisp.

Faded flowers may be generally more or less *restored* by immersing them half-way up their stems in *very hot water,* and allowing them to remain in it until it cools, or they have recovered. The "*coddled*" portion of the stems must then be cut off, and the flowers placed in *clean cold water.* In this way a great number of faded flowers may be restored, but there are some of the more fugacious kinds, on which it proves useless.

Flowers may be *produced in winter* by taking up the plants, trees, or shrubs in the spring, at the time when they are about to bud, with some of their own soil carefully preserved around the roots, and placing them upright in a cellar till Michaelmas; when, with the addition of *fresh earth,* they are to be put into proper tubs or vessels, and placed in a stove or hot-house, when they must be treated in the usual manner. By this method, in the month of February, *fruits* or *roses* will appear. *Flowers* sown in pots about *Michaelmas,* may thus be made to bloom at *Christmas.*

The apparently *instantaneous flowering of plants,* lately exhibited by M. Herbert to an astonished audience, is, we believe, effected by the heat generated by *fragments of quicklime* concealed in the mould close to, but not in immediate contact with, the roots. The plants selected by M. Herbert, —a *group of geraniums* and a *rose tree*—were planted in two rather deep boxes of garden mould, and were covered with glass shades. The operator commenced by pouring over the roots, from a small watering-pot, a liquid which, uniting to the ingredients already in the earth, caused a great heat, as was shown by an intense steam or vapour, which was evolved within the shades, and allowed, to some extent, to escape through a small hole in the top, which at first was kept closed. The effect upon the geraniums was certainly almost instantaneous: the buds beginning to burst in about five or six minutes, and the plants being in full bloom within ten minutes, when the blossoms were gathered by M. Herbert, and distributed amongst the ladies present. With the rose tree the exhibitor was less fortunate. The invention may prove useful where ladies require to decorate their drawing-rooms or boudoirs with the beauties of the floral world somewhat earlier in the season than they can otherwise be obtained. It must not, however, be forgotten that the plants are, as it were, parboiled during the process, and die after a few days.

The *collection* and *preservation of flowers* for *medicinal purposes* and *distillation*, will be found noticed under *Vegetable Substances.*

FLOWERS (Artificial). The beauty and value of these pleasing articles of personal decoration mainly depend upon the taste and ingenuity of the maker. The delicate fingers of woman and her ready powers of imitation and invention, combined with her natural affection for the chaste and beautiful, have enabled her the more especially to excel in this manufacture. The productions of the female artificial florists of the French capital, are justly admired everywhere.

The French employ *velvet*, *kid*, and *fine cambric* for the *petals*, and *taffeta* for the *leaves*. Very recently *thin plates* of *bleached whalebone* have been used with great success for some portions of artificial flowers.

As *colours and stains*, the following are employed in Paris:—

Blue. Indigo dissolved in oil of vitriol, and the acid partly neutralized with salt of tartar or whiting.

Green. A solution of distilled verdigris.

Lilac. Liquid archil.

Red. Carmine dissolved in a solution of salt of tartar, or in spirits of hartshorn.

Violet. Liquid archil, mixed with a little salt of tartar.

Yellow. Tincture of turmeric.

The above colours are usually applied to the petals with the finger.

FLOWERS. Syn. *Flores,*—Lat. Among *Chemists* this term is applied to various pulverulent or flower-like substances obtained by sublimation, as *flowers of antimony, benzoin, zinc, sulphur, &c.* The term has been discarded from modern chemical nomenclature, but is still commonly employed in familiar language and trade.

FLOWERS (Candied). See *Candies.*

FLUATES. See *Fluorides.*

FLUID CAMPHOR (Sir J. Murray's). *Prep.* From *camphor* (in powder), 1 dr.; *freshly precipitated carbonate of magnesia,* 2 dr.; *cold distilled water*, 1 pint; the solution is effected by forcing in *carbonic acid gas* under pressure. Each *fl. oz.* contains 3 gr. of *camphor,* and 6 gr. of *carbonate of magnesia.* See *Essence of Camphor.*

FLUID EXTRACTS. See *Essences, Extracts*, and *Liquors.*

FLUID MAGNESIA. Syn. *Liquor Magnesiæ Carbonatis, L. M. Bicarbonatis, &c.* The preparations sold under this name are mere solutions of *freshly precipitated carbonate of magnesia* in *water*, by means of *carbonic acid gas*, under powerful pressure, and long agitation. Those best known are *Sir J. Murray's* and *Mr. Dinneford's*, each *fl. oz.* of which are *said* to contain about 17½ gr. of the carbonate, but their actual richness in the latter seldom exceeds 10 or 12 gr., and by the time they reach the consumer, is often as low as 5 or 6 gr. *Recently precipitated carbonate of magnesia* placed in a *bottle* or *other suitable vessel,* which is then filled by means of a *soda-water apparatus* with *water fully charged with carbonic acid gas,* readily dissolves on slight and cautious agitation, and the *aerated water* becomes *saturated* with magnesia. A scruple of carbonate of magnesia put into a soda-water bottle, and thus treated, is all taken up in from 20 minutes to half an hour, and the beverage continues beautifully clear.

FLUIDS (Antiseptic). See *Putrefaction.*

FLUIDS (Disinfecting). See *Disinfecting Compounds.*

FLUIDS (Etching). See *Etching.*

FLUMMERY. A species of thick hasty-pudding, made with oatmeal or rice, flavoured with milk, cream, almonds, orange flowers, lemons, &c., according to fancy.

Prep. 1. (*Dutch Flummery.*) From *blancmange* and *eggs*, flavoured with *lemon peel* and *sweetened* with *sugar.*

2. (*French Flummery.*) From equal parts of *blanc-mange* and *cream*, *sweetened*, and *flavoured.* The above are poured into forms, and served *cold*, to eat with wine, spirit, cider, &c.

3. (A. T. Thomson.) Take *oatmeal* or *groats*, 1 quart; rub it for a considerable time with *hot water*, 2 quarts; and let the mixture stand until it becomes sour; then add *another quart of hot water*, and strain through a hair sieve. Let stand till a white sediment is deposited, decant the fluid portion, and wash the sediment with cold water. This is now to be boiled with *fresh water*, until it forms a mucilage, stirring the whole time. A light and nutritious food, during early convalescence.

FLUOBORATES. Syn. *Fluoborides*

Borofluorides, Hydrofluoborates. Compounds of fluoboric acid with the salifiable bases. (See *below.*)

FLUOBORIC ACID. Syn. *Terfluoride of Boron.* A peculiar gaseous compound of fluorine and boron, discovered by Gay-Lussac and Thénard.

Prep. A mixture of *vitrified boracic acid,* 1 part; *fluor spar,* 2 parts; and *oil of vitriol,* 12 parts; is exposed to heat in a leaden retort. The gas evolved is collected in glass jars standing over mercury.

Prop., &c. Colourless; transparent; very heavy; fumes in the air; rapidly absorbed by water, forming *liquid fluoboric acid* (Gay-Lussac, Thénard, Dr. Davy), or *borohydrofluoric acid* (Berzelius). It does not attack glass, but rapidly destroys organic substances. Water absorbs fully 700 times its volume of this gas. (Davy.) See *Borofluorides.*

FLUORIC ACID. See *Hydrofluoric Acid.*

FLUORIDES. See *Fluorine.*

FLUORINE. Syn. *Fluorinium,*—Lat. The electro-negative element of *hydrofluoric acid* and the *fluorides.* This substance, though long known in combination, has only been lately obtained in a separate state. The honour of having first obtained it in an isolated form is due to Baudrimont, who procured it by passing *fluoride of boron* over *minium* heated to redness, and receiving the gas in a dry vessel. As thus obtained, it is not *absolutely* pure, being contaminated with small quantities of hydrofluoric and silico-fluoric acids. It has a yellowish colour, and an odour between that of chlorine and burnt sugar. In this state it does not act on glass, but combines directly with gold. With *hydrogen* it forms *hydrofluoric acid,* and with the metals *fluorides.* The well-known mineral, *fluor-spar,* is a fluoride of calcium.

FLUOSILICIC ACID. See *Hydrofluosilicic Acid.*

FLUOTITANIC ACID. See *Titanium.*

FLUX. Syn. *Fluxus, Fluor,*—Lat. A term formerly applied to several diseases attended with a copious discharge, as diarrhœa (*flux*), dysentery (*bloody flux*), English cholera (*bilious flux*), fluor albus (*white flux*), &c. These terms are still current among the vulgar.

FLUX. Syn. (See *above*). A term applied to various substances of easy fusibility, which are added to others which are more refractory, to promote their fusion. The principal fluxes are the following:—

Prep. 1. (Black Flux.) *Nitre,* 1 part; *crude tartar* or *cream of tartar,* 2 parts; mix, and deflagrate, by small quantities at a time, in a crucible, heated to dull redness. The *product* consists of carbonate of potassa, mixed with charcoal in a finely-divided state. *Used* for smelting metallic ores. It exercises a reducing action, as well as promotes the fusion. It must be kept in a dry corked-bottle.

2. (Christison's Flux.) *Carbonate of soda* (cryst), 8 parts; *charcoal* (in fine powder), 1 part; heat the mixture gradually to redness. For reducing arsenic.

3. (Cornish Reducing Flux.) *Crude tartar,* 10 parts; *nitre,* 4 parts; *borax,* 3 parts; triturate together.

4. (Cornish Refining Flux; White Flux.) *Crude tartar* and *nitre,* equal parts; deflagrated together. See *Black Flux.*

5. (Crude Flux.) Same as *black flux,* omitting the deflagration. Reducing.

6. (Fresenius' Flux.) *Carbonate of potassa* (dry), 3 parts; *cyanide of potassium,* 1 part. For the arsenical compounds.

7. (Liebig's Flux.) *Carbonate of soda* (dry), and *cyanide of potassium,* equal parts. As the last. See *Arsenious Acid,* (p. 91.)

8. (Morveau's Reducing Flux.) *Powdered glass* (free from lead), 8 parts; *calcined borax* and *charcoal,* of each, 1 part; all in fine powder, and triturated well together. *Used* as *black flux.*

9. (Lewis Thompson.) See *Copper* (Estim.), p. 288.

10. (White Flux.) See *above.*

11. (Fluxes for Enamels.) See *Enamels.*

12. (Various.) *Borax, tartar, nitre, sal ammoniac, common salt, limestone, glass, fluor spar,* and several other substances, are used as *fluxes* in *metallurgy.*

Obs. On the *large scale* crude tartar is employed in the preparation of fluxes; on the *small scale,* commercial cream of tartar or bitartrate of potassa.

FLY. See *Flies* and *Cantharides.*

FLY PAPERS. See *Birdlime* (Factitious).

FLY POISON. *Prep.* 1. A strong *solution* of *white arsenic* (say 1 *dr.* to the *pint*), sweetened with *moist sugar, treacle,* or *honey.* Sold under the name of "*Fly Water.*"

2. *Treacle, honey,* or *moist sugar,* mixed with about $\frac{1}{12}$th their weight of *King's yellow* or *orpiment.* Both the above are *dangerous preparations,* and should never be employed where there are children.

3. (Redwood.) *Quassia chips* (small), $\frac{1}{4}$ *oz.; water,* 1 pint; boil 10 minutes, strain, and add of *treacle,* 4 *oz.* "Flies will drink this with avidity, and are soon destroyed by it." See *Flies, &c.*

FLY POWDER. The dark gray-coloured

powder (*oxide*) obtained by the free exposure of *metallic arsenic* to the *air*. Mixed with *sweets* it is used to kill flies.

FLY WATER. See *above*.

FOILS. These are thin leaves of polished metal, placed under precious stones and pastes, to heighten their brilliancy, or to vary the effect. Foils were formerly made of *copper*, *tinned copper*, *tin*, and *silvered copper*, but the last is the one wholly used for superior work at the present day.

Foils are of two descriptions,—*white*, for diamonds and mock diamonds, and —*coloured*, for the coloured gems. The *latter* are prepared by varnishing or lacquering the *former*. By their judicious use the colour of a stone may be often modified and improved. Thus, by placing a *yellow foil* under a *green stone* that turns too much on the blue, or a *red one* under a stone turning too much on the *crimson*, the hues will be brightened and enriched in proportion.

Prep. 1. *Crystal*, *Diamond*, or *White Foil.* —*a.* This is made by coating a *plate of copper* with a *layer of silver*, and then rolling it into sheets in the flatting mill. The foil is then highly polished, or covered with crystal varnish.

b. The inside of the socket in which the stone or paste is to be set, is covered with *tin foil*, by means of a little stiff gum or size; when dry, the surface is polished and the socket heated, and whilst it is warm, filled with *quicksilver;* after repose for two or three minutes, the fluid metal is poured out, and the stone gently fitted in its place; lastly, the work is well-fitted round the stone, to prevent the alloy being shaken out.

c. The bottom of the stone is coated with a *film* of *real silver*, by *precipitating* it from a solution of the *nitrate* in *spirit of ammonia*, by means of the *oils of cassia* and *cloves.* (See *Silvering.*) This method vastly increases the brilliancy both of real and factitious gems, and the work is very permanent.

2. *Coloured Foils.* The following formulæ produce beautiful coloured effects, when judiciously employed:—

a. (Amethyst.) *Lake* and *prussian blue*, finely ground in *pale drying oil.*

b. (Blue.) *Prussian blue* (preferably *Turnbull's*), ground with *pale, quick-drying oil.* Used to deepen the colour of *sapphires.*

c. (Eagle marine.) *Verdigris* tempered in *shell-lac varnish* (alcoholic), with a little *prussian blue.*

d. (Garnet.) *Dragon's blood* dissolved in *rectified spirit of wine.*

e. (Vinegar garnet.). *Orange lake* finely tempered with *shell-lac varnish.*

f. (Green.) — *α.* From *pale shell-lac*, dissolved in *alcohol* (lacquer), and tinged green by dissolving *verdigris* or *acetate of copper* in it.

β. From *sesquiferrocyanide of iron* and *bichromate of potassa*, of each, ½ *oz.;* ground to an impalpable powder, first alone, and then with *gum mastic* (clean and also in fine powder), 2 *oz.;* a little *pyroxilic spirit* is next added, gradually, and the whole again ground until the mass becomes homogeneous and of a fine transparent green. The beauty increases with the length of the grinding. The predominance of the bichromate turns it on the yellowish green; that of the salt of iron, on the bluish green. For use it is to be thinned with pyroxilic spirit. (Chem., iii, 238.) *Used* for *emeralds.*

g. (Red.) *Carmine*, dissolved in *spirit of hartshorn*, or in a *weak solution* of *salt of tartar*, and a little *gum* (dissolved) added.

h. (Ruby.)—*α.* From *lake* or *carmine*, ground in *isinglass.*

β. *Lake* ground in *shell-lac varnish.* Both are used when the colour turns on the *purple.*

γ. From *bright lake* ground in *oil. Used* when the colour turns on the *scarlet* or *orange.*

i. (Yellow.)—*α.* Various shades of yellow may be produced by tinging a *weak alcoholic solution* of *shell-lac* or *mastic*, by digesting *turmeric*, *annatto*, *saffron*, or *socotrine aloes* in it. The former is the brightest and is used for *topazes.*

β. From *hay saffron* digested in 5 or 6 times its weight of *boiling water* until the latter becomes sufficiently coloured, and a little *solution of gum* or *isinglass* added to the filtered liquor. When dry, a coating of spirit varnish is applied.

Obs. By the skilful use of the above varnishes, good imitations of the gems may be cheaply made from transparent white glass or paste, and by applying them to foils set under coloured pastes (*factitious gems*), a superior effect may be produced. The pigments employed must be reduced to the *finest state possible* by *patient grinding*, as without this precaution, transparent and beautiful shades cannot be formed. The *palest* and *cleanest mastic* and *lac*, dissolved in *alcohol*, and also the *palest* and *quickest drying oil*, should alone be used when these substances are ordered. In *every case* the colour must be laid on the foil with a *broad soft brush;* and the operation should be performed, if possible, *at once*, as no part should be *crossed*, or *twice* gone over whilst wet. If the colour turns out too pale, a second coat may be given when the first one has become *quite* dry, but this practice should be avoided, if possible.

FOMENTATION. Syn. *Fomentatio*, *Fomentum*, *Fotus*,—Lat. A liquid, either simple or medicated, used for local bathing. *Fomentations* are distinguished from *lotions*, chiefly, in being applied in a heated state, and in larger quantities, and for a longer period at a time.

Fomentations are chiefly *employed* to allay pain or irritation, or to promote suppuration or the healthy action of the parts. As the intention is to convey heat, combined with moisture, to the part fomented, the utmost care must be taken to manage the application so as to promote the object in view as much as possible. *Flannel cloths*, wrung out of the hot or boiling liquid, by means of two sticks turned in opposite directions, form the best vehicles for fomentations. If they are shaken up, and laid lightly over the part, they involve a considerable quantity of air, which, being a bad conductor, retains the heat in them for a considerable time. "In every process of fomenting, there should be two flannels, each (say) three yards long, with the ends sewed together, to admit of the boiling water being wrung out of them; and the one flannel should be got ready whilst the other is applied. The fineness or the coarseness of the flannel is not a matter of indifference. The coarser it is, the less readily does it conduct heat, and the longer it retains its warmth; therefore, it is more efficient for fomenting. *White flannel* also retains the heat *longer* than *coloured flannel*." (Dr. R. E. Griffith.) More harm than good is frequently done by allowing the patient to become *chilled* during the application. "If only *one* (flannel) is used, the skin becomes chilled during the time occupied in removing the flannel, soaking it in the water, wringing it out, and re-applying it; but if two are used, one of them is ready, and can be applied the moment the other is taken off, by which means the part is never exposed to the air, no matter how long the fomentation is continued. In some diseases, (*rheumatism*, *peritonitis*, *&c.*), the patient is scarcely conscious of a degree of heat which scalds the nurse's hands. In this case, the fomenting flannels should be put into a towel, by which means they may be wrung out without being handled by the nurse, and may be applied far hotter than can be done by any other method." (Dr. J. B. Nevins.)

The *quantity of liquid* forming a *fomentation*, as well as the size of the cloths employed, must entirely depend upon circumstances. In some cases, (as in slight affections of the face, &c.,) the application may be effectually made by holding the part in the steam of the hot liquid, and bathing it continually by means of a sponge or cloth. In some instances, ½ pint to a pint of liquid may be found a sufficient quantity; whilst in others, several quarts will be required. Under all circumstances, care must be taken to keep the fomentation as near as possible at the temperature ordered, during the whole time of its application; and, as soon as the operation is finished, to quickly wipe the part dry, and to cover it with ample clothing, in order that the reaction set up may not be prematurely checked.

Fomentations usually *consist of* simple water, or the decoction of some simple vegetable substance, as *chamomiles*, *elder-flowers*, or *mallows;* but, occasionally, the leaves and flowers of *aromatic* and *narcotic plants*, and *saline matter* are employed under this form. The following formulæ are given as examples:—

FOMENTATION (Anodyne). Syn. *Fotus Anodynus*, *Fomentatio Anodyna*, *Fomentum Anodynum*,—Lat. *Prep.* 1. Simple *decoction of poppy-heads.*

2. (Hosp. F.) *Poppy-heads* (without the seeds), 1½ *oz.; water*, 3½ pints; boil to 2½ pints; add of *elder flowers*, ¾ oz.; boil to a quart, and strain. *Used* to allay pain.

3. (Pierquin.) *Opium*, 1 *oz.; wine*, 1 quart; boil to a pint and strain. *Used* in severe gouty, rheumatic, and syphilitic pains.

4. *Opium*, 1 *oz.; water*, 1 quart; boil to ¾ pint, add *pyroligneous acid*, 2 *fl. oz.;* boil for 10 minutes longer, then further add of *sherry wine*, ¾ pint; and as soon as the whole again boils, strain it for *use*. Superior to the last, and cheaper.

5. (Trousseau and Reveil.) *Cyanide of potassium*, 1 dr.; *distilled water*, 6 fl. oz.; dissolve and keep it in a well-closed bottle in the dark. *Used* in neuralgia, especially in that of the face (*tic douloureux*). A compress of lint or soft linen is dipped in it and applied to the part. It must not be used internally or applied to a wounded surface, as it is very *poisonous*.

FOMENTATION (Antineuralgic). Syn. *Fomentatio Antineuralgica*,—Lat. *Prep.* 1. (Mialhe.) *Acetate of morphia*, 2 gr.; *acetic* *acid,* 2 or 3 drops; *eau de Cologne,* 2 or 3 dr.; dissolve. In facial neuralgia.

2. See *Anodyne Fomentations,* Nos. 3, 4, and 5, (*above.*)

FOMENTATION (Antiseptic). Syn. *Fomentatio Antiseptica,*—Lat. *Prep.* 1. *Decoction of mallows,* 4 pints; *sal ammoniac, 2 oz.;* dissolve, and add of *disulphate of quinine,* 20 gr., dissolved in *camphorated spirit, 4 fl. oz.*

2. (Hosp. F.) *Decoction of bark,* 1 quart; *infusion of chamomile,* 1 pint; *camphorated spirit,* 2 fl. oz.; *hydrochloric acid,* 1 fl. dr. Both are used when there is a tendency to gangrene or putrescence.

FOMENTATION (Arnica). Syn. *Fomentatio Arnicæ,*—Lat. *Prep.* 1. *Flowers of arnica,* 1 oz.; *water,* 3 pints; boil to a quart, and strain. *Used* in contusions.

2. (Graefe.) *Flowers of arnica,* 2 oz.; *rue* (leaves), 1 oz.; *boiling water,* q. s. to strain 12 fl. oz. of infusion after an hour's maceration at nearly the boiling temperature. *Used* in contusions and extravasations, especially as an application to *black eyes.*

3. (Radius.) *Flowers of arnica,* ½ oz.; *boiling vinegar,* q. s. to strain 6 fl. oz. of *infusion,* in which dissolve of *carbonate of ammonia,* 2 dr. *Used* in œdema of the scrotum.

FOMENTATION (Aromatic). Syn. *Fomentatio Aromatica, Fotus Aromaticus,*—Lat. *Prep.* 1. *Sea wormwood, southernwood,* and *chamomiles,* of each, 1 oz.; *laurel leaves,* ½ oz.; *water,* 5 pints; boil to ½ gall., and strain. In rheumatism, cutaneous affections, colic, &c.

2. (Augustin.) *Rosemary,* ½ oz.; *red wine* and *water,* of each, 3 fl. oz.; infuse and strain with expression. In contusions, especially *black eyes.*

3. (Hosp. F.) *Cloves* and *mace,* of each, 1 oz.; *opium,* 20 gr.; *red wine* (boiling), 1 pint; digest at near boiling for 1 hour, and strain. *Used* as both the last.

4. (Rideau.) *Bay leaves, rosemary, southernwood,* and *wormwood,* of each, 1 oz.; *water,* 2 quarts; boil 5 minutes and strain. As No. 1.

FOMENTATION (Astringent). Syn. *Fotus Astringens, F. Roborans,*—Lat. *Prep.* 1. *Decoction of oak bark.*

2. To each quart of the last, add of *alum,* 1 dr.

3. (Ph. Chirur.) *Bruised galls,* 1 oz.; *boiling water,* 2½ pints; digest 1 hour, and strain.

4. (Ricord.) *Tannin,* 2½ dr.; *aromatic wine* (hot), ½ pint; dissolve.

5. *Bistort* and *pomegranate peel,* of each, 2 oz.; *sal ammoniac,* ¼ oz.; red wine 1 pint; infuse at a gentle heat. The above are *used* in hemorrhages, piles, prolapsus, &c.

FOMENTATION (Chamomile). Syn. *Fomentatio Anthemidis,*—Lat. *Prep. Chamomiles,* 2 oz.; *water,* 3 pints; boil 10 minutes, and strain with expression. Emollient.

FOMENTATION (Common). Syn. *Fotus Communis,*—Ph. 1746. Same as *aromatic fomentation,* No. 1, (above.) Emollient.

FOMENTATION (Diuretic). Syn. *Fomentatio Diuretica,*—Lat. *Prep.* (Trousseau.) *Tinctures of squills* and *foxglove,* of each, 2 oz.; *hot water, 6 fl. oz.;* mix. Applied by lint or linen compresses to the insides of the thighs, in dropsies, when the stomach will not bear diuretics.

FOMENTATION (Elder Flowers). Syn. *Fotus Sambuci,*—Lat. *Prep.* From *elder flowers,* 1 *oz.; boiling water,* 2 quarts; digest in a hot place for 1 hour, and express the liquor. Emollient.

FOMENTATION (Emollient). Syn. *Fomentatio Emolliens,*—Lat. *Prep.* 1. *Marshmallow root* and *poppy-heads,* of each, 1 oz.; *water,* 3 pints; boil to a quart, and strain.

2. (P. Cod.) *Emollient herbs,* 1 oz.; *boiling water,* 1 quart; infuse 1 hour, and strain with expression. (See *above.*)

FOMENTATION (Narcotic). Syn. *Fomentatio Narcotica,*—Lat. *Prep.* (P. Cod.) *Narcotic herbs,* 1 oz.; *boiling water,* 1½ pint; infuse as last.

FOMENTATION (Resolvent.) Syn. *Fotus Resolvens,*—Lat. *Prep.* (Richard) *Fomentation of elder flowers,* 8 fl. oz.; *liquor of diacetate of lead,* ½ fl. dr.; mix. *Used* to discuss tumours, &c.

FOMENTATION (Stimulant). Syn. *Fomentatio Stimulans,*—Lat. *Prep.* 1. *Sesquicarbonate of ammonia,* 1 oz.; *tincture of cantharides,* 2 fl. oz.; *warm water,* 1 pint.

2. *Household mustard,* 4 *oz.; hot water,* 1½ pint; mix. Both the above are rubefacient and counter-irritant, and excellent in rheumatism, neuralgia, &c.

FOMENTATION (Vermifuge). Syn. *Fomentatio Vermifuga, Fotus Anthelminticus,*—Lat. *Prep. Leaves* and *flowers of tansy, wormwood,* and *chamomile,* of each, 3 oz.; *water,* 1 quart; boil to 1½ pint, and strain. Applied to the abdomen, &c., in worms.

FOOD. Syn. *Cibus, Materia Alimentaria,*—Lat. Anything which feeds or promotes the natural growth of organic bodies, by supplying them with materials which, by assimilation, may be converted into the substances of which they are composed; or which, by their decomposition or slow combustion, maintain the temperature, or some other essential condition of life, at the proper standard. The numerous articles employed as food are all compounds; and in many cases they consist of mechanical mixtures or chemical combinations of two or more compounds. Organized matter, or that which has possessed either animal or vegetable life, or which has been produced by living organs, seems to be alone capable of assimilation, to any extent, by the animal system; and hence it is from the organic kingdom that our aliments (commonly so called) are necessarily derived. Water, iron, earthy phosphates, chloride of sodium, and other salts which form the inorganic constituents of the body, though not of themselves nourishing, are also assimilated when taken in conjunction with organic aliments, and then contribute essentially to nutrition. In the animal and vegetable substances employed as food, these inorganic compounds are provided in small, but sufficient quantities to meet the requirements of the healthy body; and in this state of combination alone can they be regarded in the light of aliments. With respect to water, it is a question with some persons, whether it may not undergo decomposition in the body, and be made directly subservient to the nutrition of the solid parts. Our present knowledge, however, does not afford any evidence in support of this opinion. A complete consideration of this subject embraces not only all the substances used as food, but also those things which when taken with them improve their flavour, promote their digestion, and render them more wholesome and nutritive; and also their preparation for the table in its various relations with health and disease. See *Nutrition*, *Putrefaction*, *Respiration*, *&c.*

FOOD (Farinaceous). See *Farina*, *&c.*

FOOD (of the Gods). See *Assafœtida.*

FOOLS. Cooks give this name to a species of jam made of boiled and crushed fruit, mixed with milk or cream, and sweetened.

Apple Fool. From the *peeled* and *cored fruit*, placed in a jar, with *moist sugar*, q. s. to render it palatable, and a very little *cider* or *perry;* the jar is set in a saucepan of water over the fire, and the heat continued until the apples become *quite soft*, when they are pulped through a colander, and a sufficient quantity of *milk*, a little *cream*, and some *sugar* added to bring them to the proper "palate."

Gooseberry Fool. From *gooseberries*, as the last. Those which are unripe are generally preferred. These preparations, when nicely made, are very pleasant and wholesome. Even now, we look back with envy to our boyish days, when we luxuriated over slices of "home-baked," surmounted with huge piles of *gooseberry* or *apple fool*, which commonly formed our dinner 4 or 5 days a week during the fruit season.

FOOT (Human). See *Feet* (The).

FOOTS. Coarse moist sugar. The scrapings of the sugar hogsheads, refuse sugar, waste, and dirt, is also sold to the publicans under this name, who use it in the adulteration of their beer; chiefly to make it stand more water, and to impart "briskness."

FORCEMEAT. Syn. *Farce*, *Stuffing.* A species of sausage meat, either served up alone, or employed as an ingredient in other dishes.

Mrs. Rundell truly remarks that "at many tables, where everything else is done well, it is common to find very bad forcemeat or stuffing." To avoid this error care should be taken to so proportion the ingredients that "no *one* flavour should predominate; yet if several dishes be served the same day, there should be a marked variety in the tastes of the forcemeats, as well as of the gravies. A general fault is, that the tastes of *lemon-peel* and *thyme* overcome all others; therefore they should only be used in small quantities." Forcemeats should be just consistent enough to cut with a knife, but not dry and heavy. Herbs are very essential ingredients; and it is the copious and judicious use of them that chiefly gives the cookery of the French its superior flavour. "To *force* fowls, meat, &c., is to stuff them." (Mrs. Rundell.)

FORCING. Horticulturalists apply this term to the art of accelerating the growth of plants, so as to obtain fruits or flowers at unusual seasons. *Dung-beds*, *bark-beds*, and *frames*, *pits*, and *houses*, with *glass roofs*, are commonly employed by the gardeners for this purpose.

FORMIATE. Syn. *Formate*, *Formias*, —Lat. The salts of formic acid. The *formiates* are readily obtained, either by direct saturation of the acid, or by double decomposition; most of them are very soluble, and are decomposed by hot oil of vitriol. *Formiate of ammonia* crystallizes in square prisms; *formiate of soda*, in rhombic prisms; *formiate of potassa* is deliquescent and crystallizes with difficulty; the *formiates of baryta*, *lime*, *magnesia*, and *strontia*, form small prismatic crystals; *formiate of lead* assumes the shape of small colourless needles, soluble in 40 parts of water; the *formiates of cobalt*, *iron*, *man-*

ganese, *nickel*, and *zinc* are easily crystallizable, whilst that of copper forms very beautiful, large, bright-blue rhombic prisms; *formiate of silver* is less soluble than the salt of lead, and is decomposed at a gentle heat. See *Formic Acid.*

FORMIC ACID. Syn. *Acid of Ants; Acidum Formicum*,—Lat. The sour liquid ejected by ants when irritated. It was formerly solely prepared from these insects by distilling them along with water. It was discovered by Gehlen, but was first obtained artificially by Doebereiner.

Prep. 1. *Sugar*, 1 part; *water*, 2 parts; *binoxide of manganese*, 3 parts; mix in a retort capable of holding fully 10 times the bulk of the ingredients, and add, cautiously, *oil of vitriol*, 3 parts, diluted with an equal weight of *water;* as soon as the first violent effervescence has subsided, heat may be applied, and the product collected and purified, as *below.*

2. (Doebereiner,) *Tartaric acid*, 2 parts; *peroxide of manganese* and *concentrated sulphuric acid*, of each, 3 parts; *water*, 5 parts; distil in a capacious retort into a well-cooled receiver.

3. (Fownes.) From *dry oxalic acid* and *silicious sand*, equal parts, distilled together. The *product* is scanty, but very strong, and contains a little oxalic acid.

4. (Liebig.) *Starch*, 1 part; *peroxide of manganese* (in fine powder), 4 parts; *water*, 4 parts; mix in an alembic or retort, as before, heat to 104° Fahr., and add, by degrees, *oil of vitriol*, 4 parts; after the frothing is over, apply heat and distil off 4½ parts of liquid.

5. (Liebig.) *Formiate of lead* in fine powder is introduced into a *long glass tube*, one end of which is connected with an apparatus evolving *sulphuretted hydrogen*, and the other, with a receiver. As soon as the salt is entirely decomposed (*blackened*) *a very gentle* heat is applied, and the distilled liquid collected; the product is, lastly, boiled for a minute or less, to expel any adhering sulphuretted gas. This furnishes *chemically pure hydrated formic acid*, containing 1 atom, or 20$^{0}_{0}$ of *water.*

6. (Liebig.) *Dry formiate of lead*, 18 parts; *oil of vitriol*, 6 parts; *water*, 1 part; distil in a *chloride of calcium* bath. This hydrate contains 2 atoms, or 40$^{0}_{0}$ of water.

7. From *pyroxilic* or *wood spirit* and *platinum black*, as *acetic acid*, No. 25, (p. 9.) In this process, unlike that of alcohol, no intermediate compound corresponding to aldehyde is produced.

8. (C. Watt, Jun.) From *naphtha* or *pyroxilic spirit*, 1 part; *bichromate of potassa* and *sulphuric acid*, of each, 3 parts; the sulphuric acid, diluted with an equal weight of water, being gradually added last. A portion of naphtha distils over with the acid, and may be again treated with *bichromate of potassa* and *sulphuric acid*, when a fresh portion of formic acid will be produced. This process yields a large product.

Prop., *&c.* The products of the above processes are limpid and colourless; the stronger ones fume slightly in the air, and possess an extremely penetrating odour. The *first hydrate* (No. 5, *above*) boils at 209° Fahr., crystallizes in brilliant scales below 32°, and has the sp. gr. 1·2353. Its vapour is inflammable and burns with a blue flame. The *second hydrate* (No. 6, *above*) boils at 223°, does not solidify at—5°, and has the sp. gr. 1·1167. Both of them are extremely corrosive, and rapidly destroy the texture of living organic substances. The products of the other processes are very dilute, and possess the above properties in only a minor degree. They may all be purified and concentrated by saturating them with pure *carbonate of soda* or of *potassa*, and after subjecting the liquid to a gentle heat for a short time, and liberating the formic acid from the salt by means of dilute sulphuric acid, finally submitting the mixture to distillation, when the hydrated acid will come over perfectly pure.

Formic acid reduces the salts of mercury and silver, and forms salts with the bases termed *formiates.*

Formic acid is readily distinguished from *acetic acid*, which in many points it resembles, by *heating* it with a little *solution of oxide of silver* or *mercury;* the metal is reduced, and precipitated in a pulverulent state, while carbonic acid is extricated. The odours of the two acids also vary.

FORMIC ETHER. See *Ethers.*

FORMOBENZOIC ACID. Syn. *Formiate of Hydruret of Benzyle.* A peculiar acid discovered by Winkler, and obtained by dissolving *crude oil of bitter almonds* in *water*, adding *hydrochloric acid*, evaporating, and treating the dry mass with *ether*, which dissolves out the new acid. It may be decoloured by *animal charcoal*, and obtained in crystals by careful evaporation. It readily combines with the bases forming salts called *formobenzoates.*

FORMOMETHYLAL. Syn. *Formiate of Methyle* (*tribasic*). A light, oily, and very volatile liquid, obtained by Kane, by distilling a mixture of *pyroxilic spirit* and *peroxide of manganese*, of each, 2 parts; and *oil of vitriol* and *water*, of each, 3 parts. As soon as the boiling point of the distilled liquor reaches 177° Fahr., the formiate of methyle begins to pass over, and the receiver must be changed. The product is purified by rectification. It has then an agreeable aromatic odour, boils at 170° Fahr., and is soluble in 3 parts of water; sp. gr. 0·855.

FORMULA. Syn. *Formula*,—Lat. *Formule*,—Fr. A prescribed form; a rule, recipe, or prescription. *Chemists* apply this name to the abbreviations or symbols used in the place of the names of substances; more especially for exhibiting in a condensed form the composition and relations of compound bodies. The full consideration of the subject belongs to a work on pure chemistry. See *Equivalents*, *Symbols*, *&c.*

FORMYLE. Syn. *Formule.* A hypothetical organic radical, consisting of two equivalents of *carbon* and 1 eq. of *hydrogen*, of which formic acid is the oxide. Its existence is inferred from the constitution of certain known compounds. (Liebig.) *Iodide*, *bromide*, *chloride*, and *sulphuret of formyle*, have been obtained. Its *terchloride* is chloroform, and its *teroxide* is formic acid.

FORMYLE (Terchloride of). Syn. *Chloroform*,—Dumas; *Chloroformyl*,—Ph. L. *Chloroformum*,—Ph. D. *Chloride of Formyle*, *Perchloride of do.*, *Formyl-chlorid*,—Liebig; *Chloric Ether*, *Terchloride of Carbon*, *Æther Chloricus*,—Obs. or unus. An ethereal compound, the composition of which was first accurately determined by Dumas, in 1834, and has since been confirmed by the analysis of Liebig and others. It is rich in synonyms, owing to the different views which were formerly held regarding its composition.

Prep. 1. (Dumas.) *Chloride of lime* (in powder), 4 ℔; *water*, 12 ℔; mix, in a capacious retort or still, add of *rectified spirit*, 12 fl. oz., and cautiously distil, as long as a dense liquid, which sinks in the water it passes over with, is produced; separate this from the water, agitate it with a little *sulphuric acid*, and, lastly, rectify it from *carbonate of baryta*.

2. (Ph. L.) *Chlorinated lime*, 4 ℔; *water*, 10 pints; *rectified spirit*, ½ pint; proceed as last, using a spacious retort that the mixture will only 1-3rd fill, and the heat of a sand bath. "When ebullition commences remove the fire as quickly as possible, lest the retort be broken by the suddenly increased heat,' and "let the solution distil into a receiver as long as there is nothing which subsides, the fire being restored if it be at all needed. Add to the distilled liquid four times as much water, and shake the whole well together;" next "cautiously separate the heavier part as soon as it has subsided, and to this add of *chloride of calcium*, broken into fragments, 1 dr.; and shake occasionally during an hour; finally let the fluid again distil from a glass retort into a glass receiver."

3. (Ph. D.) *Quicklime*, 5 *lb.*, (slaked with) *boiling water*, 1 quart, is put into a sheet iron or copper still, with *chlorinated lime*, 10 *lb.*; *water*, 3¾ gall., previously mixed with *rectified spirit*, 25 *oz.*, and raised to the temperature of 100° Fahr., is then added; heat is now applied, but *withdrawn immediately* the *distillation commences.* The lower stratum of the distilled product, the bulk of which need not exceed a quart, is next agitated, twice in succession, with an *equal volume* of *distilled water*, and then in a *separate bottle* with *half its volume* of *pure sulphuric acid.* Lastly, it is shaken in a matrass with *peroxide of manganese*, in fine powder, ¼ *oz.*; and rectified from off this at a *very gentle heat.*

4. *Hydrate of lime*, 1 part, is suspended in *cold water*, 24 parts, and *chlorine* passed through the mixture until nearly the whole of the lime is dissolved; *hydrate of lime*, q. s. just to restore the alkaline reaction of the liquid is then added; and, afterwards, *rectified spirit of wine* or *wood spirit*, 1 part, is mixed in; the whole, after repose for 24 hours in a covered vessel, is cautiously distilled as before.

Prop., *&c.* Transparent; colourless; odour, fragrant, ethereal, and apple-like; taste, ethereal, sweetish, but slightly acrid; soluble in 2000 parts of water; mixes in all proportions with alcohol and ether; dissolves (readily), bromine, camphor, caoutchouc, gutta percha, iodine, oils, resins, wax, and several other like substances; boils at 141° Fahr.; kindles with difficulty; burns with a greenish flame; and communicates a dull, smoky-yellow colour to the flame of alcohol. Sp. gr. 1·48 to 1·49; density of vapour, 4·2 (4·116,—Fownes).

Pur. Chloroform is frequently adulterated with alcohol and ether; and owing to careless manipulation, is also sometimes contaminated with acetic, formic, or sulphuric acid. The first two may be detected by the odour left on the palm of the hand after the chloroform has volatilized; and the last, by adding a solution of chloride of barium to water which has been previously agitated with it. When pure it is "free from colour, and of a pleasant odour. Sp. gr. not less than 1·48. It is not perfectly soluble in water; and does not turn the colour of litmus red. Rubbed on the skin, it quickly evaporates, scarcely leaving any odour." (Ph. L.) "The sp. gr. of chloroform is 1·496." (Ph. D.)

Uses, &c. Chloroform is anodyne, antispasmodic, sedative, stimulant, and anæsthetic. *Dose.* 5 to 12 or 15 drops, in water, mixed with a little syrup or mucilage. (See *Chloric Ether.*) It is now chiefly used as an *inhalation* to produce insensibility to pain during surgical operations. The *dose* for this purpose is 1 fl. dr., which is repeated, in a few minutes, if no effect is produced, until 3 fl. dr. have been thus exhibited; the effects being carefully watched, and the source of the chloroform vapour removed as soon as a sufficient degree of anæsthesia is produced, or any unpleasant symptoms develop themselves.

Chloroform in *large doses* depresses the heart's action, and causes profound coma, and death. It is therefore dangerous in all cases complicated with diseases of the heart or brain, or any visceral affections of a congestive character. In other cases, atmospheric air loaded with 4% or 5% of chloroform vapour, may be inhaled with perfect safety until insensibility to pain comes on. When it contains more than 7% of the vapour, it is absolutely dangerous, a fact to which the number of deaths in our hospitals during the last few years bear ample testimony. Dr. Simpson has used as much as "8 fl. oz. in thirteen hours, in a case of labour." Such a dangerous proceeding, however, deserves the severest censure.

The *usual mode of administering chloroform* is by means of an inhaler made for the purpose, but a much simpler and safer plan is, to twist a handkerchief or a napkin into the form of a bird's nest, on the inner surface of which the fluid is to be sprinkled before applying it over the mouth and nose.

The *treatment* of *asphyxia* from chloroform is—the horizontal position, cold affusion to the head and spine, artificial respiration, and, if possible, either the application of electricity, or the inhalation of protoxide of nitrogen or oxygen gas, largely diluted with atmospheric air.

Concluding Remarks. The preparation of chloroform or terchloride of formyle is not unattended with danger, and frequently miscarries in careless or inexperienced hands. This arises chiefly from the violent reaction which immediately follows the application of the heat. On the common plan there is great danger of explosion, or of the liquid in the still being forced over into the receiver, owing to the extraordinary rapidity with which the vapours are eliminated, and the ingredients, in consequence, swell up. The method we have successfully adopted on the *large scale*, is to employ a very broad and shallow capsule-shaped still, having a flat rim round it, with a head or capital furnished with a corresponding rim at its lower part. In use, a flat, endless band of vulcanized Indian rubber is placed between the two rims, which are then held air-tight together by means of small iron clamps. The application of heat is also delayed for some time after the admixture of the spirit with the other ingredients, and the process is interrupted as soon as the first violence of the reaction has subsided, by which time the whole product of chloroform will have passed over into the receiver. If the distillation is continued beyond this point, the remaining product is water. On the *small scale*, a very capacious flat-bottomed retort or cucurbit should be employed. A similar refrigeratory may be used to that noticed under ether. *Chloroform* is also produced when *chloral* is treated with an *aqueous solution of caustic potassa.*

FOUSEL OIL. See *Acetate of Amyle* and *Oils.*

FOXGLOVE. Syn. *Digitalis,*—Ph. L. E. & D. "The recent and dried stem-leaf of the uncultivated" "*digitalis purpurea*" (Ph. L.), or *purple foxglove.* "The leaves (folia),"—Ph. E. & D. "Let it be gathered before the terminal flowers have expanded." "The petiole and mid-rib of the leaf being cut off, dry the lamina." (Ph. L.) The *seeds* (digitalis semina) which were ordered, as well as the leaves, in former pharmacopœias, are said to be in many points preferable to them. When good, the leaves are of a dull-green colour, and possess a feeble narcotic odour, and a bitter unpleasant taste. Both the *dried leaves* and the *powder* should be preserved in corked bottles covered with dark-coloured paper, or in well-closed tin canisters, and kept in a dark cupboard; and the stock should be renewed yearly, as age considerably diminishes the medicinal activity of digitalis.

Foxglove is diuretic, sedative, and antispasmodic, and exerts a specific action over the cerebro-spinal system, promoting the functions of the absorbents, and reducing the force of the circulation in a remarkable manner. It is administered in *fevers* and *inflammations,* to reduce the frequency of the pulse, and to allay excessive vascular excitement; in *dropsy*, (unless the habit is full and pulse tight and cordy,) as a diuretic, either alone, or combined with squills, calomel, salines, or bitters; in *internal hemorrhages*, as a sedative, when the pulse is full, hard, and throbbing; in *diseases of the heart* and *great vessels*, and in *phthisis*, to reduce the force and velocity of the circulation; in *epilepsy* and *insanity*, to repress vascular excitement; and in *spasmodic asthma*, *scrofula*, and several other diseases, with one or other of the above intentions.

The *greatest caution* is required in the use of foxglove, as its effects accumulate in the system, and the unwary practitioner is occasionally surprised at the sudden demise of his patient, even after he has left off the use of this drug. *Dose.* ½ gr. to 1½ gr., in powder, every 6 hours. See *Extracts*, *Infusions*, *Tinctures*, *&c.*

FOXING. See *Malt Liquors*.

FOX'S CREAM. *Prep.* From *marrow pomatum* and *oil of almonds*, of each, 2 *oz.*; melt together, and when it has cooled considerably, stir in *huile au jasmin* and *essence of bergamotte*, of each, 1 dr. An excellent soft pomatum.

FRACTURE. Syn. *Fractura*, — Lat. The breaking or disrupture of a bone. When the bone is merely divided into two parts, it is called a *simple fracture;* when the integuments are also lacerated, a *compound fracture*; and when the bone is splintered, a *comminuted fracture*. See *Surgery* (Popular).

FRANKINCENSE. Syn. *Common Frankincense; Thus*, — Ph. L. *Abictis Resina*,—Ph. L. 1836. "The turpentine which exudes from the bark" of "*abies excelsa* (Norway spruce fir) and *pinus palustris* (pitch or swamp pine), hardened by the air." (Ph. L.) The gum-resin *olibanum*, which is the produce of the *Boswellia serrata*, is the *odorous frankincense of commerce*.

FRANKINCENSE (Prepared). Syn. *Thus Præparatum*,—Ph. L. *Prep.* (Ph. L.) *Frankincense*, 1 ℔; *water*, q. s. to cover it; boil until the resin is melted, and strain through a hair sieve; when the whole has cooled, pour off the water, and keep the frankincense for use. Resembles common resin in its general properties.

FRAXININE. Syn. *Fraxina*. A peculiar, soluble, bitter, neutral, and crystallizable substance, extracted from the bark of *fraxinus excelsior* (Linn.) or *common ash*. It is febrifuge.

FRECKLES. These are round or oval-shaped yellowish spots, similar to stains, developed on the skin. There are two varieties,—*Freckles*, or *summer freckles*, resulting from the action of the sun and heat during the summer season, and disappearing with the hot weather or exposure; and—*Cold freckles*, which occur at all times of the year. The former are chiefly confined to persons of fair complexion, whilst the latter attack persons of all complexions indifferently, and sometimes assume a lively yellow or greenish colour.

Common freckles may generally be removed by the frequent application of *dilute spirits*, *acids*, or *alkaline solutions;* the last two just strong enough to prick the tongue. *Cold freckles* commonly occur from disordered health, or some general disturbance of the system, to which attention should be chiefly directed. In both varieties, the *solution of bichloride of mercury* (Ph. L.), or *Gowland's lotion*, will be found a most useful external application.

FRECKLES (Lotions for). *Prep.* 1. *Bichloride of mercury*, 5 gr.; *hydrochloric acid*, 30 drops; *lump sugar*, 1 *oz.; rectified spirit of wine*, 2 *oz.; rose water*, 7 *oz.;* agitate together until the *whole* is dissolved.

2. *Petals* or *leaves of red roses*, 1 *oz.; hot water*, 12 *fl. oz.;* infuse an hour, and strain, with expression, ½ pint; add of *citric acid*, 30 gr.; dissolve, and in a few hours decant the clear.

3. *Rose leaves* (dried), ¼ *oz.; lemon juice* (freshly expressed); and *rum* or *brandy*, of each, ¼ pint; digest 24 hours, and squeeze out the liquor for use.

4. (Kittoe's.) *Sal ammoniac*, 1 dr.; *spring water*, 1 pint; *lavender water* or *eau de Cologne*, ¼ *oz.;* mix. The above are applied with the fingers night and morning, or oftener.

FRECKLES (Pomade for). *Prep.* 1. *Citrine ointment*, 1 dr.; *simple ointment*, 7 dr.; *otto of roses*, 3 drops.

2. *Elder flower ointment*, 1 *oz.; sulphate of zinc* (levigated), 20 gr.; mix by porphyrization, or by trituration in a wedgwood-ware mortar. Both the above, applied night and morning, are excellent for either *cold* or *summer freckles*.

FREEMAN'S BATHING SPIRITS. *Prep.* 1. *Opodeldoc* or *soap liniment*, coloured with *Daffy's elixir*.

2. (Wholesale.) *Soft soap*, 1¾ *lb.; camphor* (small), 3 *oz.; rectified spirit* and *water*, of each, 1 gall.; dissolve, and add *spirit colouring*, q. s. Resembles common opodeldoc.

FREEZING MIXTURES. See *Ice* and *Refrigeration*.

FRENCH BERRIES. Syn. *Persian*

Berries, Avignon do.; Graines d'Avignon. The berries or fruit of the *rhamnus infectorius*, (Linn.) They are imported from France and Persia; those from the latter country being esteemed the best. Their decoction dyes cloth, previously mordanted with *alum, tartar*, or *protochloride of tin*, of a *yellow colour;* with *sulphate of copper*, an *olive;* and with *red sulphate of iron*, an *olive-green colour.*

FRENCH POLISH. Several varnishes are used under this name. That most generally employed is a simple solution of *pale shell-lac* in either *rectified spirit* or *wood naphtha.* That made with the former solvent is now only used for the very best work, on account of its costliness. Sometimes a *little* mastic, sandarac, or elemi, or copal varnish, is added to render the polish tougher.

Prep. 1. From *pale shell-lac*, 5½ *oz.; finest wood naphtha* or *pyroxilic spirit*, 1 pint; dissolve.

2. Pale *shell-lac*, 3 *lb.; wood naphtha*, 1 gall. *Rectified spirit* (68 o. p.) may be substituted for the naphtha in each of the above formulæ where expense is no object.

3. *Pale shell-lac*, 5 *oz.; gum sandarac*, 1 *oz.; spirit* (68 o. p.), 1 pint.

4. *Pale shell-lac*, 5½ *oz.; gum elemi*, ¾ *oz.; rectified spirit*, 1 pint.

5. *Pale shell-lac*, 1¼ *lb.; mastic*, ¼ *lb.; rectified spirit*, 2 quarts.

6. *Pale shell-lac*, 2¼ *lb.; mastic* and *sandarac*, of each, 3 *oz.; rectified spirit*, 1 gall.; dissolve, add *copal varnish*, 1 pint, and mix by roughly agitating the vessel. All the above are used in the manner described below.

7. *Shell-lac*, 12 *oz.; wood naphtha*, 1 quart; dissolve, and add of *linseed oil*, ½ pint.

8. *Shell-lac*, ½ *lb.; gum sandarac*, ¼ *lb.; rectified spirit*, 1 quart; dissolve, add of *copal varnish*, ¼ pint; mix well, and further add of *linseed oil*, ½ pint. The last two require no oil on the rubber.

Obs. The preparation of French polish is precisely similar to that of other spirit or naphthalic varnishes. Sometimes it is coloured, in order to modify the character of the wood. A *reddish tinge* is given with dragon's blood, alkanet root, or red sanders wood; and a *yellowish tinge*, by turmeric root or gamboge. When it is simply desired to *darken* the wood, brown shell-lac is employed to make the polish; and when the object is to keep the wood *light coloured*, a little oxalic acid (2 to 4 dr. to the pint) is commonly added. These substances are either steeped in, or agitated with the polish, or with the solvent, before pouring it on the "gums," until they dissolve, or a sufficient effect is produced. French polish is not required to be so clear and limpid as other varnishes, and is, therefore, never artificially clarified. See *Varnishes, &c.*

FRENCH POLISHING. This process, now so generally employed for furniture and cabinet work, is performed as follows:—The surface to be operated on being finished off as *smoothly as possible* with *glass paper*, and placed *opposite* the light, the *rubber* being made as directed below, and the *polish* (see *above*) being at hand, and preferably contained in a *narrow-necked bottle*, the workman moistens the *middle* of the *flat face of the rubber* with the polish, by laying the rubber on the mouth of the bottle and shaking up the varnish against it, *once*, by which means the rubber imbibes the proper quantity to cover a considerable extent of surface. He next *incloses* the *rubber* in a *soft linen cloth*, doubled, the rest of the cloth being gathered up at the back of the rubber to form a handle. The face of the linen is now moistened with a *little raw linseed oil*, applied with the finger to the *middle* of it, and the operation of polishing immediately commenced. For this purpose the workman passes his rubber *quickly* and *lightly* over the surface uniformly in *one* direction, until the varnish becomes dry, or nearly so, when he again charges his rubber as before, omitting the *oil*, and repeats the rubbing, until three coats are laid on. He now applies a *little oil* to the rubber, and two coats more are commonly given. As soon as the coating of varnish has acquired some thickness, he wets the *inside* of the *linen cloth*, before applying the varnish, with *alcohol*, or *wood naphtha*, and gives a *quick, light*, and *uniform* touch over the whole surface. The work is, lastly, carefully gone over with the *linen cloth*, moistened with a *little oil* and *rectified spirit* or *naphtha*, WITHOUT *varnish*, and rubbed, as before, until dry.

The *rubber* for *French polishing* is made by rolling up a strip of *thick woollen cloth* (list) which has been *torn* off, so as to form a soft elastic edge. It should form a coil, from 1 to 3 inches in diameter, according to the size of the work.

FRESCO PAINTING. See *Painting.*

FRETTING IN. See *Wines.*

FRICANDEAU. Among *cooks*, a *ragoût*, or *fricassee of veal.* The same term is also sometimes applied to stewed beef, highly seasoned.

FRICASSEE. A dish prepared by stewing or semi-frying, highly flavoured with herbs, spices, or sauce. Small things, as *chickens*, *lamb*, *&c.*, and *cold meat*, are usually formed into fricassees.

FRICTION. In *mechanics*, this is the resistance which the surface of a moving body meets with from the surface of the body on which it moves. The amount of friction is proportionate to the roughness of the surfaces. Bodies *absolutely* smooth offer no resistance to each other of this kind; but *perfect* smoothness is unattainable, even by the most careful polishing. The brilliant surface of the diamond possesses asperities which exercise a similar effect to the rougher surfaces of the metals employed for machinery, although in an immensely less degree. To *lessen* the *amount of friction*, various unctuous substances, as *oil*, *tallow*, *soap*, *blacklead*, *&c.*, are used by engineers. These substances act by imparting smoothness to the points of contact, and thus reduce their resistance to each other. The full consideration of the subject belongs to engineering. See *Anti-attrition* and *Lubrication.*

FRICTION. Syn. *Frictio*,—Lat. Friction, whether simple or conjoined with liniments, is a therapeutical agent of considerable power, and is frequently a most important aid to the more strictly medical treatment of disease. By it, the circulation is promoted in debilitated parts, and medicinal substances (*iodine*, *mercurials*, *opium*, *&c.*) are made to penetrate the pores of the skin. "The benefit of friction, which consists of motion and heat, whether or no the same be raised by rubbing the body with a coarse cloth or the flesh-brush, has advantages inconceivable and scarcely credible, by which the obstructions of the pores and cutaneous glandules are opened, their stagnating juices broken into small particles, dissolved, and rendered fit to be carried off in perspiration, in the room of which, as my Lord Verulam well observes, new juice will succeed with new vigour to the body; and longevity, saith that great naturalist, is this way most certainly promoted." (Daniel Turner.)

Simple friction is performed by the *hand* alone, or with a *piece of flannel*, a *hair glove*, or a *flesh brush.* "If it be properly performed—namely, by short, brisk strokes with the tips of the fingers, and with great celerity, when the naked hand is the agent; and if it be continued for an hour or upwards, and repeated several times a day—its influence in *reducing swelled glands* and *swellings of the joints*, as well as in *alleviating rheumatic pains*, is very great; but, besides being well performed, the friction should be continued for (*at least*) half an hour, in order to render it useful." (Dr. R. E. Griffith.)

Gentle, *slow*, and *equable friction*, by producing a continued repetition of an agreeable impression on the nervous system, acts both as an *anodyne* and *hypnotic.* For this purpose "the operator should sit by the side of the bed, and, introducing the hand under the bed-clothes, rub the legs or the arms (or other parts) gently, with equally lengthened but slow movements. When the invalid is a child, its influence is more powerful when aided by a monotonous, but a soft tune, which, although it operates upon a distinct sense, yet, by combination, renders the friction more soporific." (Griffith.)

When the *friction* is *accompanied* with the use of any *acrid* or *irritating substance*, or is intended to introduce any active remedy into the system, the rubbing should be brisk, and of sufficient force to slightly abrade and inflame the cuticle; and should be continued until the substance, which is usually in the form of an ointment, either wholly or partially disappears, owing to its absorption by the skin. The hand of the operator should, in most cases, be guarded by a glove; otherwise he is likely to share with the patient the effects of the medicine, a result not always agreeable or even safe.

FRIGORIFIC MIXTURES. See *Refrigeration.*

FRITT. The pulverulent materials of glass, heated until they coalesce without melting. See *Enamels*, *Glass*, *&c.*

FRITTERS. Fried batter. A species of pancake, containing fruit, sweetmeats, poultry, meat, or fish.

Prep. 1. (M. Alexis Soyer.) "The following is thirty receipts in one:"—Soak *crum of bread*, 1 *lb.*, in *cold water*, q. s.; take the same quantity of any kind of *boiled* or *roasted meat* (a *little fat*), and chop it into fine dice; press the water out of the bread; put into the pan *butter*, *lard*, or *dripping*, 2 *oz.*, with *chopped onions*, two tea-spoonfuls; fry two minutes, add the bread, stir with a wooden spoon until rather dry, then add the *meat*, and season with *salt*, 1 tea-spoonful; *pepper*, ½ do.; and a *little grated nutmeg*, if handy; stir till quite hot; then further add *two eggs*, one at a time, mix very quickly, and pour it on a dish to cool; next roll it into the shape of *small eggs*, then in *flour*, *egg them*, and bread-crumb them; lastly, fry in abundance of fat to a nice yellow colour, and serve either *plain*, or with any *sharp* or other savoury sauce you fancy. *Innumerable dishes* can be made in this way; in fact, from everything that is eatable, and at any season of the year,—from the *remains* of *meat, poultry, game, fish, vegetables, &c.* The same can be done with *chopped dried* or *preserved fruits,* simply using a ¼ *lb.* more *bread;* and sifting *powdered sugar* and *cinnamon* over them. *Cream* may also be used for *fruits* or *curds.*

Fritters are also (and more commonly) fried in ordinary *batter,* instead of breadcrumbs. "There is no end to what may be done with these receipts." "They can be ornamented, and made worthy the table of the greatest epicure, if the bread be soaked in cream, and spirits or liquor introduced into them." (Soyer.)

2. (Mrs. Rundell.)—*a.* (Apple Fritters.) See *Fruit Fritters.*

b. (Buckwheat Fritters, B. Cakes, Bockings.) Made by beating up *buckwheat flour* to a batter with some *warm milk,* adding a little yeast, letting it rise before the fire for 30 or 40 minutes, then beating in some *eggs* and *milk* or *warm water,* as required, and frying them like pancakes. *Buckwheat fritters,* when well prepared, are excellent. Made without eggs, and served up with *molasses,* they form a common dish in almost every breakfast in the U. S. of America.

c. (Curd Fritters.) From *dried curd,* beaten with *yelk of egg* and a *little flour,* and flavoured with *nutmeg.*

d. (French Fritters.) *Common pancakes,* beaten up with *eggs, almonds,* and *flavouring* (sugar, orange-flower water, and nutmeg), and the paste dropped into a stew or frying-pan half full of *boiling lard,* so as to form cakes the size of large nuts, which are cooked till brown.

e. (Fruit Fritters.) From the *sliced fruits,* with *rich batter.*

f. (Soufflé Fritters.) *Rich pancakes,* flavoured with *lemon.*

g. (Spanish Fritters.) From slices of *French rolls* soaked in a *mixture* of *cream, eggs, sugar,* and *spices,* and fried brown.

FROG. The esculent variety, in Europe, is the common *green* or *gibbous frog,* the *rana esculenta* of Linnæus, and belongs to the *bactrachia,* or fourth order of the *reptilia.* As an aliment it is much esteemed on the Continent. Its *liver* is among the simples of the Ph. L. 1618, and was once considered a useful remedy in certain forms of ague.

FROST-BITES. When those parts of the body in which the circulation of the blood is most languid are exposed to *extreme* cold they quickly become frozen, or as it is called *frost-bitten.* The fingers, toes, ears, nose, and chin, are most liable to this attack. The remedy is *long-continued friction* with the *hands* or *cold flannel,* avoiding the fire, or even a heated apartment. See *Cold.*

FRUIT. Syn. *Fructus,*—Lat. Among *botanists* this is the ovarium or the pistillum arrived at a state of maturity. In *familiar language* the term is applied to any product of a plant containing the seed, more especially those that are eatable.

Fruits are extensively employed as articles of diet by man, both as luxuries and nutriment. The fruit of the *cereals* furnishes our daily bread; that of the *vine* gives us the well-known beverage, wine; whilst *other varieties* enrich our desserts, and provide us with some of our most valuable condiments and aromatics. The *acidulous* and *subacid fruits* are antiseptic, aperient, attenuant, diuretic, and refrigerant. They afford little nourishment, and are apt to promote diarrhœa and flatulency. They are, however, occasionally exhibited medicinally, in putrid affections, and are often useful in bilious and dyspeptic complaints. The *farinaceous fruits,* as already stated, furnish the principal and most useful portion of the food of man. The *oleo-farinaceous* (nuts, &c.) are less wholesome and less easy of digestion than those purely farinaceous. The *saccharine fruits,* or those abounding in sugar, are nutritious and laxative, but are apt to ferment and disagree with delicate stomachs when eaten in excess. *Stone fruits* are more difficult of digestion than the other varieties, and are very apt to disorder the stomach and bowels.

As a rule, *fruit* should never be eaten in large quantities at a time, and only when quite ripe. It then appears to be exceedingly wholesome, and to be a suitable corrective to the grossness of animal food. It also exercises a powerful action on the skin, and is a specific for scurvy in its early stages. Many cutaneous diseases may likewise be removed by the daily use of a moderate quantity of fruit, or other fresh vegetable food. Cases are not uncommon which, after resisting every variety of ordinary medical treatment, yield to a mixed fruit or vegetable diet.

The *farinaceous, succulent,* and *aromatic fruits* are probably the *original* and *proper food of man.* The *first,* as nourishment, the *second,* in their juices, and the *third* in their stimulant and corrective tendency, provide him with all that is necessary for his support and well-being.

Fruits should be *gathered* in dry weather, and preferably about noon, because the dew and moisture deposited on them during the night and earlier part of the morning has then evaporated. They should be quite ripe when gathered, but the sooner they are removed from the tree, after this point is arrived at, the better. *Immature* fruit never keeps so well as that which has ripened on the tree; and *over-ripe* fruit is liable to be bruised and to lose flavour. The less fruit is handled in gathering the better. Some of them, as *peaches*, *nectarines*, *grapes*, *plums*, *&c.*, require to be treated with great delicacy, to avoid bruising them or rubbing off the bloom. Some fruit, as a few varieties of *apples*, *pears*, and *oranges*, *&c.*, are gathered before they are fully ripe, in order that they may the better undergo the perils of transit and storeage.

Ripe fruits are commonly *preserved* in the *fresh state* by placing them in a cool, dry situation on shelves, so that they do not touch each other; or by packing them in in *clean*, *dry* sand, sawdust, straw, bran, or any similar substance, with like care, to preserve them from the action of air and moisture. An excellent plan, commonly adopted for *dessert fruit* in the country, is to wrap each separately in a piece of *clean*, *dry paper*, and to fill small wide-mouthed jars or honey-pots with them. The filled pots are then packed one upon another (see *engr.*) in a dry and cold place (as a cellar), where the frost cannot reach them. The space (*a*) between the two pots may be advantageously filled up with *plaster of Paris* made into a paste with *water*. The joint is thus rendered air-tight, and the fruit will keep good for a long time. The mouth of the top jar is covered with a slate. For *use*, the jars should be taken one at a time from the store-room, as wanted, and the fruit exposed for a week or ten days in a warm dry room, before being eaten, by which the flavour is much improved.

1.

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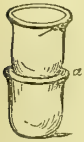


Fruit is *preserved* on the *large scale* for the *London market* by placing in a cool situation, *first* a *layer of straw* or *paper*, *then* a *layer of fruit*, *next* a *layer of straw*, and so on alternately, to the height of 20 or 25 inches, which cannot be well exceeded, as the weight of the superincumbent fruit is apt to crush or injure the lower layers. Sometimes *alternate layers* of *fruit* and *paper* are arranged in baskets or hampers, which are then placed in the cellar or fruit-room. The baskets admit of being piled one over the other without injury to the fruit. The use of *brown paper* is inadmissible for the above purposes, as it conveys its peculiar flavour to the fruit. Thick *white-brown* paper is the cheapest and the best. See *Putrefaction*, *Vegetables*, *&c.*

FRUMENTY. *Wheat* boiled in water until quite soft, then taken out, drained, thinned with *milk*, sweetened with *sugar*, and flavoured with *nutmeg*. When *currants* and *eggs* are added, it forms "*Somersetshire frumenty.*" Some persons boil the wheat like rice. "Eaten with milk, in the evening, for some time, it will often relieve costiveness." (Griffith.)

FRYING. "The frying-pan is, without doubt, the most useful of all kitchen implements, and, like a good-natured servant, is often imposed on, and obliged to do all the work, while its companion, the gridiron, is quietly reposing in the chimney corner." "The *usual complaint* of food being rendered *greasy* by frying, is totally remedied by *sautéing* the meat in a *small quantity* of fat, butter, or oil, which has attained a *proper degree of heat*, instead of placing it in *cold fat*, and letting it soak while melting." "According to the (common) mode in which all objects are cooked which are called *fried*, it would answer to the French word '*sauté*,' or the old English term '*frizzle;*' but to *fry* any object, it should be *immersed* in *very hot* fat, oil, or butter." "To *frizzle*, *sauté*, or, as I will now designate it, *semi-fry*, is to place in the pan any oleaginous substance, so that, when melted, it shall cover the bottom of the pan by about two lines; and when *hot*, the article to be cooked is to be placed therein. To do it to perfection requires a little attention, so that the pan shall never get *too hot*. It should also be *perfectly clean*—a great deal depends on this." (Soyer.)

According to the above high authority in all matters connected with the gastronomic art, a *chop* or *steak*, for frying, should be chosen about ¾ of an inch thick, and should "*never exceed* one inch, nor be *less* than half an inch, and to be as near as possible of the same thickness all over." "An *ill-cut* chop (or steak) never can be but *ill-cooked;* you can always equalise them (when badly cut) by beating them out with a chopper."

"The motive of semi-frying food is to have it done quickly; therefore, to fry a *whole* fowl, or even half, (for example) is useless, as it could be cooked in a different way in the same time; but to *semi-fry* a fowl (in joints, or pieces,) with the object of having it quickly placed on the table, in order to satisfy a good, and perhaps fastidious appetite, it should be done in a similar way to that practised in Egypt some 3000 years since, and of late years for the great Napoleon—that is, *cooked in oil*."

"In France this dish is called '*Poulet à la Marengo*.' It is related that the great conqueror, after having gained that celebrated victory, ate *three small chickens* at *one meal* done in this way, and his appetite and taste were so good, and he approved of them so highly, that he desired that they might always be served in the same way during the campaign."

"For many objects, I prefer the *frying-pan* to the *gridiron*; that is, if the pan is properly used. As regards *economy*, it is preferable, securing all the fat and gravy, which is often lost when the gridiron is used." "This simple *batterie de cuisine*," may be employed "equally as well in the *cottage* as in the *palace*, or in the *bachelor's chamber* as in the *rooms of the poor*." (Soyer.)

FUCUSAMIDE, *Fucusine*, and *Fucusol.* Compounds obtained by Dr. Stenhouse from several varieties of fucus. See *Furfurine.*

FUEL. Matter used for the production of heat by burning. The principal substances employed as fuel are—*anthracite*, *charcoal*, *coal gas*, *coke*, *pitcoal*, *turf*, and *wood.*

TABLE of the *heating power, &c., of* 1 *lb. of the several substances mentioned, expressed in the nearest common numbers.*

NAMES.	Pounds of water heated from 32° to 212° Fahr.	Pounds of water at 212° Fahr. converted into steam.	Weight of atmospheric air at 32° Fahr. consumed.
Alcohol (commercial) . .	52½	9½	11¾
Anthracite	69½	12¼	11
Charcoal of wood (dry) .	73	13¼	11½
„ „ (ordinary)	65¾	12	10½
„ turf or peat .	64½	11¾	15
Coke	65	12	11½
Oil	77	14	15¼
Pitcoal	60¼	11	9½
Tallow	78	14¼	15¼
Turf or peat	30	5½	43¼
Wax	78	14¼	15
Wood (dry)	35	6¼	6
„ (ordinary)	26	4¾	4½

Obs. The above results are scarcely ever obtained in practice, owing to the imperfect construction of boilers, and a large portion of the heat (probably ⅐ to ½) passing up the chimney, and being wasted. 1 *lb.* of coal, with ordinary boilers, is usually reckoned sufficient to convert 7½ *lb.* (9 *lb.*; —Watt.) of *boiling water* into *steam*, or to heat 41¼ *lb.* of water from 32° to 212° Fahr. 1 *lb.* of *fir wood* will evaporate fully 4 *lb.* of *water*, or heat 22 *lb.* to the boiling point.

Engineers commonly reckon the *consumption of coal* in the *furnace of a steam engine*, of good construction, at about 10 to 12 *lb.* per horse-power, the hour; but in the *Cornish pumping-engine*, the quantity has been long reduced to 1½ *lb.* to 2 *lb.*; whilst three or four of those recently constructed, are capable of raising, with only 1 *bushel* (84 *lb.*) *of coal*, from 80 to 100 *millions* of *lb.* of water *one foot high.*

The *evaporative power of fuel*, other circumstances being equal, depends mainly on the extent of the surface of the boiler exposed to its action. With ordinary steam boilers this ranges between 7 and 10 square feet per horse-power; but when economy is an object, it should *not* be *less* than that last mentioned.

FUELS (Economical). Various mixtures have been recommended under this name:—

Prep. 1. *Small coal*, *charcoal*, or *sawdust*, 1 part; *clay*, *loam*, or *marl*, 1 part; *sand* or *ashes*, 2 parts; *water*, q. s.; make the mass up wet into balls. For *use*, these balls are piled on an ordinary fire to a little above the top bar. They are said to produce a heat considerably more intense than that of common fuel, and ensure a saving of one half the quantity of coals, whilst a fire thus made up will require no stirring, nor fresh fuel for ten hours. The quantity of the combustible ingredient in them should be doubled, when they are intended to be used with a very little "foundation of coal."

2. *Peat and turf*, both recent and charred, are commonly used as fuel by the lower classes, in neighbourhoods where they are plentiful.

3. *Fir cones* or *tops*, contain a great quantity of solid woody, in addition to the resinous matter, and are well adapted for domestic fires.

FUELS (Patent). These are numerous. It is, however, very doubtful whether any *artificial fuels* can compete, in economy, on the large scale, with those provided by the hand of nature ready for our use.

Albert's Patent Fuel consists of the *bituminous refuse* from various manufactures, *bituminous schist* (in powder), and *small coal*, of each, 10 parts; *clay* (dry), 5 parts; and *mineral oil* or refuse of the naphtha distilleries, 1½ part; mixed with heat, and ladled whilst soft, into a hole in the ground, near the melting pan.

Grant's Patent Fuel is formed of *coal dust*, 1 cwt., and *coal-tar pitch*, 20 *lb.*, melted together by a heat of 220° Fahr., and moulded into blocks the size of common bricks, under a pressure of 5 or 6 tons. These are, lastly, whitewashed. It is heavier than common steam-coal, and is said to go fully 1-3rd further, by which facility of transport and economy is combined.

FULIGOKALI. *Prep.* (Dr. Polya.) *Caustic potassa*, 1 part; *water*, q. s.; dissolve; add of *wood soot* (powdered, shining,—Deschamps), 5 parts; boil 1 hour, dilute with water, filter, evaporate the filtrate to dryness, and put the product at once into warm, dry bottles. *Dose.* 2 to 3 gr., thrice a day, made into pills, which must be coated with gum and kept from the air. (See *below.*)

FULIGOKALI (*Sulphuretted*). Syn. *Fuligokali Sulphuretum*,—Lat. *Prep.* (Dr. Polya.) *Caustic potassa*, 7 parts; *sulphur*, 2 parts; *water*, q.s.; dissolve with heat, add of *fuligokali*, 30 parts, evaporate to dryness, and preserve it in well-corked dry bottles. *Dose, &c.* As the last.

Obs. M. Gibert has tried both fuligokali and sulphuretted fuligokali on his patients at the Hospital Saint-Louis, both internally and externally, with manifest advantage in various obstinate chronic skin diseases. He made a pommade of 30 grammes (say 1 oz.) of *lead ointment*, and 1 or 2 grammes (say 20 to 25 gr.) of *fuligokali*, in which he *recognised* positive resolvent, detersive, and stimulant properties. (Gaz. des Hôpitaux, 1842.)

FULLER'S EARTH. Syn. *Cimolia, C. Terra, C. Purpurascens*,—Lat. var. A soft, unctuous, friable, greenish or yellowish-gray species of clay, containing 53% of *silica*, 10% of *alumina*, and about 9% of *oxide of iron.* After being dug out of the earth, it is thoroughly dried in ovens, and then thrown into cold water, where it soon falls to powder, and is purified by the common process of edulcoration or washing-over. It is extensively *used* to extract oil and grease from cloth in the process of "fulling;" it forms an excellent filtering powder for oils, and is applied as a cooling and healing dressing by the poor to inflamed breasts, excoriations, &c.

FULLING. Syn. *Milling.* The process of cleaning cloth, and making it compact and firm in a mill. (See *above.*)

FULMINATES. The salts of *fulminic acid.* They are all characterised by the property of exploding with violence by slight heat or friction. (See *below.*)

FULMINATING COMPOUNDS. These are numerous, and are scattered through several distinct classes of bodies. Among the most powerful and dangerous are the *chloride* and *iodide of nitrogen, perchloric ether*, the *fulminates of gold, silver*, and *mercury, fulminating antimony, gun cotton*, and *mixtures* of *chlorate of potassa* and certain *inflammable substances*, as phosphorus, sulphur, carbon, orpiment, &c.

FULMINATING ANTIMONY. Syn. *Fulminating Antimonial Powder; Antimonium Fulminans*,—Lat. *Prep.* 1. (Serullas.) *Tartar emetic* (dried), 100 parts; *lamp black* or *charcoal powder*, 3 parts; triturate together, put it into a crucible that it will 3-4ths fill (previously rubbed inside with charcoal powder), cover it with a layer of *dry charcoal powder*, and lute on the cover; after 3 hours' exposure to a strong heat in a reverberatory furnace, and 6 or 7 hours' repose to allow it to cool, &c., cautiously transfer the solid contents of the crucible, as quickly as possible, without breaking it, to a wide-mouthed stoppered phial, where, after some time, it will spontaneously crumble down into a powder.

2. (Ann. de Chim. 1822.) *Antimony*, 100 parts; *carburetted cream of tartar* (i.e., roasted to blackness), 75 parts; *lamp black*, 12 parts; triturate together, &c., as the last.

Obs. When the above processes are properly conducted, the resulting powders contain potassium, and fulminate violently on contact with water. A piece the size of a pea introduced into a mass of gunpowder explodes it on being thrown into water, or on its being moistened in any other manner.

FULMINATING BISMUTH. Syn. *Bismuthum Fulminans,*—Lat. *Prep.* From *bismuth,* 120 parts; *carburetted cream of tartar,* 60 parts; *nitre,* 1 part. Very rich in potassium. *Prop., &c.,* resemble those of the last. We have been assured that this is the compound used by the late Capt. Warner for some of his secret fusees.

FULMINATING COPPER. Syn. *Fulminate of Copper; Cuprum Fulminans, Cupri Fulminas,*—Lat. *Prep.* Digest *copper* (in powder or filings) with *fulminate of mercury* or *of silver,* and a *little water.* It forms soluble green crystals that explode with a green flame.

FULMINATING GOLD. Syn. *Auric Fulminate, Aurate of Ammonia, Ammoniuret of Teroxide of Gold; Aurum Fulminans, Auri Fulminas, A. Oxidum Ammoniatum,*—Lat. *Prep.* 1. Recently precipitated *peroxide of gold* is digested in strong *liquor of ammonia* for 24 hours, and the resulting *fulminate* is dried in the open air or at a temperature below 180° Fahr., care being taken to avoid the *slightest* friction lest it should explode. A deep olive-coloured powder.

2. From *terchloride of gold,* digested in *ammonia,* in excess. Brownish yellow.

3. From a solution of *gold* in *aqua regia* (made by dissolving 4 *oz.* of *sal ammoniac,* in 12 or 16 *oz.* of *nitric acid*), precipitated with a *solution of carbonate of potassa.*

Obs. This compound can only be safely made in *very small quantities at a time,* as without *great care* it explodes with extreme violence. This is caused by the *slightest* friction or sudden increase of heat. Its fulminating property may be destroyed by boiling it in pearlash ley, or weak oil of vitriol; and by heating the residuum after washing it in water, *pure gold* will be obtained. *Fulminating gold* is said to be sedative, antispasmodic, and carminative. *Dose.* $\frac{1}{10}$ to 1 gr.; in fevers, nervous diseases, colic, &c. It has been given in larger doses. Its use has "in some cases, produced very serious, and even fatal results." (Pereira.)

FULMINATING MERCURY. Syn. *Fulminate, Fulminate of Mercury, F. of Protoxide of do.; Hydrargyrum Fulminans, Hydrargyri Fulminas,*—Lat. *Prep.* 1. (Berzelius.) *Mercury,* 1 part; *nitric acid,* (sp. gr. 1·375), 12 parts; dissolve, add, at intervals, to this solution, *alcohol* (sp. gr. 0·850), 16·3 parts; apply heat till the effervescence and cloud of gas disappears, adding, gradually, on the action becoming violent, 16·3 parts *more* of *alcohol. Product.* 112% of the mercury employed.

2. (Howard.) *Mercury,* 1 part; *nitric acid* (1·36), 12 parts; dissolve, and pour the solution gradually and cautiously into *alcohol* of 80 to 85%, 11 parts, a gentle heat being applied; cool, filter, dissolve in boiling water, and again filter; as the solution cools, crystals of the fulminate are deposited.

3. (Ure.) *Mercury,* 100 parts; *nitric acid* (sp. gr. 1·4), 1000 parts; (or 740 parts by *measure*); dissolve by a gentle heat, and when the solution has acquired the temperature of 130° Fahr., slowly pour it through a glass funnel tube into *alcohol* (sp. gr. 0·830), 830 parts (or 1000 parts by *measure*); as soon as the effervescence is over, and white fumes cease to be evolved, filter through *double paper,* wash with *cold water,* and dry by *steam* (not *hotter* than 212°) or *hot water.* The fulminate is then to be packed in 100 gr. paper parcels, and these stored in a tight box or corked bottle. *Product.* 130% of the weight of mercury employed.

4. (Ure.) *Quicksilver,* 1 *oz.; nitric acid* (1·4), 10 *oz.* (or 7½ *fl. oz.*); *alcohol* (0·830), 8·3 *oz.* (or ½ pint); proceed as last.

Prop., &c. Small brownish-gray crystals, which sparkle in the sun; entirely soluble in 130 parts of boiling water, and deposited as the solution cools under the form of beautiful pearly spangles. "An imperial pint of boiling water will dissolve 67 gr. of *pure* fulminate." (Ure.) It greatly resembles fulminate of silver in its appearance and general properties. It explodes violently by both friction and percussion, but unlike the silver-salt, merely burns with a sudden and almost noiseless flash when *kindled* in the open air.

Obs. The formula of Dr. Ure is not only the cheapest but the best and safest. That of Berzelius is more expensive and dangerous. There is "no little hazard in pouring the alcohol into the nitric solution; for at each effusion an explosive blast takes place; whereas, by pouring the solution into the alcohol, as originally enjoined by the Hon. Mr. Howard, the inventor, no danger whatever is incurred." (Ure.) This preparation is used for priming the copper percussion caps for fowling pieces, muskets, &c. Dr. Ure, in his first report to the Board of Ordnance, recommended the use of a *spirituous solution of gum sandarac,* as the best substance for diluting the fulminate, and fixing it in the caps; but in a subsequent report to the same board, he states that a solution of *mastic in spirit* is to be *preferred.* Less than ¼ gr. of the fulminate is employed for each cap. The French use a mixture of *fulminate,* 10 parts, and *gunpowder,* 6 parts, made into a dough with water by grinding them on a smooth marble table with a wooden muller. 2½ *lb.* are employed to charge upwards of 40,000 of the French caps.

⁂ *Fulminate of mercury* should only be dried in small parcels at a time, and these should be placed at a distance from each other. The dreadful explosion at Apothecaries' Hall, by which Mr. Hennel, the talented chemist of the Apothecaries' Company, lost his life, was occasioned by the spontaneous detonation of this substance.

FULMINATING PLATINUM. Syn. *Platinum Fulminans,*—Lat. *Prep.* By acting on *sulphate of platinum* with *pure ammonia,* in slight excess. It is analogous to the gold and silver-salt.

FULMINATING POWDER. Syn. *Detonating Powder; Pulvis Fulminans,*—Lat. *Prep.* 1. *Nitre,* 3 parts; *carbonate of potash* (dry), 2 parts; *flowers of sulphur,* 1 part; reduce them *separately* to fine powder, before mixing them. A little of this compound (20 to 30 gr.) slowly heated on a shovel over the fire, first fuses and becomes brown, and then explodes with a deafening report.

2. *Sulphur,* 1 part; *chlorate of potassa,* 3 parts. When triturated, with strong pressure, in a marble or wedgewood-ware mortar, it produces a series of loud reports. It also fulminates by percussion.

3. *Chlorate of potassa,* 6 parts; *pure lamp-black,* 4 parts; *sulphur,* 1 part. A little placed on an anvil, detonates with a loud report, when struck with a hammer. No. 1 is the substance commonly known as *Fulminating Powder.* See *Blasting Powder.*

FULMINATING SILVER. Syn. *Fulminate of Silver, Argento-fulminate; Argentum Fulminans, Argenti Fulminas,*—Lat. *Prep.* 1. Digest *oxide of silver* (recently precipitated and dried by pressure between bibulous paper) in *concentrated liquor of ammonia,* for 12 or 15 hours, pour off the liquid, and cautiously dry the black powder (*fulminate of silver*) in the air, in divided portions. The *decanted ammoniacal liquor,* when *gently* heated, yields, on cooling, small crystals, which possess a still more formidable power of detonation than the black powder, and will *scarcely bear touching,* even whilst under the liquid.

2. Dissolve *chloride of silver* in strong *liquor of ammonia,* cautiously add *pure potassa* (in fragments), and when effervescence ceases, decant the fluid portion, and wash and dry the powder, as before. Slightly less powerful than the last.

3. (Brugnatelli's.) — *a.* Pour *alcohol,* 1 oz., on *nitrate of silver* (in fine powder), 100 gr., previously placed in a capacious flask or beaker-glass, and shortly afterwards add *strong nitric acid,* 1 oz.; as soon as all the powdered nitrate assumes the form of white clouds, add *cold distilled water,* q. s., to suspend the ebullition, and next collect the powder on a filter, and otherwise proceed as before.

b. (Fownes.) *Metallic silver,* 40 to 50 gr.; *nitric acid* (sp. gr. 1·37), ¾ fl. oz., dissolve by the aid of a *gentle* heat, add, whilst the solution is still hot, *alcohol,* 2 fl. oz., and again apply heat until reaction commences; the fulminate slowly separates from the hot liquid under the form of small, brilliant, white, crystalline plates, which after being slightly washed with a little *cold distilled water,* are to be distributed upon *separate* pieces of filtering paper, in portions not exceeding 1 or 2 gr. each, and left to dry in the air. When dry, the papers are to be folded up, and *carefully* preserved in a box or bottle. A *sixpence* and the strongest *commercial* nitric acid and rectified spirit, answer for the above purpose.

c. (Liebig.) *Grain silver,* 1 part; *nitric acid* (sp. gr. 1·36 to 1·38), 10 parts; dissolve at a gentle heat, and add the solution to *alcohol* of 85%, 20 parts; apply a gentle heat till the liquid begins to boil, then remove it from the fire and set it aside to cool; the *fulminate of silver* is deposited in lustrous, snow-white, acicular crystals, and when washed and dried, equals in weight that of the silver employed. The *products* of the last three formulæ are slightly less explosive than of those wherein ammonia is ordered.

Prop., &c. Fulminating silver occurs either in the form of a dark-coloured powder, or small, brilliant, acicular crystals or crystalline plates, according to the mode of its preparation. It dissolves in 36 parts of boiling water, but the solution deposits the greater portion of the fulminate as it cools. It is one of the most dangerous substances for which we are indebted to modern chemistry. It explodes with unparalleled violence by the *slightest* friction or percussion, or when touched with strong sulphuric acid. This occurs even whilst it is moist, if it is pressed by a hard body; and when *dry,* the touch of a feather is often sufficient to explode it. Indeed, its explosive tendency is so great, that it can be hardly made, handled, or kept, with safety. We have, nevertheless, with others, succeeded in burning it in a tube, along with oxide of copper, to determine its composition, in a similar manner to that employed in the analysis of other organic substances. Many frightful accidents have happened from the spontaneous explosion of this substance. 1 or 2 gr. are the most that can be exploded with safety, in a building or confined space.

The products of Nos. 1 and 2, probably slightly differ in composition, as they do in explosive power, from Brugnatelli's compound. It has been proposed to call the latter, by way of distinction, "*detonating silver.*" The last is the true *fulminate of silver.*

FULMINATING ZINC. Syn. *Fulminate of Zinc; Zincum Fulminans, Zinci Fulminas,*—Lat. *Prep.* From *fulminate of silver*, *zinc filings*, and a little *water*, digested together, as *fulminating copper.*

FULMINATION. Syn. *Fulminatio,*—Lat. Detonation. A sudden explosion, accompanied with a loud report and extreme violence. Some *chemists*, without sufficient reason, have endeavoured to confine the application of the term to the explosion of a *fulminate.*

FULMINIC ACID. Syn. *Acidum Fulminicum,*—Lat. A peculiar acid formed by the action of nitrous acid on alcohol in the presence of a metallic salt. It has never been isolated. The *cyanic*, *fulminic*, and *cyanuric acids*, are isomeric compounds, but differ in their powers of saturation; the first being *monobasic;* the second, *bibasic;* and the last, *tribasic.*

The *existence* of fulminic acid was first pointed out by Gay-Lussac and Liebig. Its salts are the *metallic fulminates.* (See *above*).

FUMARAMIDE. A white insoluble powder, formed by the action of *ammonia* on *fumaric ether.* It closely resembles *oxamide.*

FUMARIC ACID. A peculiar acid, discovered by Lassaigne, and produced by the action of heat on malic acid.

Prep. Pure *malic acid* is kept heated a little higher than its melting point for some time, until it forms a crystalline mass, which is then powdered, and washed with *cold water*, to remove any undecomposed malic acid.

Prop., &c. Small, white, crystalline laminæ; freely soluble in hot water and in alcohol, but requires 200 parts of cold water for its solution; heated in a strong current of air, it sublimes; with the bases it forms salts termed *fumarates;* with alcohol it forms *fumaric ether* or *fumarate of oxide of ethyle.* This acid was originally obtained from *fumaria officinalis*, or *common fumitory.*

FUMIGATION. Syn. *Fumigatio, Suffumigatio,* — Lat. Fumigations (*fumigationes*) are vapours or gases extemporaneously extricated for the purpose of destroying contagious or noxious miasmata or effluvia (*antiloimics, disinficientia*), or to mask unpleasant odours (*odoraments; odorata, odoramenta*), or to produce a medicinal action on those parts of the body with which they are brought in contact.

Fumigations, for the purpose of obviating or masking unpleasant odours in the sick chamber, must never be employed to the neglect of cleanliness and ventilation; for most of them, instead of purifying the air, actually render it less fit for respiration. The common practice of burning *scented paper, pastilles, sugar, juniper berries, benzoin, cascarilla, &c.*, so as to create an odoriferous smoke, is of this character. As *disinfecting agents*, they are utterly useless; and are relics of an ancient custom of burning frankincense, and other odorous substances in vitiated air, to overcome the fetor which is more or less present. The fumes thus diffused through the atmosphere, "disguise unpleasant odours; but they accomplish nothing more. The infection remains not only unaltered by the diffusion of the most powerful aromatic vapours, but its deleterious properties are sometimes augmented by them."

Among the various substances used as DISINFECTING FUMIGATIONS, *chlorine* and the *hypochlorites* (chlorides of lime, soda, and potassa), by almost general consent, hold the first place. Dr. Carmichael Smyth recommended *nitrous acid*, which is even now preferred by Dr. Christison to chlorine; whilst Prof. Graham regards the *fumes of burning sulphur* as more efficacious than either of these substances. The *vapours* of *hydrochloric acid* and of *vinegar*, and the *smoke* of *gunpowder*, which once had their advocates, have now justly sunk into disfavour.

Of all common diseases, *scarlet fever* appears to be the one most requiring fumigation. For this purpose, *chlorine gas* or *heat* should be employed. The infectious matters of certain diseases, especially scarlet fever, are either dissipated, or destroyed, at a heat slightly above that of boiling water. (Dr. Henry.) Contagious diseases are very commonly propagated in this metropolis by persons having their linen washed by laundresses who perform their operations in the same sinks of dirt and misery in which they live. See *Disinfectants*, *Inhalations*, *&c.*, (and *below.*)

FUMIGATION (Acetic). Syn. *Fumigatio Acetica*,—Lat. The *fumes* of *strong vinegar* or *acetic acid*, obtained by heating the liquid over a lamp, or by sprinkling it on a hot shovel. *Aromatic vinegar* in this way yields very refreshing fumes, and was formerly thought more efficacious than simple acetic acid.

FUMIGATION (Anodyne). Syn. *Fumigatio Anodyna*,—Lat. *Prep.* (Trousseau & Reveil.) *Stramonium* and *sage*, equal parts, sufficient to fill a small pipe. Smoked in spasmodic asthma, irritating coughs, &c.

FUMIGATION (Aromatic). See *Balsamic Fumigation.*

FUMIGATION (Balsamic). Syn. *Aromatic Fumigation; Fumigatio Aromatica, F. Balsamica*,—Lat. *Prep.* 1. From *gum benzoin*, either alone, or mixed with *olibanum* or *styrax*, thrown on hot cinders or a heated shovel.

2. (Dr. Dohrn.) *Gum olibanum*, 4 parts; *gum benzoin*, *styrax*, and *flowers of roses* and *lavender*, of each, 1 part; to be reduced to powder, and used as before.

3. *Amber*, *mastic*, and *olibanum*, of each, 3 oz.; *benzoin* and *styrax*, of each, 1 oz.; *camphor*, 1 dr. As last. The above are used in hooping-cough, asthma, &c.; a small quantity only being employed at a time.

FUMIGATION (Belladonna). Syn. *Fumigatio Belladonnæ*, — Lat. *Prep.* (M. Schrœder.) From *dried belladonna leaves*, 1 to 2 dr.; as before. In spitting of blood, asthma, tickling cough, &c.

FUMIGATION (Chlorine). Syn. *Disinfecting Fumigation, Guyton-Morveau's do.; Fumigatio Chlorinii, F. Oxymuriatica, Suffumigatio Guytoniana*,—Lat. var. *Prep.* 1. (P. Cod.) *Common salt*, 3 parts; *water* and *oil of vitriol*, of each, 2 parts; *black oxide of manganese*, 1 part; mix in a shallow vessel, placed in the centre of the apartment. This is used to disinfect unoccupied rooms.

2. *Chloride of lime*, either sprinkled on the flour (if *uncarpeted*) or (if *carpeted*) placed about the room in shallow dishes. An old plate or flower-pot saucer answers for this purpose. *Used* for inhabited rooms, and on shipboard, &c.

3. A *solution of chloride of lime* (1 *oz.* of the *chloride* to each quart of *water*). *Used* as the last, but more freely.

Obs. Chlorine fumigations, although so popular, and so much relied on by many medical practitioners, are apparently useless in preventing the progress of certain contagious diseases. "In Moscow, chlorine was extensively tried and found unavailing, nay even injurious, in cholera." (Dr. Pereira.) "At the time that the cholera hospital was filled with *clouds* of chlorine, then it was that the greatest number of the attendants were attacked." (Dr. Albers.) At the Smallpox Hospital, where chlorine was tried, with the view of arresting the progress of erysipelas, "all offensive smell was removed, but the power of communicating the disease remained behind." (Lond. Med. Gaz.) Notwithstanding these marked failures, the confidence of many eminent members of the profession continues unabated. "As a fumigation agent, disinfectant, and antiseptic, chlorine, I believe, stands unrivalled." "For destroying miasmata, noxious effluvia, and putrid odours, it is the most powerful agent known." (Dr. Pereira.) Our own experience leads us to the conclusion that chlorine is more useful in neutralizing the contagious or morbific matter of fevers (especially of scarlet fever) and putrid diseases generally, than of the other diseases in which it has been employed.

FUMIGATION (Hydrochloric). Syn. *Muriatic Fumigation; Fumigatio Muriatica, F. Acidi Hydrochlorici*,—Lat. *Prep.* From *common salt* placed in a cup or saucer, and an equal weight of *oil of vitriol* poured over it. Now seldom used. It rapidly neutralizes ammoniacal fumes.

FUMIGATION (Iodine). Syn. *Fumigatio Iodinii*,—Lat. From *iodine*, 5 to 25 gr., or more, according to extent of surface, placed on a heated iron contained in a box or case in which the limb is enclosed. In the usual skin diseases in which the use of iodine is indicated.

FUMIGATION (Iodine,—Compound). Syn. *Fumigatio Iodinii Composita*,—Lat. *Prep.* (Sellers.) *Iodine*, 20 gr.; *red sulphuret of mercury*, 40 gr.; *sulphur*, 6 dr.; mix and divide into 12 powders. One to be used, as the last, 3 times daily; in lepra, psoriasis, &c.

FUMIGATION (Mercurial). Syn. *Fumigatio Mercurialis*,—Lat. *Prep.* (Bouchardat.) *Olibanum* (in powder), 2 parts; *red sulphuret of mercury*, 3 parts. A little is sprinkled on red-hot coals or a heated shovel held beneath the part; or the fumes are inhaled. *Obs.* Abernethy used the black oxide of mercury (1½ to 2 dr.), and applied it to the whole body, excepting the head, in a similar way to the sulphur bath, and continued the application for about a quarter of an hour. See *Candles* (Medicated).

FUMIGATION (Muriatic). See *above.*

FUMIGATION (Nitric). Syn. *Nitrous Fumigation, Nitric Acid do.; Fumigatio Nitrica, F. Nitrosa, F. N. Smythianæ, F. Acidi Nitrici, Suffumigatio cum Acido Nitrico,*—Lat. var. *Prep.* (P. Cod.) *Sulphuric acid* diluted with *half its weight of water,* is placed in a porcelain cup (any shallow vessel of glass or earthenware will do), placed over heated cinders, and small quantities of *powdered nitre* added to it from time to time.

Obs. Heat causes the gas to be evolved more rapidly, and thus renders the fumes more offensive, without increasing their efficacy. Equal weights of *oil of vitriol* and *water* are the proportions usually employed. $\frac{1}{4}$ *oz.* of *nitre* is said to be sufficient for a small room. (Dr. Bateman.) The vessel containing the ingredients should be placed in an elevated position in the centre of the apartment.

Dr. Carmichael Smyth, who introduced nitric acid gas as a fumigation (1799), received a reward of £5000 from Parliament for publishing his formula.

FUMIGATION (Sulphurous). Syn. *Fumigatio Sulphurosa, F. Sulphuris,*—Lat. *Prep.* 1. The *fumes* of *burning sulphur.*

2. *Flowers of sulphur,* 7 parts; *nitre,* 4 parts; *benzoin* and *olibanum,* of each, 2 parts; *camphor,* 1 part; pressed into the bowls of tobacco pipes, and lighted with a quick-match. See *Baths* and *Disinfectants.*

FUMIGATION (Tar). Syn. *Fumigatio Picea, Suffumigatio Picis Liquidæ,*—Lat. *Prep.* 1. *Vegetable tar,* 1 part; *water,* 7 or 8 parts; mix, and let it simmer in an open vessel set over a spirit-lamp placed near the centre of the apartment.

2. (Sir A. Crichton.) *Norway tar,* 1 *lb.; powdered carbonate of potash,* $\frac{1}{2}$ *oz.* or 1 *oz.;* mix, and heat it as last. The potash is added to neutralize any volatile acid. Formerly highly thought of in bronchitis and pulmonary consumption.

FUMIGATION (Toothache). Syn. *Fumigatio Odontalgica, F. Anti-neuralgica,*—Lat. *Prep.* 1. From *henbane seeds,* powdered and thrown into a basin of *boiling water,* and the affected part held in the steam. Sometimes a *little of the seed* is placed in a *heated iron spoon,* and the part exposed to the fumes.

2. (Mr. Beasley.) A popular remedy is to throw *henbane seed* on hot cinders, inverting a cup over them to receive the smoke and empyreumatic oil produced. The cup is then filled with *hot water,* and the steam conveyed to the affected side of the mouth.

FUMING LIQUORS. See *Hydrosulphuret of Ammonia,* the *Chlorides of Antimony, Arsenic,* and *Tin, &c.*

FUNGI. See *Mushrooms, &c.*

FUNGIC ACID. A peculiar compound obtained by Braconnot from certain fungi —the *boletus juglandis, boletus pseudo-igniarius, phallus impudicus, merulius cantharellus, peziza nigra, &c.* It is prepared by boiling the *expressed juice,* filtering, evaporating to the consistence of syrup, and digesting *alcohol* on it, the *residuum* is then dissolved in *water,* and precipitated with *acetate of lead,* and the precipitate, after being washed, decomposed with *dilute sulphuric acid* at a gentle heat; the remaining solution is filtered and evaporated. It occurs as a sour deliquescent mass. Its salts are called *fungates.* The *fungate of ammonia* crystallizes in prisms.

FUNGINE. The *fleshy portion* of *mushrooms,* deprived of soluble matter by digestion in *water* and in *alcohol.*

FUNNEL. See *Filtration.*

FURFURINE. A remarkable organic compound discovered by Fownes. It is *prepared* by boiling *furfurolamide* in a *dilute solution of caustic potassa.* The liquid deposits *furfurine,* on cooling, under the form of small, white, silky needles.

Prop., &c. Scarcely soluble in cold water; soluble in 135 parts of boiling water; freely soluble in both alcohol and ether; inflammable; reaction strongly alkaline; it is powerfully basic; with the acids it forms a series of beautiful crystallizable salts which are intensely bitter. This substance is "the nearest approach to the native alkaloids yet made." *Fucusine* is obtained from the fuci by a like process.

FURFUROLAMIDE. A yellowish-white, crystalline, insoluble substance formed by acting on *furfurole,* for some hours, with *liquor of ammonia.* Water decomposes it slowly, and acids instantly.

FURFUROLE. *Prep.* (Fownes.) *Sulphuric acid,* diluted with an equal bulk of *water,* is carefully mixed with *twice* its weight of *wheat-bran,* and the adhesive pasty mass thus obtained, is exposed, in a proper vessel to the action of a current of steam, which is afterwards condensed by a worm and refrigerator; the distillate holds *furfurole* in solution. By redistillation several times repeated, the first half of the liquor only being collected, it may be extracted from the water, and then by cautions rectification may be obtained in a state of purity. The *product* is much increased by first depriving the bran of soluble matter by steeping it in a *dilute solution of caustic potassa* and then washing it with *cold water*, and drying it in the sun, or by a gentle heat.

Prop., &c. In appearance and odour it greatly resembles oil of cassia; it distils unchanged; dissolves in all proportions in alcohol, and to some extent in water; it boils at 325° Fahr.; strong acids and alkalies decompose it. Sp. gr. 1·165. *Fucusol* is obtained by a like process from the fuci.

FURNACE. The construction of furnaces belongs to engineering. Some useful information on the subject, in its connection with the laboratory, will, however, be found under the heads—*Chimneys, Evaporation, Fuel, Reverberatory Furnace, Smoke, Steam, &c.*, in this work.

FURNISHING. It is essential for the sake of neatness, and for a pleasing effect to the eye, that there should be a harmony of colours, and also a similarity of style in the main articles of furniture. The tints of the *carpet*, of the *paper* or *paint of the walls*, and of the *window-curtains*, should be all in harmony in each room; that is, either possess a general resemblance of colour, or various colours in pleasing contrast and harmony with each other. If the preponderating colour of the curtains is *scarlet*, and the colour of the walls or carpet *blue*, a most inharmonious and unpleasing effect is produced; but *brown* and *green*, or *green* and *gold*, will be in harmony, and may therefore be placed together. *Carpets* being the most expensive articles, it is safest to buy them first, and then to let their colour guide us in the tone and style of the *curtains, paper-hangings, chair-covers, hearth-rugs*, and the various minor articles. It is also economical to buy carpets of the same pattern for several rooms, because in the event of removal to a house with different sized apartments, a piece of one carpet may be taken to alter the size of another.

FURNITURE. See *Oils, Polishes, Varnishes, &c.*

FURS. Of these the most valuable are *ermine* and *sable*. Fur skins when unprepared, or merely dried, go under the name of *Peltry*. (Brande.)

Furs may be *preserved* from *moths* and other *insects* by placing a little *colocynth pulp* (bitter apples), or *spice* (cloves, pimento, &c.) wrapped in muslin among them; *or* they may be washed in a very weak *solution of corrosive sublimate in warm water* (10 or 15 gr. to the pint), and afterwards carefully dried. As well as every other species of clothing, they should be kept in a clean, dry place.

FUSCINE. A brown colouring matter obtained from *empyreumatic oils*. It possesses no practical interest.

FUSEL OIL. See *Amyle, Distillation*, &c.

FUSIBILITY. The property by which solid bodies assume the liquid state under the influence of heat. See *Melting Point* and *Liquefaction.*

FUSIBLE ALLOYS. Syn. *Fusible Metal. Prep.* 1. *Bismuth*, 2 parts; *lead*, 5 parts; *tin*, 3 parts. Melts in boiling water.

2. (D'Arcet's.) *Bismuth*, 8 parts; *lead*, 5 parts; *tin*, 3 parts. Melts below 212° Fahr.

3. (Onion's.) *Lead*, 3 parts; *tin*, 2 parts; *bismuth*, 5 parts. Melts at 197° Fahr.

4. To the last, after removing it from the fire, add of *quicksilver* (warm), 1 part. *Liquid* at 172°; *solid* at 140° Fahr.

Obs. The *first three* of the above are used to make toy-spoons, to surprise children by their melting in hot liquors, and to form pencils for writing on asses' skin, or paper prepared by rubbing burnt hartshorn into it, &c.; also as a metal bath in the laboratory. The *last* is used for anatomical injections.

FUSION. Syn. *Fusio*,—Lat. The liquefaction of solid bodies by the action of heat. The term *aqueous fusion* has been applied to the melting of salts in their combined water when heated; and the term *igneous fusion*, to the liquefaction of bodies by heat alone.

The *vessels* in which substances are *fused* are formed of various materials and shapes, according to the properties of the solid operated on, and principally with reference to the degree of heat required for its fusion. In every case the containing vessel should be capable of sustaining the proper degree of heat, *without* either *melting* or *cracking*, and should also be *unacted on* by the substances melted in them. *Crucibles*, made of very refractory clay, are employed for high temperatures, and *metallic* or *earthenware vessels* for lower ones. See *Crucibles, &c.*

FUSTIC. Syn. *Fustic Wood.* Of this dye-stuff there are two varieties—

Old Fustic (bois jaune). The wood of the *morus tinctoria.* Its decoction dyes WOOLLENS *yellow* of different shades, according to the mordant. *Alum, tartar*, and *spirits of tin* brighten the tint; *acetate* and *sulphate of iron* and *common salt*, darken it; with *sulphate of iron* it gives OLIVES and BROWNS; with the *indigo vat* and *sulphate of indigo* GREEN. These colours are very permanent. Its yellow turns on the LEMON when pale, and on the ORANGE when darker. 1 *lb.* of *old fustic* will dye 3 to 5 *lb.* of wool.

Young Fustic (Yellow Fustic; Fustet). The wood of the *rhus cotinus* or *Venice sumach.* It gives a YELLOW turning on the green, but its colours are not very permanent. It is chiefly used in combination with other dye-stuffs.

GALBANUM. Syn. *Gum Galbanum; Galbanum,*—Ph. L. E. & D. The "gum resin" of "*galbanum officinale?*" (Ph. L.) The "concrete gummy-resinous exudation of an imperfectly ascertained umbelliferous plant; probably a species of *opoidia.*" (Ph. E.) Its properties are similar to the other fetid antispasmodic gum-resins. It ranks between assafœtida and ammoniacum.

GALBANUM (Strained). Syn. *Prepared Galbanum; Galbanum Colatum; G. Præparatum,*—Ph. L. From *crude galbanum,* as *prepared ammoniacum.* Formerly the common practice was to melt it in the *dry* state, by heat cautiously and quickly applied, and to strain it through a piece of coarse canvass stretched across a wooden frame or "horse." See *Filtration.* The strained galbanum of the shops is seldom pure. The following forms are current in the trade for its "*reduction,*" as this species of adulteration is technically termed:—

1. *Galbanum* (true), 9 *lb.;* strain as above, then add, towards the end, *black resin* (clean), 3 *lb.;* and when the whole is melted, further add of *Venice turpentine,* 2 *lb.* *Product.* 12 *lb.*

2. *Strained galbanum* and *black resin,* of each, 6 *lb.;* melt, and add of *strained assafœtida,* 2 *oz.;* *Venice turpentine,* 3 *lb.* *Prod.* 14½ *lb.*

GALBANUM (Strained,—Factitious). Syn. *Galbanum Colatum Factitium,*—Lat. *Prep.* 1. From *black resin,* 4 *lb.*; melt, and add of *Venice turpentine,* 2 *lb.; assafœtida,* 2½ *oz.; oils of juniper* and *fennel,* of each, 1½ dr.; *water,* ½ pint.

2. As the last, adding *soft soap,* 5 *oz.* Sometimes the small and "waste" of the chests are added to the above to improve them.

GALACTOMETER. See *Lactometer* and *Milk.*

GALL. Syn. *Bile; Bilis, Fel,*—Lat. A bitter fluid secreted by the liver; in part flowing into the intestines, and in part regurgitating into the gall-bladder. Its uses in the animal economy appear to be—to separate the chyle from the chyme, to promote digestion of oleaginous substances, and to assist in exciting the peristaltic action of the intestines. The fæces appear to owe their colour chiefly to the presence of bile, since without, they appear of a dirty pipe-clay colour.

The *gall* of *various animals* was *formerly* used in medicine. From whatever source it was obtained, it was believed to be calefacient, desiccant, detergent, discutient, and parturifacient; but besides these properties, each variety was conceived to possess virtues peculiarly its own. Thus, *bear-gall* (fel ursi) was reputed anti-epileptic; *eel-gall* (fel anguillarum) parturifacient; *hare-gall* (fel leporis), "good in cataract;" and *ox-gall* (fel bovis), "sovereign against stiff joints, rheumatics, angry ulcers, and stomach colics." The gall of the *bat, goat, hen, hog, partridge, siluris, &c.,* were also employed as remedies. At the present time *ox-gall* is the only one used in medicine and the arts.

Ox-gall has been recently re-introduced into medicine by Dr. Allnatt, and others, and in certain cases of dyspepsia and biliary derangement appears to be superior to all other remedies.

Crude ox-gall is extensively employed by the scourers of woollen cloth, clothes renovators, &c. It rapidly extracts grease and oil from textile fabrics, without injuring the colour. See *Constipation, Extracts, Indigestion, Ox-gall, Pills, &c.*

GALL (Glass). See *Sandiver.*

GALLATE. Syn. *Gallas,*—Lat. The salts of gallic acid. Those of the *alkalies* are soluble. They rapidly suffer decomposition in the presence of excess of the base, and the liquor gradually acquires a blackish colour. The *gallates* of *cobalt, iron, manganese, nickel,* and *zinc,* are also soluble; the rest are *insoluble.* *Gallate of ammonia* is made by neutralizing 1 part of gallic acid with ammonia; and *super-gallate of ammonia,* by adding 1 part of acid more, and crystallizing. *Gallate of lead* is obtained by either adding acetate of lead to a warm solution of gallic acid in excess, or by adding the former to the latter at the boiling point. The first is a *supergallate,* the latter a *basic* salt.

GALLIC ACID. Syn. *Acidum Gallicum,*—Ph. L. & D. The "acid prepared from the gall-nut;" in "crystals." (Ph. L.) It may be also obtained from other vegetable substances. It appears to be a product of the oxidation of tannic acid, and probably does not exist ready formed in recent vegetables.

Prep. 1. (Dumas.) *Nut-galls*, reduced to powder, are moistened with *water*, and exposed to the action of the air, in a warm situation (say 70° to 80° Fahr.), for 2 or 3 months, adding *more water*, from time to time, to make up for that lost by evaporation. At the end of the above period, the mouldy, dark-coloured mass is strongly pressed in a cloth, and the solid portion boiled in a considerable quantity of *water*. The solution (filtered whilst hot), deposits on cooling, crystals of gallic acid, which after being thoroughly drained and pressed dry between bibulous paper, are purified by boiling them along with about $\frac{1}{6}$th of their weight of *prepared animal charcoal*, in 8 parts of *water*, and filtering, &c., as before.

2. (Graham.) A *strong infusion* or *decoction of galls* is precipitated with *sulphuric acid*, in the cold; the resulting thick mass is mixed with *dilute sulphuric acid* (cold), and the liquid expressed; the marc is next treated with *sulphuric acid*, diluted with twice its weight of *water*, and after boiling the mixture for some minutes, the whole is allowed to cool; the resulting crystals are purified as before.

3. (Liebig.) A strong *aqueous solution of tannic acid* (tannin) is added to *sulphuric acid*, as long as a precipitate falls; the powder is collected, washed, and dissolved by the aid of heat in *dilute sulphuric acid;* the solution after being boiled for a few minutes, deposits, on cooling, *crystals of gallic acid* in considerable quantity.

4. (Scheele.) A filtered *decoction of galls* is exposed for some months in an open vessel; after a time it grows mouldy, and becomes covered with a thick glutinous pellicle; in two or three months, the sides of the vessel and the under portion of the pellicle is found to be covered with small yellow crystals of gallic acid, which are purified as directed above. (See No. 1.)

5. (Ph. D.) The Dublin Ph. contains two formulæ for gallic acid, the one being based on that of Dumas or Scheele; the other, on that of Graham or Liebig.—*a.* From *galls* (in coarse powder), 1 *lb.; water*, q. s. to make a stiff paste; a porcelain dish is ordered, and the exposure in the moistened condition is to be continued for 6 weeks; the solution of the first crop of crystals is to be made in 10 fl. oz. of *boiling water*, and when the filtrate has cooled to 80° Fahr., it is to be poured off from the crystals which have formed, which are then to be washed with *ice-cold water*, 3 fl. oz., and dried,—first in blotting paper, and finally by a steam or water heat. By boiling the undissolved portion of the galls with 45 fl. oz. of *fresh water*, more crystals may be obtained.

b. Powdered *gall-nuts*, 1 *lb.;* are steeped for 24 hours in *water*, 1 pint, and after being placed in a porcelain displacement apparatus, are treated with *water*, 1½ pint, added in successive portions; *oil of vitriol*, 5 fl. oz., diluted with an equal volume of *water*, and allowed to cool, is now added to the percolated infusion, and after thorough admixture, the liquid is filtered from the viscid precipitate which forms; *oil of vitriol*, 5 fl. oz. (diluted as before), is then added to the filtrate; the precipitates, enveloped in calico, are submitted to powerful pressure, and subsequently dissolved in *oil of vitriol*, 16 fl. oz., previously diluted with *water*, 56 fl. oz.; the solution is boiled for 20 minutes, and set aside for a week; at the end of this time the deposit which forms, is dissolved in *three times* its weight of *boiling water*, and the solution treated as before.

Prop. Gallic acid forms small, feathery, and nearly colourless crystals, which have a beautiful silky lustre; that of commerce is usually of a pale yellow colour; it is soluble in 100 parts of *cold* water, and in 3 parts of *boiling* water; it is also soluble in alcohol, and *slightly* so in ether; the aqueous solution is decomposed by exposure to the air; dissolved in hot oil of vitriol, it forms a deep, rich, red solution, which when thrown into water, drops the gallic acid, deprived of some of its water. This substance is soluble in the alkalies, and dyes cloth like madder. When strongly heated, gallic acid is converted into *metagallic acid*, *pyrogallic acid*, &c.

Tests. Gallic acid is distinguished from *tannic acid* by not affecting solutions of gelatin, the protosalts of iron, or the salts of the alkaloids, and by giving a deep bluish-black precipitate with the sesquisalts of iron, which disappears when the liquid is heated. It is distinguished from *pyrogallic acid* by its inferior solubility in water, and by its *not* affecting the solutions of the protosalts of iron. To detect *gallic acid* mixed with *tannic acid*, the latter should be removed, either by digesting the substance in ether, or by immersing for some time in its solution a piece of skin depilated by lime, previously to applying the tests.

Pur. "Free from colour; decomposed by heat; soluble in water, and in rectified spirit. It turns preparations of the sesquioxide of iron, dissolved in water, of a bluish-black colour, but throws down nothing from a solution of isinglass." (Ph. L.)

Uses, &c. The principal use of pure gallic acid is in the art of photography. It has recently been employed in *medicine*, as an internal astringent, in *doses* of 3 to 10 gr., thrice a day, or oftener; in hemorrhage and fluxes, as well as for checking the night sweats in phthisis. Dr. Todd says, that in all cases of internal hemorrhage, or hemorrhagic tendency, it is the best astringent or styptic we possess. As an *external* astringent, it is greatly inferior to tannic acid. It has been given in doses of 15 to 30 gr. in tape-worm, "but without any benefit." (Pereira.)

Obs, Gallic acid, as obtained by either of the above forms, is never quite pure; but it may be rendered *absolutely pure* by combining it with oxide of lead, and decomposing the compound (*gallate of lead*) by sulphuretted hydrogen. The sulphuret of lead acts like animal charcoal in removing the colour. (Liebeg.) Commercial gallic acid "may be rendered nearly white by dissolving it in 20 times its weight of *boiling distilled water*, and causing the solution to traverse a stratum of *prepared animal charcoal* spread upon a calico filter. When the liquid passes through colourless, it should be evaporated to 1-6th its volume, and then suffered to cool, in order to the separation of the crystallized acid." (Ph. D.)

GALLIC FERMENTATION. This name has been given to the peculiar process by which *tannic acid* is converted into *gallic acid*, under the joint influence of moisture and atmospheric oxygen. According to the researches of M. Antoine Larocque, the peculiar ferment of nut-galls which operates this change, also converts sugar into alcohol and carbonic acid, in the same way as yeast does; whilst beer yeast, muscular flesh, and caseous matter, change tannin into gallic acid. The similarity of the gallic and vinous fermentation may hence be reasonably inferred.

GALLS. Syn. *Gall-nuts, Nut-galls; Galla,* —Ph. L. & D. *Gallæ,*—Ph. E. "A swelling of the small twigs of" the "*quercus infectoria,*" "excited by the cynipe gallæ tinctoriæ" or gall fly. (Ph. L.) The best galls are "bluish-black, heavy," and "not yet perforated," (Ph. L.) They are imported from Aleppo, and are known in commerce as *black* or *blue galls* (gallæ nigræ, g. cœruleæ). The next quality is termed, from their colour, *green galls* (gallæ virides). Both are gathered before the insect has escaped, and are styptic and powerfully astringent. *White galls* (gallæ albæ) are lighter, less astringent, and inferior.

Uses, &c. Galls are extensively employed in the art of dyeing, and constitute one of the principal ingredients in all the shades of black, and are also employed to fix or improve several other colours. A decoction of galls, to which a little green copperas and gum arabic has been added, forms common writing ink. In *medicine* they are used as an astringent, in hemorrhages and fluxes, in *doses* of 10 to 20 gr.; and *topically*, under the form of infusion or decoction, as a gargle in relaxation of the uvula; as an injection in gleet and leucorrhœa; as a lotion or fomentation in flabby ulcers, prolapsus ani, &c.; and as an ointment in piles, watery ulcers, &c. The infusion or decoction is also used as an antidote to poisoning by the alkaloids, and was formerly given as a tonic in intermittents. See *Gallic Acid, Ink, &c.*

GALLSTONE. Syn. *Calculus Biliosus, C. Cysticus Bovinus,*—Lat. Formed in the gall-bladder of *neat cattle* in winter, when they are fed upon dry food. *Used* as a yellow pigment, and in medicine. *Dose.* 1 gr. in dyspepsia and flatulency.

GALVANIC BATTERY. See *Voltaic Battery.*

GALVANISM. See *Voltaic Electricity.*

GALVANIZED IRON. See *Iron* and *Zincing.*

GALVANO-PLASTIC. See *Voltatype.*

GAMBOGE. Syn. *Cambogia, Gambogia,* —Lat. "The gum-resin" from "uncertain species of *garciniæ.*" (Ph. L.) Gamboge is an active hydragogue and drastic purgative, which occasionally proves useful in torpor of the abdominal and pelvic viscera; but which is highly dangerous in an irritable or inflammatory state of the stomach or bowels, and during pregnancy. It is very apt to induce nausea and vomiting. In large quantities it is a *violent poison.* "The deaths which have occurred from the use of enormous quantities of Morrison's pills, are mainly ascribable to the gamboge contained in those medicines." (Pereira.) *Dose.* 1 to 5 gr., made into pills or mixture, every 4 to 6 hours; in obstinate constipation, in dropsies, in apoplexy and like cerebral affections, and in worms (especially tape-worm), either alone or combined with other cathartics. See *Compound Extract of Colocynth* (and *below*).

GAMBOGIC ACID. Syn. *Gambodic Acid, Gamboge Resin; Acidum Cambogicum,*—Lat. From the *ethereal tincture of gamboge* abandoned to spontaneous evaporation. It forms orange-coloured scales, or a deep cherry-red resinous mass, which is insoluble in water, very soluble in ether and in alcohol, giving an appreciable yellowness to fully 10,000 times its weight of the latter. With the caustic alkalies it forms dark red-coloured solutions (*alkaline gambogiates*), from which the *gambogic acid* is precipitated unchanged by the stronger acids. Added to a solution of acetate of lead, it throws down a yellow *gambogiate of lead*, and from solutions of the salts of *iron* and *copper*, *gambogiates* of those metals. Its physiological properties are similar to those of gamboge, but much milder and more certain. In *doses* of 3 to 5 gr. it produces copious liquid discharges from the bowels, without pain or inconvenience.

GANGRENE. See *Mortification.*

GANTEINE. A composition used to clean kid and other leather gloves.

Prep. 1. (M. Buhan.) *Curd soap* (in small shavings), 1 part; *water*, 3 parts; mix with heat, and stir in of *essence of citron*, 1 part.

2. (*Saponine*,—M. Duvignau.) *Soap* (in powder), 250 parts; *water*, 155 parts; dissolve with heat, cool, and add of *eau de javelle*, 165 parts; *liquor of ammonia*, 10 parts; and rub the whole to a smooth paste. Patent. A small portion of either of the above is rubbed over the glove with a piece of flannel (always in one direction), until it is sufficiently clean. See *Gloves.*

GARANCINE. See *Madder Red.*

GARDENING. The art of cultivating a garden. It is divided into—"*horticulture*, which comprehends the cultivation of culinary vegetables and fruits;—*floriculture*, which includes the culture of ornamental and curious flowers, shrubs, and trees;—*arboriculture*, which implies the culture of trees and shrubs used for various purposes in the arts and in general economy;—and *landscape gardening*, or the general distribution of the scenery or landscape about a country residence." (Loudon.) Our space precludes a lengthened notice of this subject. Several matters intimately connected with it in its various applications, will be found in this work, under the respective heads.

GARGLE. Syn. *Gargarism*, *Throat-wash; Gargarisma*, *Gargarismus*, *Gargarismum*,—Lat. A liquid medicine applied to the back part of the mouth or upper part of the throat. Gargles are applied by allowing a small mouthful, to run as much possible over the affected part, by holding the head backwards, and breathing through it, by which means the liquid is agitated and its action promoted.

Gargles are *not to be swallowed.* It often happens, however, that patients, either by accident or from negligence, do swallow a certain quantity, notwithstanding the instructions given them to the contrary. Care should therefore be taken to avoid making gargles of such substances as may occasion unpleasant symptoms in small doses, though they may not, perhaps, amount to poisoning.

Gargles usually have for their basis either *simple water*, or *milk*, *wine*, or *vinegar*, diluted with *water*, to which, in both cases, *sugar*, *honey*, or *syrup*, is generally added. Their other ingredients vary with the indication, but must, in all cases, be either in the liquid form, or soluble in the liquid used as the excipient.

Gargles are commonly "*dispensed*" in mixture bottles. The quantity used at a time, under ordinary circumstances, may be about 2-3rds of a wine-glassful.

GARGLE. Syn. *Gargarisma*, *G. Commune*, *G. Simplex*,—Lat. *Prep.* (St. B. Hosp.) *Honey* or *honey of roses*, 1½ oz.; *strong vinegar*, 2½ fl. oz.; *barley water*, 1 pint. In common sore throats, &c. The formulæ of several other hospitals are similar.

GARGLE (Acetate of Ammonia). Syn. *Gargarisma Ammoniæ Acetatis*, — Lat. *Prep.* (Wendt.) *Solution of acetate of ammonia* and *honey of roses*, of each, 1 oz.; *elder-flower water*, 8 fl. oz.; mix. In the ulcerated sore-throat of scarlet fever.

GARGLE (Alum). Syn. *Gargarisma Aluminis*, — Lat. *Prep.* 1. (Augustin.) *Oak-bark* (in powder), 1 oz.; *water*, 1½ pint; boil to a pint, filter, cool, and add of *alum*, ½ dr.; *brandy*, 2 fl. oz. In inflammation of the mouth and throat.

2. (Cavarra.) *Alum*, 3 dr.; *water*, 6 fl. oz.; dissolve. In offensive breath.

3. (Foy.) *Alum*, 1 dr.; *tincture of myrrh*, 2 dr.; *tincture of bark*, 4 dr.; *honey of roses*, 2 oz.; *laudanum*, 20 drops; *wine*, ¾ pint. In scurvy.

4. (Grant.) *Alum*, 1 oz.; *tincture of myrrh*, ½ fl. oz.; *peppermint water*, 7 fl. oz. In relaxation of the uvula, &c.

5. (Mid. Hosp.) *Alum*, 1 dr.; *water*, 6 fl. oz. As No. 4.

6. (P. Cod.) *Alum*, 40 gr.; *honey of roses*, 1 oz.; *infusion of roses*, 6 fl. oz. As the last.

7. (Ratier.) *Alum*, 1 oz.; *infusion of red roses* and *barley water*, of each, 3 fl. oz.; *honey of roses*, 2 oz. As No. 4.

8. (Ph. Wirtem.) *Alum* and *nitre*, of each, 3 oz.; *cream of tartar*, 4 oz.; dilute *acetic acid*, 4 ℔; dissolve, evaporate to dry-

ness, and powder the residuum. For *use*, ½ oz. of the powder, is dissolved in *water*, 8 fl. oz. Highly recommended in inflammation of the fauces and tonsils. This forms Zobel's *Specific for quinsy.*

GARGLE (Antiscorbutic). Syn. *Gargarisma Antiscorbuticum*, — Lat. *Prep.* (P. Cod.) *Bitter species*, 1 dr.; *boiling water*, 8 oz.; macerate 1 hour, strain, and add *syrup of honey*, 2 oz.; *antiscorbutic tincture*, 1 oz.

GARGLE (Antiseptic). Syn. *Gargarisma Antisepticum*, — Lat. *Prep.* (Fr. Hosp.) *Decoction of bark*, 6 oz.; *camphor*, 20 gr.; *sal ammoniac*, 12 gr. In putrid sore throat, &c.

GARGLE (Astringent). Syn. *Gargarisma Astringens*,—Lat. *Prep.* 1. (Collier.) *Tincture of galls*, 2 fl. dr.; *honey*, ½ oz.; *water*, 6 fl. oz. In relaxation of the uvula and fauces.

2. (Collier.) *Honey*, 4 dr.; *tincture of myrrh*, 3 dr.; *powdered alum*, 40 gr.; *compound infusion of roses*, 5½ fl. oz. As the last, and in fetid sore throat.

3. (Sir A. Cooper.) *Alum*, 2 dr.; *decoction of bark*, 12 oz.; *honey of roses*, 1½ oz.

4. (Dr. A. T. Thomson.) *Infusion of roses*, 7 fl. oz.; *dilute sulphuric acid*, 1 fl. dr.; *tincture of catechu*, 6 fl. dr.; *laudanum*, 1½ fl. dr. For relaxation of the uvula.

GARGLE (Borax). Syn. *Gargarisma Boracis*,—Lat. *Prep.* 1. (Ellis.) *Borax*, 1 dr.; *tincture of myrrh*, 4 fl. dr.; *clarified honey*, 1 fl. oz.; *rose water*, 4 fl. oz.

2. (Fr. Hosp.) *Borax*, 2 dr.; *honey* or *capillaire*, 1 oz.; *rose water*, 7 fl. oz.

3. (Guy's Hosp.) *Borax*, 2 dr.; *honey of roses*, 1 oz.; *barley water*, 7 fl. oz.

4. (Mid. Hosp.) *Borax*, 2 dr.; *simple oxymel*, ½ fl. oz.; *water*, 11½ fl. oz. The above are used in thrush or aphthous sore mouth, ptyalism, &c.

GARGLE (Capsicum). Syn. *Gargle of Cayenne Pepper; Gargarisma Capsici*,—*Prep.* 1. (Dr. Griffith.) *Tincture of capsicum*, ½ fl. oz.; *rose water*, 8 fl. oz.

2. (St. B. Hosp.) *Capsicum*, 3 dr.; *common salt*, 1 oz.; *boiling water*, 1 pint; macerate for 12 hours, strain and add of *distilled vinegar*, 1 pint.

3. (U. C. Hosp.) *Tincture of capsicum*, 1 fl. dr.; *vinegar*, 1 fl. oz.; *water*, 6 fl. oz. *Used* in ulcerated sore throat, scarlet fever, &c.

GARGLE (Chlorate of Potassa). Syn. *Gargarisma Potassæ Chloratis*,—Lat. *Prep.* (Beasley.) *Chlorate of potassa*, 1 dr.; *honey of roses*, 1 oz.; *water*, 7 oz.

GARGLE (Chlorate of Soda). Syn. *Gargarisma Sodæ Chloratis*,—Lat. *Prep.* (Radius.) *Chlorate of soda*, 40 gr.; *honey of roses*, 1 oz.; *water*, 3 fl. oz. Both the above are used in malignant sore throat, scarlatina, &c.

GARGLE (Chloride of Lime.) Syn. *Gargarisma Calcis Chlorinatæ*,—Lat. *Prep.* From *chloride of lime*, 1 dr.; *water*, ½ pint; agitate together for 10 minutes, filter through linen, and add of *simple syrup*, 1 fl. oz. *Used* in putrid sore throat, scarlet fever, &c.

GARGLE (Chloride of Soda). Syn. *Gargarisma Sodæ Chlorinatæ*,—Lat. *Prep.* (Copland.) *Liquor of chloride of soda*, 12 fl. dr; *honey*, ½ oz.; *water*, 6 fl. oz. *Used* as the last.

GARGLE (Chlorine). Syn. *Gargarisma Chlorinii*,—Lat. *Prep.* 1. (Fr. Hosp.) *Chlorine water*, ½ fl. oz.; *syrup*, 1 fl. oz.; *water*, 4½ fl. oz.

2. (Mid. Hosp.) *Chlorine water*, 2 fl. oz.; *distilled water*, 10 fl. oz. *Use.* As the last.

GARGLE (Cinchona Bark). Syn. *Gargarisma Cinchonæ*,—Lat. *Prep.* From *decoction of cinchona*, 7 fl. oz.; *simple oxymel*, 1 fl. oz. Antiseptic and astringent; in relaxation, &c.

GARGLE (Common). Syn. *Gargarisma Commune*,—Lat. *Prep.* 1. (Ed. Hosp.) *Water*, 6 fl. oz.; *nitre*, 1 dr.; *honey of roses*, 1 oz. For ordinary sore throat, &c.

2. Instead of *nitre* use *borax*, 2 dr. See *Gargle* (above).

GARGLE (Cyanide of Mercury). Syn. *Gargarisma Hydrargyri Cyanidi*,—Lat. *Prep.* (Brera.) *Cyanide of mercury*, 10 gr.; *honey of roses*, 1 oz.; *barley water*, 1 pint.

2. (Cullerier.) *Cyanide of mercury*, 10 gr.; *linseed tea*, 1 pint. *Used* in the same cases as mercurial gargle.

GARGLE (Detergent). Syn. *Gargarisma Detergens*,—Lat. *Prep.* 1. (P. Cod.) *Alcoholized sulphuric acid*, 1 dr.; *honey of roses*, 2 oz.; *barley water*, 8 oz.

2. (Dr. A. T. Thomson.) *Nitre*, 2 dr.; *honey of roses*, 4 fl. dr.; *infusion of roses*, 5½ fl. oz. In inflammatory sore throat.

GARGLE (Emollient). Syn. *Gargarisma Emolliens*,—Lat. *Prep.* 1. (Buchan.) *Marsh-mallow root*, 1 oz.; *figs*, 2 oz.; *water*, 1 quart; boil to a pint and strain. Demulcent; soothing.

2. (Trousseau & Reveil.) *Barley water*, 8 oz.; *honey*, 1½ oz. Both are used in inflammatory affections of the throat and mouth.

GARGLE (Horseradish). Syn. *Gargarisma Armoraciæ*,—Lat. *Prep.* (Collier.) *Compound spirit of horseradish*, 1 fl. oz.; *honey*, 2 oz.; *water*, 4 fl. oz. A good gargle for scurvy of the fauces and pharynx, vulgarly called the *inward scurvy.*

GARGLE (Hydrochloric Acid). Syn. *Muriatic Acid Gargle; Gargarisma Acidi Hydrochlorici,*—Lat. *Prep.* 1. (Guy's Hosp.) *Hydrochloric acid,* 30 drops; *honey of roses,* 2 oz.; *barley water,* 6 fl. oz.

2. (Ratier.) *Hydrochloric acid,* 2 fl. dr.; *clarified honey,* 2 fl. oz.; *barley water,* 1 pint.

3. (St. B. Hosp.) *Red-rose leaves,* 2 dr.; *boiling water,* 1 pint; *hydrochloric acid,* 1½ fl. dr.; digest 1 hour, and strain. In inflammatory sore throat, ulcerations of the mouth, scarlet fever, &c.

GARGLE (Iodine). Syn. *Gargarisma Iodinii,*—Lat. *Prep.* 1. *Iodine,* 10 gr.; *iodide of potassium,* 12 gr.; *rectified spirit* and *simple syrup,* of each, 1 fl. oz.; *water,* 5 fl. oz. In chronic enlargement of the tonsils, in scrofulous habits.

2. (Dr. Ross.) *Tincture of iodine,* 1½ fl. dr; *tincture of opium,* 1 fl. dr.; *water,* 6 fl. oz. In ulceration of the tonsils.

GARGLE (Mercurial). Syn. *Gargarisma Hydrargyri, G. Mercuriale,*—Lat. *Prep.* 1. (G. Hyd. Bichloridi.) *Corrosive sublimate,* 2 to 5 gr.; *barley water,* 1 pint; *honey of roses,* 2 fl. oz. For syphilitic ulcers in the throat.

2. (Plenck.) *Calomel,* 6 gr.; *quicksilver,* 30 gr.; *powdered gum,* 3 dr.; *syrup of poppies,* ½ oz.; triturate till the globules of metal disappear, and add of *decoction of clematis,* 26 fl. oz.; *honey of roses,* 1 oz.; *essence of myrrh,* 1 dr., (or *tincture of myrrh,* 1 fl. oz.) In syphilitic and putrid sore throat.

GARGLE (Myrrh). Syn. *Gargarisma Myrrhæ,*—Lat. *Prep.* 1. (Ainslie.) *Tincture of myrrh,* 6 fl. dr.; *vinegar,* 1 fl. dr.; *honey of roses,* 1½ fl. oz.; *barley water,* 12 fl. oz.

2. (Ph. Chirur.) *Tincture of myrrh,* ½ oz.; *honey of roses,* 1½ oz.; *lime water,* 6 fl. oz, In scarlatina and putrid sore throat.

GARGLE (Nitre). Syn. *Gargarisma Salis Nitri, G. Potassæ Nitratis,*—Lat. *Prep.* 1. *Nitre,* 2 dr.; *honey* or *syrup,* ½ oz.; *rose water,* 5½ fl. oz.

2. (*Brande.*) *Nitre,* 2 dr.; *oxymel,* 1 fl. oz.; *barley water,* 7 fl. oz. In inflammatory sore throat.

GARGLE (Oak-bark). Syn. *Gargarisma Corticis Quercûs,*—Lat. *Prep.* 1. *Oak-bark,* 2 dr.; *boiling water,* 6 fl. oz.; macerate 1 hour and strain.

2. (Ellis.) *Decoction of oak-bark,* 1 pint; *alum,* ½ dr.; *brandy,* 2 fl. oz. In chronic sore throat, relaxation of the uvula, &c.

GARGLE (Pellitory). Syn. *Gargarisma Pyrethri. Prep.* 1. *Pellitory root,* 4 dr.; *water,* 16 fl. oz.; boil to 8 fl. oz., and add of *liquor of ammonia,* 2 fl. dr.

2. (Swediaur.) *Infusion of pellitory,* 1 pint; *vinegar,* 3 fl. oz.; *sal ammoniac,* 3 dr. To promote the maturation and healing of throat ulcers.

GARGLE (Roses). Syn. *Gargarisma Rosæ, G. Rosarum,*—Lat. *Prep.* (Kendrick.) *Conserve of roses,* 3 oz.; *boiling water,* 16 fl. oz.; infuse 1 hour; add of *dilute sulphuric acid,* 2 fl. dr., and strain. Antiseptic; astringent; *used* in several indications.

GARGLE (Spirit). Syn. *Gargarisma Spiritûs Vini,*—Lat. *Prep.* (Dr. Watson.) *French brandy,* 1 fl. oz.; *water,* ¼ pint. In relaxations and salivation.

GARGLE (Stimulant). Syn. *Gargarisma Stimulans,*—Lat. *Prep.* (Dr. Copland.) *Infusion of roses,* 6½ fl. oz.; *dilute hydrochloric acid,* 40 drops; *tincture of capsicum,* 1½ fl. dr.; *honey,* 3 dr. See *Gargle of Capsicum.*

GARGLE (Tannin). Syn. *Gargarisma Acidi Tannici,*—Lat. *Prep.* 1. (Beral.) *Tannin,* 1 dr.; *honey of roses,* 2 oz.; *rose water,* 2 fl. oz.; *distilled water,* 8 fl. oz.

2. (Jannart.) As the last, but using only *half* the quantity of tannin. In salivation and aphthous ulcerations.

GARGLE (Verdigris). Syn. *Gargarisma Æruginis, G. Cupri Acetatis,*—Lat. *Prep.* (Guy's Hosp.) *Oxymel of verdigris,* 4 dr.; *honey of roses,* 2 oz.; *barley water,* 3½ fl. oz. *Used* as a detergent for ulcers in the throat. If swallowed it produces violent vomiting. The addition of 2½ oz. of water to the above, produces a gargle sufficiently strong for most cases.

GARGLE (Vinegar). Syn. *Oxymel Gargle; Gargarisma Aceti, G. Acidi Acetici,*—Lat. *Prep.* (St. B. Hosp.) *Barley water,* 12 fl. oz.; *acetic acid,* 1½ fl. oz.; *honey,* 6 dr. Antiseptic. For ordinary sore throat.

GARGLE (Zinc). Syn. *Gargarisma Zinci, G. Z. Sulphatis,*—Lat. *Prep.* (Dr. Copland.) *Sulphate of zinc,* 20 gr.; *oxymel,* 1 fl. oz.; *rose water,* 7 fl. oz. In aphthous sores, relaxations, ulceration of the tonsils, &c.

GARLIC. Syn. *Allium,*—Lat. The *allium sativum* of Linnæus. It is diaphoretic, diuretic, expectorant, stimulant, and tonic; and *externally,* irritant, rubefacient, and even vesicant. *Dose.* ½ dr. to 1½ dr.; in enfeebled digestion, chronic diarrhœa, old chronic coughs, atonic dropsies, and worms. An antispasmodic and counter-irritant liniment is made of the juice, which was formerly esteemed in chest diseases and infantile convulsions. A small clove of garlic, or a few drops of the juice, was formerly introduced into the ear in certain forms of deafness. As a *condiment*, its properties resemble those of the onion, than which it is much more powerful.

GARNET. The finest specimens of "noble garnet" (*Syrian* or *Oriental garnet*) are brought from Pegu. According to chemical analysis, the garnet is a double silicate of alumina and lime, coloured with about 4% of oxide of iron.

GARNET (Factitious). See *Pastes, Enamels, &c.*

GARUM. A species of pickle prepared of *fish*, in a state of incipient putrefaction, strongly *salted*, and seasoned with *aromatics.* According to Pliny, the Romans used a species of lobster for this purpose.

GAS. Any aëriform or permanently elastic fluid, excepting the compound of oxygen and nitrogen, constituting the atmosphere, to which, in English, the term *air*, is exclusively appropriated. The principal gases are—*ammonia, carbonic acid, carbonic oxide, carburetted hydrogen, chlorine, hydrochloric acid, hydrogen, nitrogen, oxygen, ozone, phosphuretted hydrogen, protoxide of nitrogen, sulphuretted hydrogen,* and *sulphurous acid.* See these substances under their respective heads.

GAS (Coal). Syn. *Light Gas.* Obtained from coal by distillation in iron cylinders or retorts. This gas is a compound of carburetted and bicarburetted hydrogen, more or less pure; its value for the production of light depending on the latter. Good coal gas ought to contain 13% by measure of bicarburetted hydrogen, and have the sp. gr. 0·650, air being 1; but, as prepared at the gasworks, it varies from about 0·550 to 0·420. The poorest gas made in England was, until very recently, that of the metropolis, which had the average sp. gr. 0·412. The best is that made by the "Liveryool New Gas Company," which has the sp. gr. 0·580. (Hedley.) Owing to the "agitation" on the subject, the opposition of rival companies, and the exposures made by the official chemist, the quality of the gas consumed in the city of London has been greatly improved during the last 2 or 3 years. It is still, however, far from possessing that purity and illuminative power which the public have a right to expect.

It has been proposed to *increase* the *illuminating power* of *ordinary coal gas*, or even *water gas*, and *light carburetted hydrogen*, by passing them through sponges or over trays containing *mineral naphtha* or *benzole;* and a patent has been taken out for this purpose. The gas so treated imbibes or dissolves a portion of the liquid, and burns with increased brilliancy. The method of saturating the gas with the liquid hydrocarbon is as follows:—"The apparatus consists of a brass reservoir or chamber attached to the end of the gas-pipe, near the burner. This reservoir may be in the shape of an oil-flask, made air-tight, with a screw-joint, or other means of supplying any highly volatile oil, turpentine, or mineral naphtha, and should be kept about half full. Into this reservoir the gas-pipe ascends a little above the surface of the oil; a very small jet-pipe of gas, regulated by a stopcock, is branched off below this chamber, to supply a minute flame, so as to cause a sufficient evaporation from the oil to unite with the gas in the flask receiver. The whole is of course surmounted with the usual burner and lamp glass."

The *illuminating power* of *gas*, as well as of other sources of light, may be directly ascertained by what is termed the "*comparison of shadows*," or indirectly, and more conveniently, by chemical analysis. See *Illumination, Smoke, Ventilation, &c.*

GAYACINE. Resin of guaiacum.

GAZOGENE. Syn. *Ærating Machine.* Under these names several ingenious modifications of what chemists call "Nooth's apparatus" have been recently brought before the public. The "*aerated-water machine*" of Mr. Masters is, however, preferable to *all* others, from the total absence of easily oxidizable metals in its construction. By this simple and inexpensive instrument, *water, wine, ale, &c.*, of the most vapid description, may in a few minutes be fully saturated with carbonic acid gas, and restored to more than its original briskness and piquancy,—to a condition, indeed, not inferior in this respect, to the choicest samples of champagne. By using *fruit syrups*, manufactured from English and foreign fruits, the most delicious aerated summer beverages can be made, resembling those so much esteemed by travellers in the South of Europe, and the sea-bord cities of the Western world. But it is not only in connexion with the *luxuries* of *our households* that this machine must be regarded. Its services in the promotion of *hygiene* and *domestic medicine* are equally important. By its aid that now very expensive, though useful preparation, *fluid magnesia*, may be prepared at the rate of *one penny a quart*,—its present price is 3*s.* 6*d.* In like manner, the various *carbonated saline waters* (potash water, soda water, Carara water, &c.) may be made at the rate of *four glasses* a *penny*, and that of equal quality to the best bottled; whilst, when flat, they lack that insipidity and taste of the cork, which is common with all these beverages purchased at the shops.

GEINE. Syn. *Geic Acid.* The name given by Berzelius to the soluble brown matter of vegetable mould. According to Braconnot it resembles ulmin. See *Humic Acid.*

GELATIGENOUS or *Gelatinous principles*, are those alimentary substances which do not contain proteine, and which furnish a jelly, when boiled with water. See *Food, Gelatine, &c.*

GELATINE. Syn. *Gelatin; Gélatine, Grenetine*,—Fr. *Gelatina*,—Lat. Animal jelly, obtained by the action of heat on the organic tissue of the bones, tendons, and ligaments, the cellular tissue, the skin, and the serous membranes, whilst in contact with water. *Glue* and *size* are coarse varieties of gelatine, prepared from hoofs, hides, skins, &c.; and *isinglass* is a purer kind, obtained from the air-bladders and some other membranes of fish.

Prop., &c. Gelatine is insoluble in cold water, but dissolves with greater or less readiness on the application of heat, according to the source whence it is obtained, and in this state forms a tremulous and transparent jelly on cooling; it is insoluble in both alcohol and ether; and is decomposed by the strong alkalies and acids; with tannin it forms *leather;* when acted on by sulphuric acid, it yields *glycicoll* or *gelatine sugar;* and when treated with alkalies it yields *glycicoll* and *leucine.* Chlorine passed into a solution of gelatine occasions a dense white precipitate (*chlorite of gelatine*), which ultimately forms a tough, elastic, pearly mass, somewhat resembling fibrine.

Tests. Its aqueous solution is recognised as follows:—1. It gelatinizes on cooling.—2. It is precipitated by alcohol.—3. Bichloride of mercury gives a whitish flocculent precipitate.—4. A solution of tannin or infusion of galls gives a copious yellowish-white, curdy precipitate, which, on being stirred, coheres into an elastic mass, insoluble in water, and incapable of putrefaction, and which, when dried, assumes the appearance of over-tanned leather.—5. The gelatinizing property is destroyed by nitric acid.—6. It is not affected by either alum or the acetates of lead. In this respect it differs from *chondrine.*

Qual. The goodness of commercial gelatine intended for food, is readily proved by pouring *boiling* water over it, and digesting the two together for a short time. If it is pure and wholesome, its colour remains unaltered, and during its solution it continues entirely free from smell. The resulting solution and jelly are also odourless, neutral to test paper, free from unpleasant taste, and perfectly transparent. If it forms a yellow gluey-looking mass, and evolves an offensive odour, it should be rejected as of inferior quality, and unfit for culinary purposes.

Uses, &c. These are too well known to require a separate notice here. As an article of diet, gelatine appears to be highly nutritious when combined with other food abounding in proteine matter; but *alone*, it appears that, notwithstanding the opinion of ages to the contrary, it is *incapable* of *supporting life.* The commendation of it as an alimentary substance has been too general and lavish, and has led to its employment as an article of diet for the sick, in cases in which it is manifestly improper. "Gelatine may be considered as the least perfect kind of albuminous (?) matter existing in animal bodies; intermediate, as it were, between the *saccharine principles* of *plants*, and *thoroughly developed albumen.* Indeed, gelatine in animals may be said to be the counterpart of the saccharine principle of plants; it being distinguished from all other animal substances by its ready conversion into a sort of sugar, by a process similar to that by which starch may be so converted." (Prout.) The similarity of composition between the *gelatine* and *albumen*, as shown by chemical analysis, is not to be taken as evidence of the existence of like properties; since *gelatine*, in reality more nearly resembles *sugar* than *albumen.* It has *none* of the properties of a compound of proteine. It neither yields proteine when acted on by potassa, nor does it produce a purple colour with hydrochloric acid. (Liebig.) Animals fed exclusively on gelatine *die* of *starvation.* For as gelatine contains no *proteine* it cannot yield *albumen, fibrine*, or *caseine*, substances necessary to the composition and support of animal bodies. Blood cannot be produced from gelatine alone; for it does not contain its most essential ingredient. But when *mixed with other food*, especially with *compounds of proteine*, or substances abounding in albumen, caseine, or fibrine, gelatine may be useful as an aliment, and serve directly to nourish the gelatinous tissues. (Liebig.) Hence gelatine is a fitting substance to form part (but only a part) of the diet of convalescents, as it conveys nutrition directly to these tissues, without tasking the diminished powers of life for its conversion; but its use should be accompanied by a proper quantity of azotized animal food, to supply the elements to the blood, for the support and increase of the muscular tissue, or fleshy portion of the body. In France the gelatine of bones is extracted and employed as a *part* of the diet in hospitals with the best effect, materially abridging the period of convalescence; but when given *alone* all animals soon become disgusted with it, and die if not supplied with other food. (D'Arcet.)

It has long been a matter of discussion whether gelatine is to be regarded in the light of a *product* or an *educt* of the tissues from which it is obtained. The talented editors of the 3rd vol. of Pereira's "*Materia Medica and Therapeutics*," assert the latter to be the case. "It is an *educt* of the swimming bladder of the sturgeon, and is properly described by the author" (Dr. Pereira), "as a constituent forming from 86 to 93$\frac{0}{0}$ of isinglass. If an educt of the air-bladder of the sturgeon, it must be equally an educt of the skin of young animals, as of the calf;—*i.e.*, it exists in the skin as such, and is *not* produced from it by the action of boiling water, any more than starch is produced from grain by a similar process. The tissue of the skin is closer than that of the air-bladder; hence it requires a longer continuance of the action of water to separate the gelatine from the other principles. Acetic acid will, however, dissolve gelatine from the skin in the *cold*, and tannic acid (in tanning skins) combines with the gelatinous tissue in the *cold* to form leather. These facts show correctly and truly that *gelatine exists in the skin* as an *independent principle* like albumen." (Vol. iii, p. 2232.) The force of these remarks will be readily admitted, provided it be taken for granted, that the compound in the skin representing gelatine, is precisely similar to that extracted from it by acetic acid, or that either of these compounds are *absolutely identical* with the gelatine extracted from the tissues by the action of heat and water. This we are not prepared to admit, although, for all practical purposes, it may be convenient to take it to be the case.

GELATINE (Animal). Various inferior qualities of gelatine have been sold under this name.

GELATINE (Bone). Obtained from *crushed bones* by coction with *water*, or by the action of *steam* and *water* successively, either with or without pressure; or by maceration in *dilute hydrochloric acid*, to extract the phosphate of lime, the remaining gelatinous mass being well washed in *cold water*, and afterwards dissolved in *boiling water* in the usual manner. A little carbonate of soda is commonly added to the last water. Gelatine has even been extracted from *fossil* bones. "A soup was prepared from one of the bones of the *great mastodon*, by the prefet of one of the departments of France." (Pereira.) Butcher's meat contains on an average 24$\frac{0}{0}$ of *dry flesh*, 56$\frac{0}{0}$ of *water*, and 20$\frac{0}{0}$ of *bone*. The last, will yield, by proper treatment, nearly 1-3rd of its weight of *dry gelatine;* or a quantity equal to about 6$\frac{0}{0}$ of the meat from which it is cut. This, as well as other varieties of gelatine, is frequently BLANCHED by *sulphurous acid* or *animal charcoal*, and TINGED of *various colours* with the ordinary *vegetable dyes.* Thus, BLUE is given with *sulphate of indigo* or the *juice of blue berries;* GREEN, with the *juice of spinach*; and RED, with juice of *red-beet.*

GELATINE (Cox's Patent). This is a very superior article recently brought before the public, of unusual beauty and purity; whilst it possesses a gelatinizing force superior to that of the best isinglass, to which, for all culinary purposes, it is fully equal.

GELATINE (French). Syn. *Cake Gelatine.* Gelatine done up into small thin cakes, like the finer sorts of glue. A good deal of it is prepared in Paris from the cuttings of the skins used in making kid gloves and slippers.

GELATINE (Nelson's Patent). According to Mr. Nelson's specification, this article is obtained from *glue-pieces*, or cuttings of the hides of beasts and skins of calves; but from the large quantities of *inferior isinglass* which that gentleman buys, it is a natural conclusion that it is principally, if not wholly formed of the latter substance. The crude materials freed from hair, wool, flesh, and fat, after being thoroughly washed and "scored," are macerated for 10 days in a *ley* of *caustic soda*, and are then placed in covered vessels at a temperature varying from 60° to 70° Fahr., until they become tender; they are next washed to free them from alkali, and are then exposed to the *vapour* of *burning sulphur* until they acquire a sensibly acid reaction; they are now dissolved in *water* contained in earthen vessels heated to 150° Fahr., and the solution, after being strained, is put into "settling vessels," and heated to 100° or 120°

Fahr., for 8 or 9 hours; at the end of this time the *clear liquor* is drawn off, and poured on the "cooling slabs" to the depth of about ½ an inch. As soon as the jelly is cold, it is cut into pieces, and washed in water until perfectly free from acid. It is then redissolved in *water* at about 85°, the solution poured out on slabs as before, and when cold, it is cut up, and, lastly, dried on nets.

There are two qualities of this article manufactured by Mr. Nelson, viz. "*first quality*," or "*opaque gelatine*," and "*second quality*," or "*transparent gelatine*." Both varieties are sold cut up in imitation of "picked isinglass," to which, for the preparation of jellies, soups, and blancmanges, they are not much inferior.

GELATINE (Rattray's Patent). From *glue-pieces* steeped in *water* until they begin to putrefy, then washed with *water*, drained, and put for 12 to 24 hours into *water* strongly soured with *sulphurous acid;* they are afterwards washed first with *cold water*, and then in *water* at 120° Fahr., and are lastly converted into *size* by digestion for 24 hours in *water* at 120° Fahr., the resulting solution being filtered through bags of double woollen-cloth.

GELATINE (Rough). Syn. *Gelatine Brut.* From the *skulls of oxen*, the *spongy insides of the horns* and *ribs*, and from several other *soft bony parts* (deprived of fat), by washing them in *water*, digesting in an equal weight of muriatic acid of 6° Baume, in *cold* weather, and 4° or 5° in summer, for 10 days, then in *acid* of only 1° Baume for 24 hours longer; afterwards soaking and washing in successive portions of *cold water* until *all* the acid is washed out, adding an ounce of *carbonate of soda* to the last water. *Used* to make glue, &c. A similar article is prepared from the bones of sheep. The pieces after being treated as above, are steeped in *boiling water* for a few minutes, wiped dry and shaken together in a bag to remove the internal pellicle; after which they are cut into squares or dice to disguise them, and finally dipped into a *hot solution of gelatine* to varnish them. In this state the article is called *gelatine brut fin. Used* to make soup. It keeps better than the cakes of portable soup. When less carefully prepared, it is also used to make glue for fine work. See *Bone Gelatine.*

GELATINE (Swinburne's Patent). Syn. *Swinburne's Patent Refined Isinglass.* From common *rough isinglass* or the *cuttings of calves' skins* (thoroughly freed from hair, and cleaned), by treatment with successive portions of *pure water* only, at a temperature ranging between 200° and 212° Fahr., until all the gelatine is removed. The quality of the product is equal to that of any gelatine in the market.

GELEE (pour le Goitre). Syn. *Linimentum Ioduretum Gelatinosum.* A preparation sold at Lausanne, and held in high repute in Switzerland, as a remedy for goitre and other glandular enlargements.

Prep. White *Castile soap* (in shavings), 2 *oz.; proof spirit,* 6 fl. oz.; dissolve by placing the bottle in hot water, and whilst still warm add of *iodide of potassium,* 1 *oz.;* (dissolved in) *proof spirit,* 4 fl. oz.; with *perfume,* q. s.

GEMS. Syn. *Jewels; Gemmæ,*—Lat. "Gems are precious stones, which, by their colour, limpidity, lustre, brilliant polish, purity, and rarity, are sought after as objects of dress and decoration. They form the principal part of the crown jewels of kings, not only from their beauty, but because they are supposed to comprise the greatest value in the smallest bulk; for a diamond, no larger than a nut, or an acorn, may be the representative sign of the territorial value of a whole country, the equivalent in commercial exchange for a hundred fortunes, acquired by severe toils and privations." "Among these beautiful minerals mankind have agreed in forming a select class, to which the title of *gems* or *jewels* has been appropriated; while the term *precious stone* is more particularly given to substances which often occur under a more considerable volume than *fine stones* ever do. *Diamonds, sapphires, emeralds, rubies, topazes, hyacinths,* and *chrysoberyls,* are reckoned the most *valuable gems;—crystalline quartz,* pellucid, opalescent, or of various hues, *amethyst, lapis lazuli, malachite, jasper, agate, &c.,* are ranked in the much more numerous and inferior class of *ornamental stones.*" (Ure.)

Tests. The only tests applicable to gems and precious stones, are the determination of their *relative hardness,* and their *specific gravity.* By the first test, *pastes* or *factitious gems* are readily detected, but beyond this, owing to the difficulty of applying it, it ceases to be useful to persons unconnected with the trade. The *determination* of the *specific gravity* is, however, of more general application, as gems are generally dismounted when offered for sale, or are so set that they may be removed from their "mountings" without injury or inconvenience. See *Specific Gravity* (and *below.*)

TABLE *of the Hardness, Specific Gravity, and Refractive Power, of the principal Gems and Precious Stones, and some other Minerals; compiled expressly for this work.*

Name.	Relative Hardness.	Specific Gravity.	Index of Refraction.
Agate	12	2·6	
Amethyst (occidental)	11	2·7	
Calcareous spar	6	2·7	
Chalk	3	2·7	
Chrysolite	10	3·7	
Cornelian	11	2·7	
Crystal	11	2·6	
Diamond (bluish)	19	3·3	2·439
„ (cubic)	18	3.2	
„ (from Ormus)	20	3·7	
„ (pink)	19	3·4	
„ (yellowish)	19	3·3	
„ (average colourless)	19 to 20	3·3 to 3·55	
Emerald	12	2·8	
Fluor spar	7	3·5	1·434
Garnet	12	4·4	1·815
Glass	various	2·3 to 3·62	1·525 to 2·028
„ (crystal or flint)		3·0 „ 3·6	1·830 to 2·028
„ (plate)		2·5 „ 2·6	1·514 to 1·542
Gypsum	5	2·3	
Jasper (green)	11	2·7	
„ (reddish yellow)	9	2·6	
Onyx	12	2·6	
Opal	10	2·6	
Quartz	10	2·7	1·548
Ruby	17	4·2	1·779
„ (pale, from Brazil)	16	3·5	
„ (spinelle)	13	3·4	1·764
Sapphire (deep blue)	16	3·8	1·794
„ (paler)	17	3·8	
Sardonyx	12	2·6	
Schoerl	10	3·6	
Topaz	15	4·2	
„ (Bohemian)	11	2·8	
„ (whitish)	14	3·5	
Tourmaline	10	3·0	
Zeolite	8	2·1	
Zircon	—	—	1·961

Obs. The relative hardness of the different substances is measured by the power they possess of cutting or scratching the other substances having a smaller number attached to them in the table. Thus no gem but the diamond (20) will scratch either the ruby (17) or the sapphire (16); and, for the same reason, a blue stone that will cut the emerald or the topaz, can be no other than the sapphire. The sp. gr. is ascertained in the usual manner, and will be found sufficiently indicative of the true nature of the stone when considered in connexion with its other characteristics. The *trial by electricity*, another method of testing the gems, is only applicable in a few cases. The *diamond*, when rubbed either in the rough or polished state, exhibits *positive* electricity; *quartz*, the only substitute that possesses much hardness, on being treated in the same manner, exhibits *negative* electricity. When exposed to the sun or the electric spark, the *diamond* becomes *phosphorescent.* The *topaz* also acquires *positive* electricity by friction. The *index of refraction* is a certain key to quality of the stone, in the hands of those who are capable of determining it, and may be applied to either "mounted" or "unmounted" gems. The most convenient instrument for the purpose is Wollaston's *Reflecting Goniometer.*

GEMS (Factitious). These, with few exceptions, are made of very pure, fusible, highly transparent, and dense glass, usually termed *paste* or *strass*, which is generally formed of *oxide of lead, potassa,* and *silica,* with *small quantities* of other ingredients to increase the brilliancy and clearness. The characteristic tints are imparted by the addition of *metallic oxides.* The beauty of artificial stones and gems, depends, chiefly, upon the tint of the *real* stones being exactly imitated, and upon proper care and skill being exercised in the cutting, polishing, and mounting them. All the coloured glasses, and enamels, may be worked up into artificial gems. See *Enamels, Foils, Pastes, &c.*

GENEVA. See *Gin* and *Hollands.*

GENTIAN. Syn. *Gentiana,*—Ph. L. E. & D. "The root" of "*gentiana lutea*" or *yellow gentian.* (Ph. L.) *Dose.* 10 to 30 gr.; as a simple bitter, tonic, and stomachic, in dyspepsia, loss of appetite, gout, &c. It was formerly a favorite remedy in agues. "Joined with galls or tormentil, and given in sufficient quantity, it has not failed in any intermittents in which I have tried it." (Dr. Cullen.) In excessive doses it is apt to relax the bowels and disturb the system. When taken for some time, it imparts its bitter flavour to the perspiration and urine. See *Decoctions, Extracts, &c.*

GENTIANINE. Syn. *Gentianina,*—Lat. A substance obtained by MM. Henry and Caventou from the root of common gentian.

Prep. 1. *Gentian root* (in powder) is digested for 2 or 3 days in cold *ether,* with agitation, and the filtered tincture evaporated to dryness; the residuum is dissolved in *rectified spirit,* and the solution is again evaporated; the semi-crystalline mass is lastly, redissolved in either *alcohol* or *ether,* and crystallized by careful evaporation.

2. (Magendie.) The *ethereal extract* is exhausted with *cold alcohol* (rectified spirit), as before, and the resulting *tincture* is evaporated to dryness; the residuum is dissolved in *water, calcined magnesia* added in excess, and the whole boiled and filtered; the sediment is digested in *ether,* and the ethereal tincture allowed to crystallize by slow evaporation.

Prop. &c. Gentianine forms golden-yellow needles, scarcely soluble in cold water, but very soluble in alcohol and ether. It is a powerful bitter and stomachic. *Dose.* ½ gr. to 2 gr. According to Trommsdorff and Leconte, the above substance is composed of *gentisin, gentianite,* and *sugar.* See *Tinctures* (and *below*).

GENTIANITE. Syn. *Bitter Principle of Gentian.* This has not been obtained in a state of purity. It may be procured combined with a portion of sugar, by digesting the *alcoholic extract of gentian* in *water,* throwing down the *gentisin* with *solution of diacetate of lead,* passing *sulphuretted hydrogen* through the liquid to remove any traces of lead, filtering, and evaporating. It may be further purified by digestion in *ether.*

GENTISIN. Syn. *Gentisic Acid.* From the *alcoholic extract of gentian,* by digesting it first in *water,* and afterwards in *alcohol;* the *tincture* is gently evaporated to dryness, and the residuum treated with ether. By repeated solutions in *alcohol* it may be obtained under the form of pale yellow needles. It is scarcely soluble in cold water; possesses feeble acid powers; and forms salts with the bases which are called *gentisates.*

GERMAN PASTE. *Prep.* From *pea-meal,* 2 *lb.; sweet almonds* (blanched), 1 *lb.; fresh butter* or *lard,* ¼ *lb.; moist sugar,* 5 *oz.; hay saffron,* ½ dr.; beat to a smooth paste, adding *cold water,* q. s., granulate the mass by passing it through a colander, and expose the product to the air, in a warm place, until quite hard and dry. The addition of 2 or 3 eggs improves it. *Used* to feed *larks, nightingales,* and other *insectivorous birds.* It will keep good for 12 months in a dry place.

GERMAN SILVER. Syn. *Albata, Argentan, Nickel Silver, Tutenag, White Copper.* A well-known alloy, the finer varieties of which nearly equal silver in whiteness and susceptibility of receiving a high polish, whilst they surpass it in hardness and durability. The following formulæ are from the highest authorities, or are the results of actual analysis of the finest commercial samples:—

Prep. 1. *Copper,* 50 parts; *nickel,* 20 parts; *zinc,* 30 parts. Very malleable, and takes a high polish.

2. *Copper,* 50 parts; *nickel,* 26 parts; *zinc,* 24 parts. Closely resembles silver; an excellent sample.

3. *Copper* and *zinc,* of each, 41 parts; *nickel,* 18 parts. Rather brittle.

4. (M. Gersdorff.) *Copper,* 50 parts;

nickel and *zinc*, of each, 25 parts. Very white and malleable, and takes a high polish. Recommended as a general substitute for silver.

5. (Gersdorff.) *Copper*, 60 parts; *nickel* and *zinc*, of each, 20 parts. For castings, as bells, candlesticks, &c.

6. (Gersdorff.) *Copper*, 60 parts; *nickel*, 25 parts; *zinc*, 20 parts. For rolling and wire. Very tough and malleable.

7. (Sample made from the ore of Hilburghausen.) *Copper*, 40½ parts; *nickel*, 31½ parts; *iron*, 2½ parts; *zinc*, 25½ parts. Equal to the best Chinese sample.

8. (Pelouze.) *Copper* and *nickel*, equal parts. Recommended by M. Pelouze as superior to any of the alloys containing zinc.

9. (Pelouze.) *Copper*, 2 parts; *nickel*, 1 part. Not so white as the last, but more malleable.

10. (White Copper from China.)—*a.* *Copper*, 30 parts; *nickel*, 36 parts; *zinc*, 34 parts.

11. (White Copper from China, said to be prepared from native ore.) *Copper*, 41 parts; *nickel*, 32 parts; *iron*, 2½ parts; *zinc*, 24½ parts. Silvery white, takes a high polish, very sonorous, malleable both cold and at a dull red heat, and may be rolled into leaves or formed into wire.

12. (White metal spoon sold as "German Plate.") *Copper*, 55 parts; *nickel*, 24 parts; *zinc*, 16 parts; *tin*, 3 parts; *iron*, 2 parts.

Assay.—a. 100 gr. of the alloy is digested in *nitric acid*, q. s., diluted with a *little water*. If the sample is unequally attacked by the acid, and a white external shell is observed which dissolves more slowly than the internal portion, it is *plated* on those parts with *silver*. If this silver shell or casing has a polished surface on both sides, the article has been *electro-plated;* if the contrary is the case, it has most probably been *plated* in the usual way.

b. The solution being completed, heat is applied to expel the excess of acid, and the remainder is largely diluted with *distilled water; dilute hydrochloric acid* is now dropped in as long as it occasions a precipitate, and the whole, after being moderately heated for a short time, and cooled, is thrown upon a small paper filter; the precipitate on the filter is next washed with *distilled water*, carefully dried, and ignited in a small porcelain crucible, the filter itself being separately burnt on the cover of the crucible, and the ashes added to its contents prior to ignition. *Every grain* of the resulting *fused chloride* is equal to $\frac{3}{4}$ gr. of SILVER; or, more accurately, to 0·7533 gr. (See *Silver.*)

c. The filtered liquid (see *b*) is next treated with a *stream* of *sulphuretted hydrogen*, and the black precipitate is collected, washed, and digested in *strong nitric acid;* when the solution is complete, *sulphuric acid* is dropped in, to precipitate the lead (if any is present); if a precipitate is formed, the whole is evaporated to dryness, and the *excess* of sulphuric acid expelled by a rather strong heat applied towards the end; the dry mass is now collected on a filter, washed with *water*, dried, and exposed to *slight* ignition in a porcelain crucible. The resulting *dry sulphate* is equal to 68% of its weight of LEAD; or, more accurately, each gr. represents 0·68367 gr. of that metal. (See *Lead.*)

d. The liquor filtered from the sulphate of lead, or (in its absence) the nitric solution of the precipitate produced by the sulphuretted hydrogen (see *c*) is next treated with *potassa, &c.*, as described under the analysis of "*Brass*" (*a*, p. 157). *Each grain* of the *dry protoxide* thus obtained, represents $\frac{4}{5}$ gr. of pure COPPER (nearly); or more correctly, 0·7983 gr. (See *Copper.*)

e. The liquor which was filtered from the precipitate produced by the sulphuretted hydrogen (see *c*) is boiled until it loses its offensive odour, and is then precipitated with *carbonate of soda*, in *slight* excess, and again boiled for a few minutes; the precipitate (*mixed oxides* of *nickel* and *zinc*) is collected, washed, and redissolved in *dilute acetic* or *nitric acid*, in excess; a *current of sulphuretted hydrogen* is next passed through the solution, the precipitate collected on a filter, washed, redissolved in *hydrochloric acid*, and the solution again treated with *carbonate of soda;* the last precipitate (oxide) is washed, dried, and gently ignited. *Each grain* of this *oxide* is equivalent to $\frac{4}{5}$ gr. of ZINC; or more accurately, 0·8013 gr. (See *Zinc.*)

f. The washings of the precipitated oxides and the liquid filtered from the precipitate occasioned by the sulphuretted hydrogen (see *e*) are mixed together, pure *liquor of ammonia* added in *considerable excess*, and the mixture agitated for some time; the undissolved portion of the precipitate is then collected on a filter, washed with *distilled water*, redissolved in *dilute nitric acid*, again precipitated with *liquor of potassa*, and this last precipitate (*oxide*), washed, dried, ignited, and weighed. *Each grain* represents $\frac{7}{10}$ (*or* 0·700) gr. of IRON. (See *Iron.*)

g. The ammonial solution filtered from the precipitate of oxide of iron (see *f*) is precipitated with pure *liquor of potassa*, boiled for a few minutes, and, when cold, thrown on a filter; the precipitate is, lastly, washed with *hot water*, dried, ignited, and weighed. *Each grain* of the *oxide*, thus obtained, is equal to $\frac{7}{9}$ gr. of NICKEL; or, more accurately, 0·7871 gr. (See *Nickel*.)

Obs. The manufacture of *nickel* or *German silver* has of late acquired an importance which is second only to that of silver plate itself. The superior quality of this alloy, and the graceful patterns which it is often made to assume in the hands of the accomplished artist, cannot fail to have attracted the admiration of the majority of our readers. The value of correct information regarding the preparation of this alloy, and of a ready method of determining the composition of the most approved commercial samples, will therefore be fully appreciated by every metallurgist who wishes to throw his wares into the arena of public competition. Much that is vended under the name of "*German silver*," is little better than the "*Britannia metal*" or "*plate pewter*" formerly so plentiful in every establishment in this country. The "*Amalgamated silver plate*" recently offered for sale, and so much puffed in handbills and newspaper advertisements, is an inferior variety of "German silver" covered with a thin film of real silver by means of the electrotype.

The union of the metals in the above formulæ is effected by heat, with the usual precautions. When iron is ordered, it is generally added under the form of tin plate. See *Alloy*, *Brass*, *Britannia Metal*, *Bronze*, *&c.*

GERMAN TINDER. See *Amadou.*

GERMINATION. The growth or vegetation of a seed by which a young plant is produced. The conditions essential to germination, are the presence of warmth, air, and moisture. The most favorable temperature is between 60° and 85° Fahr., according to the habitat of the respective plants. Below 40° Fahr. most of the more perfect seeds either refuse to vegetate, or vegetate slowly and feebly; and at or near the freezing point none of them undergo this change. At a temperature above 100° Fahr. the young germ is usually injured, and at about 125°, if it forms, it soon withers and dies. See *Malting*, *Seed*, *&c.*

GHEE. *Butter* melted in a water bath, and allowed to clarify itself by repose; the clear liquid portion is then poured off into suitable vessels in which it can be preserved from the air. Bottles are commonly used for this purpose in the East Indies, where this process is generally adopted. See *Butter.*

GHERKINS. Syn. *Girkins.* Small cucumbers adapted for pickling. See *Pickles.*

GHOST-LIGHTS. Syn. *Corpse-lights.* The illustrious Reichenbach ascribes the luminous appearances sometimes perceived over graves and sepulchres by highly sensitive subjects, when their external senses are exalted by disease, to the emanations due to the peculiar chemical changes going on in the corpse. See *Phosphuretted Hydrogen.*

GILDER'S PICKLE. See *Gilding Liquors.*

GILDER'S WAX. See *Gilding Wax.*

GILDING. Syn. *Dorure*,—Fr. The art or process of covering the surfaces of bodies with a thin film of gold, for the purpose of increasing their durability or improving their appearance. For the sake of brevity, we shall notice the leading varieties of gilding, and their applications, in alphabetical order.

Burnished Gilding. This is *distemper gilding* to which a face has been given with the "*burnisher.*" It is chiefly employed for the polished portions of the frames of pictures and mirrors, the more prominent parts of statuettes, &c.

Chemical Gilding. Those varieties in which the film of gold is formed on the surface through the agency of *chemical affinity* or the electrotype, in opposition to "*mechanical gilding*," in which the gold is made to adhere by the intervention of some glutinous substance. See *German* and *Voltaic Gilding.*

Cold Gilding. The articles (*copper* or *brass*) to be gilded, after being softened, annealed, and polished, in the usual manner, are rubbed with a little *gilding powder* by means of a piece of cork moistened with a *solution of salt in water;* after which the work is *burnished* with a piece of hematite or polished steel. (See *below.*)

Distemper Gilding. This is applied to wood, plaster, marble, &c. It is commonly performed in this country by giving the wood, *first*, a coating of *good size*, and *next*, several successive coats of *size thickened with finely-powdered whiting*, *Spanish white*, or *plaster of Paris*, until a good face is produced; observing to let each coat become quite dry, and to rub it perfectly smooth with *fine* glass-paper, before the application of the following one. When the proper "*face*" is obtained, the surface is thinly and evenly gone over with *gold size*, and when this is *nearly* dry, the *gold leaf* is applied, and afterwards burnished with an *agate*, or a *dog's tooth.* The process, as adopted by the Parisian artists, who greatly excel in this species of gilding, is very complicated, and is divided into at least 17 distinct operations, each of which they declare to be essential to its excellence.

Electro-gilding. See *Voltaic Gilding.*

Friction Gilding. A variety of *Cold gilding.* (See *above.*)

German Gilding. A variety of *Chemical gilding.* (See p. 518.)

Grecian Gilding. In this variety *sal ammoniac* and *corrosive sublimate,* equal parts, are dissolved in *nitric acid,* and a solution of gold made with this menstruum ; after slight concentration, the liquid is applied to the surface of *silver,* which immediately becomes black, but on being heated exhibits a rich gilded surface.

Gilding by *Immersion.* This is performed by simply dipping the article (metallic) into a solution of *pyrophosphate of soda* in which *teroxide* or *terchloride of gold* has been dissolved. For other methods, see *Elkington's* and *Talbot's Patent Gilding* (*below*).

Japanner's Gilding. The surface is covered with *oil size* thinned with *spirits of turpentine,* and *gold,* in powder, is gently dabbed on with a *puff of wash-leather.* This gives the appearance of "frosted gold." A coating of varnish is next given, followed by exposure to a gentle heat in the "stove."

Leaf Gilding. This term is commonly applied to the gilding of *paper, vellum, &c.*, by applying *leaf gold* to the surface, previously prepared with a *coating* of *gum water, size,* or *white of egg.* It is usually burnished with an *agate,* or a *dog's tooth.*

Mechanical Gilding. See *Chemical Gilding.*

Mercurial Gilding. See *Wash Gilding.*

Oil Gilding. This species of gilding may be divided into several operations. The following are the abridged instructions of a Parisian artist on the subject:—1. The surface is prepared by a coating of *white-lead* in *drying oil.*—2. Another coat is given, made with *calcined white-lead* or *massicot,* ground in *linseed oil and turpentine.* 3 or 4 coats of this mixture are often given, at intervals of at least 24 hours, observing to carefully smooth off each coat with *pumice stone* or *shave grass* before the application of the following ones.—3. The *Gold Colour,* or *paint,* is next applied. It is usually very adhesive *gold size,* or the bottom of the pot or dish in which painters wash their brushes. For this purpose it is thoroughly ground and strained.—4. When the gold colour becomes partially dry and sufficiently tenacious, the *gold-leaf* is applied and pressed on with a wad of *cotton-wool,* or a *soft brush.* It is now left for several days to harden.—5. A coat of *spirit varnish* is next given, and the object is cautiously passed over a *chafing-dish of charcoal,* observing to avoid stopping the motion of the piece whilst doing so, as the work would then become discoloured and blistered.—6. The work is "finished off" with *pale oil varnish.* For *out-door gilding* and *common work,* the varnishing process is generally omitted. This species of gilding is applied to woodwork, plaster, metal, &c.

Varnish Gilding. This is a mere variety of *oil gilding,* applied to *equipages, furniture, mirror* and *picture frames, &c.*, the surface being *highly* varnished and polished, before it receives the *size* or *gold colour ;* and after the gilding has become quite dry, a coat of *spirit varnish,* fumed with the chafing dish as above, is applied, followed by 2, 3, or more coats of the *best copal varnish,* at intervals of 3 or 4 days each. The whole is, lastly, carefully polished with *tripoli-and-water.*

Wash Gilding, Amalgam do., Mercurial do., Water do. This consists in the application of a thin coating of *amalgam of gold* to the metallic surface (*brass, bronze,* or *copper,*) to be gilded, and the subsequent volatilization of the mercury by heat. It is the usual method of gilding articles of copper and its alloys, and possesses great beauty and durability when skilfully executed. The occupation is, however, an unhealthy one, owing to the continual exposure of the workman to the fumes of mercury. The furnace invented by M. D'Arcet obviates this evil, as the whole of the volatilized mercury is carried off, and again condensed for further use. It should therefore be adopted by every water-gilder who studies economy, and the health of those in his employ.

The *process* of *water-gilding* consists of several distinct operations, and can only be successfully performed by those who have been schooled in the art by an apprenticeship to the trade. It would, therefore, be waste of space to enter into details here. Formulæ for several of the articles employed for the purpose will be found in their alphabetical places in this work.

Water Gilding. See *above.*

Among the *applications* of the *process of* *gilding* that deserve a separate notice are the following:—

The *gold letters* and *figures* on the *covers of books* are thus formed:—*Gum mastic*, in fine powder, is dusted over the surface to be gilded; an *iron* or *brass tool* bearing the design upon its face, is then heated to a proper temperature, and gently pressed upon a piece of *leaf gold*, which slightly adheres to it; the two are then transferred to the cover, and the tool is gently pressed on it, by which means the mastic softens, and retains the gold. The loose gold and powdered mastic are then dusted off with a brush. Gold leaf will adhere to leather without the use of mastic, but not so firmly as when it is employed.

The *edges* of the *leaves of books* and *paper* are first cut perfectly smooth, and then washed over with a *solution of isinglass* in *weak spirit*, or with a *varnish* made of *Armenian bole*, 4 parts, and *powdered sugar-candy*, 1 part, mixed up to a proper consistence with *strained white of egg*. The coating is allowed to dry, and is then smoothed with a wet rag, after which the *gold leaf* is applied and polished with the burnisher.

Brass buttons formerly so much in demand, are covered by a rough species of *wash gilding*. The buttons are polished in the lathe, and thrown into a pan with a little *amalgam of gold*, and as much *aquafortis diluted with water*, as will wet them all over. Here they are well stirred up, until they assume a *silvery* appearance, when they are washed with clean water. They are then submitted to a sufficient heat in a suitable apparatus, until the mercury is volatilized. The buttons are next cooled and well tossed and rubbed about with a painter's brush; and are, lastly, burnished by washing them well with beer or ale grounds.

Twelve dozen (1 gross) *of buttons*, of 1 inch in diameter, may be *perfectly gilded on both sides* with only 5 gr. of gold. By an Act of Parliament, which is still unrepealed, this is the *smallest* quantity of gold permitted to be used for a gross of buttons of the above size.

Glass, *porcelain*, and *earthenware*, are gilded by blending *powdered gold* with *gum-water* and a *little borax*, and applying the mixture by means of a camel-hair pencil; the article is then heated in an oven or furnace, by which means the gum is burnt, and the borax, vitrifying, cements the gold to the surface. It is afterwards polished with a burnisher. *Names, dates*, or any *fancy device* may thus be *permanently* and *easily* fixed on *glass, china, earthenware, &c.*

Japanned work is gilded by the method explained at p. 516.

Leather is gilded in the same way as the covers of books. (See *above*.) For *common work, silver leaf* or even *tin foil*, is applied to the surface, previously covered with *size* or *white of egg*, and after being burnished down and dried, is washed over with *gold-coloured lacquer*.

The *letters of sign-boards* and the *ornamental gilding* for *out-door work*, is done by first covering the design with *yellow paint* then with *oil gold-size*, and when this is *nearly* dry applying the *leaf-gold*, observing to shield it properly from the wind, lest it be blown away or become crumpled before being properly attached. The work is, lastly, varnished.

Polished metals may be gilded by one or other of the methods already noticed. Articles in *silver*, *copper*, *brass*, and *bronze*, are usually coated by the process of *wash* or *water gilding*; or directly, by the application of *gold leaf*, as follows:—The "piece" or article is heated to a bluish tint, and *gold leaf* pressed gently and carefully on it with the burnisher; heat is again applied, and the process repeated with fresh *leaves of gold* until the gilding has acquired the proper thickness and tone. The surface is lastly polished with the burnisher, or is "coloured" in the usual manner at the "stove." This succeeds with *iron, steel, silver, copper* and *its alloys, &c.* *Another method* for *polished articles* in *iron* and *steel*, which, however, is less durable than the preceding, is to apply an *ethereal solution of gold* to the surface with a camel-hair pencil. The *ether* flies off and leaves the surface coated with *gold*; which is then polished as before. In this way, any *fancy device* or *writing* may be executed on steel or iron, with extreme facility.

Silks, satins, woollens, ivory, bone, &c., may be readily gilded by immersing them in a *solution of neutral terchloride of gold* (1 of the *salt*, and 3 to 6 of *water*), and then exposing them to the action of *hydrogen gas*. The latter part of the process may readily be performed by pouring some *dilute sulphuric acid* on *zinc* or *iron filings*, in a wide-mouthed bottle, and placing it under a jar or similar vessel, inverted, at the top of which the articles to be gilded are suspended. *Flowers* or *other ornamental designs* may be produced by painting them on the surface with a camel-hair pencil dipped in the solution. The design, after a few minutes' exposure to the hydrogen, shines with all the splendour of the purest gold, and will not tarnish on exposure to the air, or in washing.

Gilded thread or *gold thread* is merely a thread of *yellow silk* covered with a very thin *flatted wire of gold*, by means of a revolving wheel.

Wire (copper, silver, *or* brass) is occasionally gilded, in coils, by a similar process to that adopted for *buttons;* but more frequently as follows:—*Rods* (usually of *silver*) are covered with *gold foil* of a thickness proportionate to the quality of the intended wire, and the compound bar is then drawn into wire in the usual way. 100 gr. of *gold* was formerly the lowest legal quantity that could be employed for 1 ℔. of *silver.*

GILDING (Elkington's Patent). Syn. *German Gilding, Anglo-German do., Bonnet's Gilding Process.* The articles to be gilded, after being *perfectly* cleaned from scale or grease, and receiving a proper "*face*," are suspended, by means of wires, in the "*gilding liquid*" (*boiling hot*) and moved about therein for a period varying from a *few seconds* to a *minute*, or *longer;* the precise time required depending on the newness and strength of the liquid. When sufficiently gilded, the articles are withdrawn from the solution of gold, washed in *clean water*, and dried; after which they undergo the usual operation of "colouring," &c. A "*dead gold appearance*" is produced by the application to the articles of a *weak solution* of *nitrate of mercury* previously to the immersion in the "gilding liquor;" or the *deadening* may be given by applying a *solution of the nitrate* to the *newly-gilded surface*, and then expelling the mercury by heat.

The *Gilding Liquor.* Take of *fine gold*, 5 oz. (troy); *nitro-muriatic acid,* 52 *oz.* (avoirdupois); dissolve by heat, and continue the heat until red or yellow vapours cease to be evolved; decant the clear liquid into a suitable vessel; add of *distilled water*, 4 gall.; *pure bicarbonate of potassa,* 20 *lb.;* and boil for 2 hours. The *nitromuriatic acid* is made with *pure nitric acid* (sp. gr. 1·45), 21 *oz.; pure muriatic acid* (sp. gr. 1·15), 17 *oz.;* and *distilled water*, 14 *oz.*

Obs. This process, though patented by Mr. Elkington in England, and claimed as *his own* invention, was in reality discovered and first practised by M. Bonnet, a foreigner. Articles thus gilded do not bear friction and the operations of being put in colour (*mise en couleur,*) so well as those gilded by the mercurial process, or by the methods of *cold* or *leaf-gilding* as applied to polished metals. For other articles it is, however, both suitable and inexpensive. See *Gilding by Immersion* (and *below*).

GILDING (Talbot's Patent). By this process *polished metallic articles* are *gilded* by simple immersion (as above) in a *solution of gallic acid in water*, *ether*, or *alcohol,* to which a *solution of gold* has been previously added. *Silvering* and *Platinizing* may be effected in the same manner, by using a *solution* of *either of these metals* instead of one of *gold.*

GILDING AMALGAM. See *Amalgams.*

GILDING LIQUOR. This name has been given to various *solutions of gold*, and to other liquids employed in gilding. The former are noticed elsewhere. Among the latter are the following:—

"*Deading*" *Aquafortis.* From *mercury*, 1 part; *aquafortis* (sp. gr. 1·33), 3 parts; dissolve, and add of *soft water*, 7 parts. *Used* to produce a "*dead-gold*" effect. It is applied (diluted) to the articles, before spreading the amalgam over them, in *water gilding;* or before placing them in the "gilding liquor," in *gilding by immersion.*

Mercurial Solution. From *mercury*, 10 parts, dissolved in *aquafortis* (sp. gr. 1·33), 11 parts, and the solution diluted with 25 times its weight of water. *Used* to moisten the "*scratch brush*" before drawing it over the amalgam, in *mercurial gilding;* also to "deaden" the gilded surface, by moistening the latter with it, and then exposing the "piece" to a heat sufficiently high to drive off the mercury.

Gilder's Pickle. From *alum* and *common salt*, of each, 1 *oz.; nitre,* 2 *oz.;* dissolved in *water*, ½ pint. *Used* to impart a rich colour to gold surfaces, especially of trinkets. Its application should not be too long continued, as it dissolves a small portion of the gold. For common purposes it is best used largely diluted with water.

Vermeil, Vermeil Coating, Or-moulu do. From *annotto* and *salt of tartar*, of each, 2 *oz.; gamboge* and *vermilion*, of each, 1 *oz.; dragon's blood,* ½ *oz.; water,* 1 quart; simmer down to about one fourth, add *saffron*, 20 gr., and, when merely tepid, strain through fine muslin into a bottle. *Used* to give lustre and fire to *distemper gilding.* A little is floated over the surface with a very soft flat camel-hair brush.

GILDING METAL. The metal employed for gilding is usually brass, or a mixture of brass and copper. The following proportions have been recommended:—

1. *Copper*, 6 parts; *brass,* 1 part.
2. *Copper*, 4 parts; *Bristol brass,* 1 part.

3. *Copper*, 13 parts; *old Bristol brass*, 3 parts; *tin*, 14 parts.

GILDING POWDER. *Prep.* 1. *Pure gold*, 5 dr.; *pure copper*, 1 dr.; *aqua regia*, 10 *oz.;* dissolve, moisten clean *linen rags* with the solution, dry them, and burn them to ashes. The latter contain the gold in a state of minute division, and must be carefully collected.

2. *Grain gold*, 1 dr.; *rose copper*, 15 gr.; *aqua regia*, 2 fl. oz.; proceed as last. *Used* in "*Cold Gilding.*"

3. See *Gold* (in powder.)

GILDING SHELLS. See *Gold Shells.*

GILDING SIZE. See *Gold Size.*

GILDING WAX. Syn. *Gilding Varnish, Gilder's Wax.* From *bees' wax*, 4 *oz.; verdigris* and *sulphate of copper*, of each, 1 *oz.;* melted together.

2. *Bees' wax*, 4 *oz.; verdigris, red ochre*, and *alum*, of each, 1 *oz.* *Used* to give a red gold-colour to water-gilding.

GIN. Syn. *Geneva.* This is corn spirit flavoured with either oil of juniper or oil of turpentine.

Gin was originally, and, for some time, wholly imported from Holland, and was a rich, soft spirit, flavoured, chiefly, with juniper berries; on which account it had obtained the name of Geneva, from *genièvre*, the French for juniper. After a time the distillation of an *imitation geneva* sprung up in this country, when the foreign spirit came to be called *Hollands*, or *Hollands Gin* or *Geneva*, to distinguish it from the spirit of home manufacture. The English monosyllable "*Gin*," is a corruption of *geneva*, the accented syllable of which, as in numerous other instances, was seized on by the vulgar, and adopted as a short and convenient substitute for the whole word.

The liquor at present known by the name of *gin* in this country, is a very different article to that imported from Holland, and consists of *plain corn-spirit*, flavoured with *oil of turpentine*, and *small* quantities of *certain aromatics.* The *thousand and one* receipts for this article, which have from time to time been printed in books, produce a flavoured spirit, bearing *no resemblance* to the more esteemed samples of English gin; and, if possible, the products are even more unlike genuine Hollands. Any person may easily satisfy himself of the truth of this assertion by actual experiment on the small scale. The cause of this incongruity has arisen chiefly from the writers not being practically acquainted with the subject, and from the disinclination of well-informed practical men to divulge, gratuitously, what they conceive to be valuable secrets. Hence the utter failure of any attempts to produce either gin or Hollands from the receipts usually published. The authors appear to have all imbibed a *juniper-berry mania*—probably from the imbibition of their favorite beverage. *Oil of juniper*, in the hands of these gentlemen, appears to be a perfect *aqua mirabilis* that readily converts whiskey into gin, and imparts the rich creamy flavour of Schiedam Hollands to crude corn or molasses spirit. But theory and experiment sometimes disagree. In practice it is found that the true flavour of *foreign geneva* cannot be imparted to spirit by juniper *alone*, and that the *English gin* of the present day depends for its flavour on *no such a substance.* The following formulæ are merely given as specimens; and it is proper to remark, that every distiller has his own receipt for this notorious beverage. Hence it is, that the gins of *no two* distillers are of *precisely* the same flavour; and this difference is still more marked when the parties reside in parts of the country remote from each other. *Booth's, Smith's* and *Nicholson's Gins* have each a characteristic flavour, readily perceived by their respective votaries; whilst the difference between *Plymouth* or *Bristol Gin*, and the *gin of the metropolis*, is as remarkable as that between *Barclay's* XXX and *Guinness' bottled Stout.* These variations in flavour, generally depend on the use of more or less flavouring matter, or of a spirit more or less clean or free from taint; and, less frequently, on the addition of a small quantity of some peculiar aromatic, which exercises a modifying influence on the chief flavouring ingredient. In many cases the flavour has originated from accident, but the consumers having become *accustomed to*, and hence *relishing* that particular "palate," it is found to be unwise, or commercially impossible to alter it. Any change in these matters is therefore looked upon in every distillery as a dangerous innovation, which would prove more prejudicial to the prosperity of its exchequer, than the repeal of the duty on French wines and brandy, or even a frightful conflagration. The distillers, like the brewers, are thorough conservatives in all matters connected with the flavour of their liquors.

In the *preparation* of *gin*, both *sweetened* and *unsweetened*, and indeed of liquors generally, the greatest possible care must be taken to avoid an excess of flavouring. The most esteemed samples are those that consist of *very pure spirit, slightly flavoured.*

Prep. 1. *Clean corn spirit*, at proof, 80 gall.; *newly rectified oil of turpentine*, 1¼ pint; mix well by violent agitation, add *culinary salt*, 14 *lb.*, dissolved in *water* 40 gall.; again well agitate, and distil over 100 gallons, or until the "*feints*" begin to rise. *Product.* 100 gall. of gin 22 u. p., besides 2 gall. contained in the "*feints*." If 100 gall. at 17 u. p., are required, 85 gall. of *proof spirit*, or its equivalent at any other strength, must be employed.

2. *Proof spirit* (as above), 8 gall.; *oil of turpentine*, 1 fl. *oz.; salt*, 1½ *lb.*, dissolved in *water*, 4 gall.; draw over 10 gall., as before. 22 u. p.

3. *Clean corn spirit*, 80 gall.; *oil of turpentine*, 1 pint; *pure oil of juniper*, 3 fl. oz.; *salt*, 21 *lb.; water*, 35 gall.; draw over 100 gall., as before. 22 u. p.

4. To the last, before distillation, add of *oil of caraway*, ½ *fl. oz.; oil of sweet fennel*, ½ *fl. oz.; cardamoms* (ground), 8 *oz.*

5. To No. 3, add of *essential oil of almonds*, 1 dr.; *essence of lemon*, 4 dr.

6. To No. 1, before distillation, add of *creasote*, 3 fl. dr.

7. To No. 3, add of *creasote*, 2 dr.

8. *Proof spirit*, 80 gall.; *oil of turpentine*, ¾ pint; *oil of juniper*, ¼ pint; *creasote*, 2 dr.; *oranges* and *lemons*, sliced, of each, 9 in no.; macerate for a week, and distil 100 gall. 22 u. p.

9. To No. 1, add of *rectified fusel oil*, ½ pint.

10. To No. 1, add of *oil of juniper*, ½ pint.

Concluding Remarks. The *oil of turpentine* for this purpose should be of the best quality, and not that usually vended for painting, which always contains resin and often fixed oil. *Juniper berries, bitter almonds*, and the *aromatic seeds* may be used instead of the essential oils; but the latter are the most convenient. *Turpentine* conveys a PLAIN-GIN flavour, —*juniper berries* or *oil* gives a HOLLANDS flavour,—*creasote* imparts a certain degree of *smokiness*, or WHISKEY flavour,—*lemon* and the other *aromatics*, a CREAMINESS, FULNESS, and RICHNESS. The flavour imparted by *cardamoms*, when used judiciously, is peculiarly agreeable and appropriate. That from *caraways* is also in general esteem. *Cassia* in *extremely* small proportions also tells well. *Fusil oil* gives a WHISKEY-GIN flavour; and in conjunction with *creasote* or *crude pyroligneous acid*, a full WHISKEY flavour. The only danger in the employment of *all* these articles is "*using too much of them*." When this misfortune happens, the remedy is to add sufficient *plain spirit* to reduce the flavour to the proper standard. The CREAMINESS and SMOOTHNESS so much admired in foreign geneva results chiefly from *age*. The English rectifier endeavours to imitate this by the addition of a *little sugar*. A rich MELLOWNESS that combines well with *gins* turning on the *Hollands flavour*, is given by a *very small* quantity of *garlic*, and with *Canadian balsam* or *Strasburg turpentine*. The peculiar PIQUANCY, or the property of "BITING THE PALATE," regarded as a proof of strength and quality by the ignorant gin-drinker, is imparted to the liquor by the addition of a little *caustic potassa*. Sliced *horse-radish* gives piquancy as well as mellowness. *Grains of paradise, cayenne pepper*, and *sulphate of zinc*, are also commonly added by fraudulent dealers.

Although gin is always *prepared* on the *large* scale by distillation, it may also be made by the simple solution or digestion of the flavouring ingredients in the spirit; but it is, of course, better for distillation. If made in the former way, *no* salt must be employed. The gin produced by the above formulæ is that denominated in the trade "*unsweetened gin*," "*grog gin*," *&c.;* but the gin usually sold in the metropolis is a sweetened spirit, and hence is technically distinguished by the terms "*sweetened*," or "*made up*." The generality of London gin-drinkers prefer the latter article, even when weaker and inferior, which it usually is; as the addition of sugar permits *adulteration* and *watering* to an enormous extent with absolute impunity. Sweetened spirit *cannot* be easily tested for its strength, and is taken by the Excise at the strength which it is *declared* to possess by the dealer. To *ascertain* whether *gin* is *sweetened* or not, a little may be evaporated in a spoon, over a hot coal or a candle, when, if it is pure, it will leave the spoon scarcely soiled; but if, on the contrary, it has been *sweetened*, a small quantity of syrupy liquid, or sugar, will be obtained, the sweetness of which may be easily recognized by tasting it.

The whole of the *casks* and *utensils* employed for gin should be perfectly clean, and properly prepared, so as not to give *colour;* as if this spirit acquires the *palest* coloured tint its value is lessened, and if *much coloured* it is rendered unsaleable. When gin has once become *much stained*, the only remedy is to re-distil it; when it is only *slightly stained*, the addition of a few *lb.* of *acetic acid* (Ph. L.) to a pipe or butt, a spoonful or two to a gallon, or a few drops to a decanterful, will usually decolour it, either at *once*, or as soon as it is mixed with water to make grog. See *Alcoholo-*

metry, Casks, Distillation, Hollands, Spirits, &c., (and *below.*)

GIN (Cordial). This is gin sweetened with sugar, and *slightly* aromatized.

Prep. Good *gin* (22 u. p.), 90 gall.; *oil of almonds*, 1 dr.; *oils of cassia, nutmeg*, and *lemons*, of each, 2 dr.; *oils of juniper, caraway*, and *coriander*, of each, 3 dr.; *essences of orris root* and *cardamons*, of each, 5 fl. oz.; *orange-flower water*, 3 pints; *lump sugar*, 56 to 60 *lb.;* dissolved in *water*, 4 gall. The *essences* are dissolved in 2 quarts of *spirit of wine*, and added gradually to the gin, until the requisite flavour is produced, when the sugar (dissolved) is mixed in, along with a sufficient quantity of *soft water*, holding 4 *oz.* of *alum* in solution, to make up 100 galls. When the whole is perfectly mixed, 2 *oz.* of *salt of tartar*, dissolved in 2 or 3 quarts of *hot water*, are added, and the liquor is again *well* rummaged up; after which the cask is bunged up, and allowed to repose. In a week, or less, it will have become *brilliant*, and may be either "racked," or drawn from the same cask. *Product.* 100 gall., about 30 u. p.

GIN (Sweetened). *Prep.* From *unsweetened gin* (22 u. p.), 95 gall.; *lump sugar*, 40 to 45 *lb.*, dissolved in *clear water*, 3 gall.; mix well; and fine it down as above. *Product.* 100 gall., at 26 u. p. This, as well as the last, is usually "*permitted*" at 22 or 24 u. p.; which is also done when the gin has been further lowered with water so as to be even 30 or 35 u. p. See *Spirits* (and *above*).

GINGER. Syn. *Ginger Root; Zingiberis Radix; Zingiber*,—Ph. L. E. & D. "The *rhizome*" (rootstock or underground stem) of "*zingiber officinale*, — Roscoe." (Ph. L.) Ginger is an aromatic stimulant and stomachic, very useful in flatulence and spasms of the stomach and bowels, and in loss of appetite and dyspepsia, arising from debility, or occurring in old or gouty subjects. A piece chewed an hour before dinner tends to provoke the *appetite;* as a *masticatory*, it often relieves toothache, relaxation of the uvula, tender gums, and paralytic affections of the tongue. Made into a paste with warm water, and spread on paper, it forms a useful and simple *headache-plaster*, which frequently gives relief when applied to the forehead or temples. As a *condiment* and *flavouring ingredient*, it is perhaps one of the most wholesome of the aromatic kinds, and is less acrid than the peppers. *Dose.* 10 gr. to ½ teaspoonful, stirred up in any simple liquid.

Pur., &c. The best is that known in commerce as "*unbleached Jamaica ginger*," which is an uncoated pale variety, occurring in large bold fleshy pieces ("*races*") which cut soft, bright, and pale-coloured. The inferior varieties occur in smaller pieces, and are darker-coloured, flinty, and shrivelled. The dealers frequently "dress up" the common dark-coloured gingers by washing them in water, drying them, and then "rouncing" them in a bag with a little calcined whiting or magnesia (*washed ginger*); or they bleach them by dipping them into a solution of chloride of lime, or by exposing them to the fumes of burning sulphur (*bleached ginger*); or they dip them into a milk formed of quick-lime or whiting and water (*white-washed ginger*). The last has a chalk-white surface, which cannot be mistaken for the natural one. *Powdered ginger* is with difficulty obtained pure and good. The common adulterants are wheat-flour, or East Indian arrow-root (*curcuma angustifolia*), and plaintain meal (*musa sapientum*). The first may be detected by the microscope, the others by the flavour and action of hot water. See *Lozenges, &c.*

GINGER (Preserved). Syn. *Conditum Zingiberis*,—Lat. An excellent stomachic sweetmeat or preserve. It is chiefly imported from the West Indies and China. See *Candies, &c.*

GINGER (Preserved, — Mock). From the *stalks of lettuce* just going to seed, using a *concentrated syrup, strongly flavoured with Jamaica ginger.* See *Candy, &c.*

GINGER BEER. See *Beers.*

GINGERBREAD. *Prep.* 1. (Dr. Colquhoun.) *Flour*, 1 *lb.; carbonate of magnesia*, ¼ *oz.;* mix; add of *treacle*, ½ *lb.; moist sugar*, ¼ *lb.; melted butter*, 2 *oz.; tartaric acid* (dissolved in a little water), 1 dr.; make a stiff dough, then add of *powdered ginger* and *cinnamon* (cassia), of each, 1 dr.; *grated nutmeg*, 1 oz.; set it aside for half an hour or an hour before putting it into the oven. It *should not be kept longer than two or three hours, at the utmost, before being baked.*

2. *Flour* and *treacle*, of each, 1 *lb.; butter*, 1½ *oz.; carbonate of magnesia*, 1 *oz.;* add *spices* (ginger, cinnamon, nutmeg, allspice, cayenne, corianders, &c.) to taste; mix as last. *Fit for baking in from four to six hours.*

3. *Flour*, 2 *lb.; carbonate of magnesia*, ½ *oz.;* mix; add *treacle*, 1½ *lb.; butter*, 2 *oz.; spice*, q. s.; *tartaric acid*, ¼ *oz.;* mix quickly, and make it into forms. *Ripe for the oven in half an hour to one hour.*

4. Instead of *tartaric acid* in the last formula, use *cream of tartar* (dissolved in water), 2 *oz.* *Ripens in* 40 *or* 50 *minutes.*

5. *Flour* or *fine pollard,* 1 *lb.; treacle,* ¾ *lb.; salt of tartar,* ½ *oz.,* dissolved in *water,* q. s.; *butter,* 1 *oz.; spices,* to palate. *Takes several days to ripen; sometimes a fortnight.*

6. (Extemporaneous.)—*a.* From *flour,* 1¼ *lb.; moist sugar* and *treacle,* of each, ½ *lb.; butter,* 2½ *oz.; baker's salt* (carbonate of ammonia), ¼ *oz.,* dissolved in *cold water,* q. s.; *ginger,* 3 dr.; *nutmeg,* 2 dr.; *cassia,* 1 dr.; *cayenne pepper* (best), ½ dr.

b. From *flour,* 6 *lb.; powdered ginger,* 2½ *oz.; caraway seeds,* 1 *oz.;* (and other spices to palate;) *candied lemon* and *orange peels,* of each, 2 *oz.; moist sugar* and *melted butter,* of each, ½ *lb.; treacle,* 4 *lb.; volatile salt,* 2 *oz.; water,* q. s.; mix as above. *May be baked at once.*

c. From *Jones's Patent flour,* 2 *lb.; treacle,* 1 *lb.; moist sugar,* ¾ *lb.; butter,* 2½ *oz.; spice,* q. s.; mix as quickly as possible, and *bake it instantly.* If the dough is *expertly* mixed up, the quality of the product is fully equal, if not superior to that of any of the preceding formulæ.

Obs. Gingerbread is either rolled out into *thin sheets* and cut into cakes or nuts (*gingerbread nuts*) with the top of a wine-glass or canister, or is formed into thick cakes, which are baked in "batches" (ordinary *gingerbread*). Both varieties require a pretty brisk oven; the thinner kinds (*nuts, &c.*) especially, must be baked as crisp as possible, without being burnt. The varieties called *lemon gingerbread, caraway do., &c.,* have a perceptible predominance of these flavouring ingredients. The addition of a *little alum,* dissolved in *water,* makes the bread both lighter and crisper, and causes it to ripen quicker, but at the same time lessens its wholesomeness.

GINGER CANDY. See *Candy.*

GINGER DROPS. See *Drops* (Confectionary).

GIRAMBING. Syn. *Limoniated Ginger Beer.* A variety of ginger beer in which the flavour of lemon predominates. See *Beers.*

GLAIRE. White of egg. See *Albumen.*

GLAIRINE. Syn. *Barégine,* — Longchamp; *Theiothermine,*—Monheim; *Zoogen,* — Gimbernat. The peculiar glairy, or mucus-like, organic substance, found in certain mineral waters. It is said to give the flavour and odour of flesh-broth to the waters containing it.

GLANDERS. Syn. *Farcinoma,*—Lat. A *contagious* disease, generally confined to the horse, ass, and mule, but communicable to man, in whom it assumes a highly malignant, and often fatal character. This disease appears under two forms—1. *Simple Acute Glanders,* marked by copious discharge of foul mucous matter from the nostrils and adjacent parts; and—2. *Farcy, Farcin,* or *Farcy Glanders,* when it attacks the lymphatics of the skin, either generally, producing a distended appearance of the vessels like moles or buttons (*bead* or *button farcy*), or, locally, when it takes the form of dropsical accumulations in the legs (*water farcy*).

Treat. Mr. Youatt considers it useless to attempt the cure of *glandered* horses; but that *farcy* in its earlier stages and milder forms may be often successfully treated. "All the mercurials have been used with *benefit* in farcy; but they must be discontinued as soon as the mouth is sufficiently affected, or sickness, loss of appetite, and like symptoms, are produced." (Blaine.) Feeding the animal entirely on green food appears to be the best mode of treatment in both varieties. The buttons are generally removed with caustic or a red-hot iron.

GLASS. Syn. *Vitrum,* — Lat. This well-known substance is, essentially a compound of silica (*silicic acid*) with the oxide of an alkaline metal, obtained by fusion. In its *usual* form, it is brittle, transparent, non-crystalline, insoluble, and fusible; but it sometimes exhibits other properties.

The manufacture of glass is one of the highest beauty, and considering the comparative worthlessness of the materials of which it is made, and the various purposes of a useful, ornamental, and scientific nature which it subserves, it may be regarded as, perhaps, the most important in the history of inventions. The principle of its production is very simple, although great skill and experience are necessary to ensure its excellence. *Silica* (commonly under the form of *sand*) is heated with *carbonate of potassa* or *of soda,* and *slaked lime* or *oxide of lead,* until the mixture fuses, and combination takes place. After a time the melted mass becomes perfectly limpid and free from air bubbles, when it is allowed to cool until it assumes the peculiar tenacious condition proper for working. The operation of fusion is conducted in large crucibles of refractory fire-clay, which, in the case of lead-glass, are covered with a dome, at the top, and have an opening at the side by which the materials are introduced, and the melted glass withdrawn.

The manufacture of glass is only conducted on the *large scale*, and the precise character and proportions of the ingredients used by the glass-maker, must necessarily greatly depend upon the nature of the raw materials furnished by his locality, or otherwise at his command. The attention of the manufacturer should be directed to the use of his materials in such proportions as will furnish, in the melting pot, the proper quantities of the essential ingredients, as determined from the known composition of the best commercial samples. The purity of the raw materials and the accuracy of his proportions and quantities, are proved or disproved by the excellence of the product; and the cause of error (if any) may be at once determined by carefully ascertaining the quality of the ingredients employed, and the composition of the defective glass.

Prep. The following formulæ exhibit the composition of the leading commercial glasses, as shown by chemical analysis, together with the proportions of the raw materials used in their production.

Bottle Glass. Sp. gr., 2·700 to 2·735.—*a.* (Composition by analysis.) 1. *Silica,* 53·55%; *lime,* 29·22%; *mixed alkali,* 5·48%; *alumina,* 6·01%; *oxide of iron,* 5·74%. Dark green.

2. *Silica,* 52%; *baryta,* 21·6%; *soda,* 26·1%; *oxides of iron* and *manganese,* 0·3%. Pale green; very superior.

b. (Raw materials used.) — 1. *Yellow sand,* 20%; *kelp,* 8%; *lixiviated wood-ashes,* 30%; *fresh wood-ashes,* 8%; *pale clay,* 16%; *cullet* (broken glass), 18%. This is the common mixture for coarse bottles, in Belgium, France, and Germany.

2. To the last add of *black oxide of manganese,* 2½ to 3%. Has a rich yellowish colour; used for Rhenish-wine bottles.

3. *Pale sand,* 51%; *lixiviated wood-ashes,* 33%; *pearl-ashes* (dried), 8%; *common salt,* 7½%; *white arsenic,* ½%; *charcoal,* q. s. Very pale green.

4. *Silicious sand* (pale), 68½%; *potash* (or its equiv.), 4%; *lime,* 23½%; *heavy spar,* 2½%; *peroxide of manganese,* 1½%. This forms the celebrated *flask-glass* of St. Etienne.

Broad Glass, Spread Window Glass. Sp. gr., 2·642.—*a.* (By analysis.) *Silica,* 69·70%; *lime,* 13·30%; *soda,* 15·25%; *oxide of iron* (and loss), 1·75%.

b. (Materials used.) 1. *White sand,* 50%; *dried sulphate of soda,* 22%; *charcoal* (in powder), 9%; *cullet,* 41%; *peroxide of manganese,* a little. Pale.

2. *White sand,* 60%; *potashes* (good), 24%; *common salt,* 10%; *nitre,* 5%; *white arsenic,* 1%; *peroxide of manganese,* a little ($\frac{1}{10}$ to $\frac{1}{12}$%); *pale cullet,* at will (10 to 30%). Very pale. This is the "*spread*" or *sheet window-glass,* in common use.

Chemical Glass. Sp. gr., 2·390 to 2·396. —*a.* (By analysis.) 1. *Silica,* 72·80%; *potassa,* 16·80%; *lime* (with a trace of alumina), 9·68%; *magnesia,* 0·40%; traces of *oxide of manganese* and *iron* (and loss), 0·32%. This is the difficultly-fusible *Bohemian tube-glass,* so valuable in chemical manipulations.

2. *Silica,* 69·3%; *potassa,* 15·8%; *soda,* 3%; *lime,* 7·6%; *alumina,* 1·2%; *magnesia,* 2%; *oxide of iron,* 0·5%; *oxide of manganese* (and loss), 0·6%. *English chemical glass* (without lead). More fusible than the last.

b. (Materials used.) 1. *Quartz* (hyalin, in powder), 60%; *calcined purified pearlash,* 30%; *fresh-burnt lime* (very pure), 9%; *nitre* (dried), ¾%; *arsenious acid* or *peroxide of manganese,* ¼%. Said to be the proportions used in the production of *a,* 1, (above.)

2. (M. Peligot.) *Quartz,* 71½%; *carbonate of potassa* (or its equiv., dry), 20%; *quicklime,* 8½%; (*manganese,* a little.) Said to be the formula for the hardest and least fusible *Bohemian tube-glass.* It is very intractable and infusible, except at a very high temperature; but the addition of an exceedingly small quantity of *boracic acid, borax,* or *arsenious acid,* causes it to flow into a glass possessing great brilliancy and hardness, and capable of being wrought at the highest heat of the ordinary furnace.

Crown Glass, White Window-glass. Sp. gr., 2·486 to 2·488.—*a.* (By analysis.) 1. *Silica,* 62·8%; *potassa,* 22·1%; *lime,* 12·5%; *alumina* (with traces of oxide of iron and manganese), 2·6%. Crown-glass of Bohemia, according to Dumas. Very beautiful.

2. *Silica,* 72·5%; *soda,* 17·75%; *lime,* 9·75%. English crown-glass; excellent quality, but not so white as the last.

b. (Materials used.) 1. *Finest white silicious sand,* 64%; *purified potashes* (dry), 23%; *lime,* 12%; *white arsenic,* ¾%; *oxide of manganese,* ¼%. Said to be used in Bohemia.

2. (Schweigger.) *Pure sand,* 57%; *dry sulphate of soda,* 28½%; *quicklime,* 11½%; *powdered charcoal,* 3 or 4%. Corresponds to *a,* 2, *above* (nearly).

3. *Pure sand,* 40%; *soda ash,* 24%; *lime,* 5%; *white cullet,* 31%. Rather superior to the last.

Crystal, Crystal Glass. The crystal glass of *England* is *flint glass* of superior quality; that of *Bohemia* is noticed under *Table glass.*

Flint Glass, Crystal. Sp. gr., 3·000 to 3·620.—*a.* (By analysis.)—1. (Berthier.) *Silica,* 59·19%; *oxide of lead,* 28·68%; *potassa,* 12·13%; *oxides of iron* and *manganese,* traces. Finets colourless English crystal.

2. (Brande; Faraday.) *Silica,* 52·0%; *oxide of lead,* 34·0%; *potassa,* 34·0%. Crystal.

3. (Faraday.) *Silica,* 44·30%; *oxide of lead,* 43·05%; *potassa,* 11·75%; *alumina,* 0·50%; *oxides of iron* and *manganese,* 0·12%; (loss, 0·28%.) Heaviest of three samples of flint glass examined.

b. (Materials used.) 1. *Finest Lynn-sand* (calcined, sifted, and washed), 51%; *litharge* (purest), 28% (or *red lead,* 29%); *refined pearlashes* (calcined before being weighed), 16%; *nitre* (purified), 4¾%; *arsenious acid* and *peroxide of manganese,* of each, ⅛%. Very fine crystal.

2. (M. Payen.) *Fine sand,* 46%; *red lead,* 31%; *purified carbonate of potash,* 23%. French crystal.

3. (Geddes.) *White Lynn-sand,* 51%; *red lead* or *litharge,* 33%; *refined pearlashes,* 13%; *nitre,* 3%; a very little *arsenious acid* and *peroxide of manganese.* Ordinary English flint-glass. *Crystal cullet* may be added at will, to the above. This glass was originally prepared from *powdered flints,* a fact to which it owes its common name.

Optical Glass. 1. (Crown Glass.) *Purest silicious sand,* 55%; *carbonate of soda* (dry), 12%; *chalk* (dry), 11%; *carbonate of baryta,* 22%.

2. (Flint Glass.)—*a.* (By analysis.) *Silica,* 44·30%; *oxide of lead,* 43·05%; *potassa,* 11·75%. This is Guinand's *dense optical glass.*

b. (Materials used.) 1. *Purest quartz,* 42%; *red lead* (finest), 42%; *purified potash,* 14¾%; *purified nitre,* 1¼%. These are the proportions used for the last.

2. (Korner.) *Finest quartz* (reduced to powder, treated with hydrochloric acid, washed, and dried), 47½%; *red lead,* 38¼%; *cream of tartar,* 14½%. The above are used by opticians in the construction of achromatic object glasses.

Plate Glass. Sp. gr., 2·488 to 2·600.—*a.* (By analysis.) — 1. (Dumas.) *Silica,* 75·9%; *soda,* 17·5%; *lime,* 3·8%; *alumina,* 2·8%. French mirror-glass.

2. (Mitscherlich.) Silica, 60%; *potassa,* 25%; *lime,* 12·5%; (loss, 2·5%?). Finest Bohemian plate.

b. (Materials used.) 1. *Finest silicious sand,* 45%; *dried carbonate of soda,* 25%; *lime,* 5%; *nitre* (purified), 2%; *plate-glass cullet,* 23%; *peroxide of manganese* and *cobalt azure,* a very little. Ordinary English plate.

2. *Whitish quartz sand,* 60%; *purified carbonate of soda* (dried), 20%; *lime* (slaked by exposure to the air), 9%; *plate-glass cullet,* 11% (or more). Sometimes as much *cullet* as sand is used; but in all cases 1% to 1½% of its weight in *carbonate of soda,* is added with it, besides that ordered in the formula, to compensate for loss of alkali by remelting. *Used* at the celebrated plate-glass works at Saint-Gobain, France. The product possess an amount of excellence which British manufacturers have yet failed to equal.

Table Glass, Bohemian Crystal. Sp. gr. 2·6 to 2·8.—*a.* (By analysis.)—1. (M. Berthier.) *Silica,* 71·7%; *potassa,* 12·7%; *soda,* 2·3%; *lime,* 10·3%; *alumina,* 0·4%; *oxides of iron* and *manganese* (and loss), 2·6%. Very white, hard, and beautiful table glass.

2. (Dumas.) *Silica,* 70%; *potassa,* 20%; *lime,* 4%; *alumina,* 5%; *oxide of iron,* 0·6%; *peroxide of manganese,* 0·4%. A beautiful white wine-glass.

b. (Materials used.) 1. *Finest sand,* 50%; *purified potashes,* 25%; *chalk,* 10%; *nitre,* 2%; *crystal cullet,* 27%; *manganese,* a little (say 1/16 %). *Used* in England recently for table glass.

2. *Quartz* (hyalin, in powder), 63%; *purified potashes,* 26%; *slaked lime* (carefully sifted), 11%; *manganese,* a little; *crystal cullet,* at will. *Used* in Bohemia.

3. (M. Perdonnet.) *Powdered quartz,* 44%; *carbonate of potassa,* 33%; *quicklime* (in fine powder), 22%; *nitre,* 1%; and a *very small* quantity of *arsenious acid* and *peroxide of manganese.* Said to be the formula used at Neuwelt, for the glass, *a,* 1, (above.)

Qual., &c. These are denoted by its hardness, transparency, homogeneity, strength, and power of resisting the action of water, air, light, and the stronger acids and alkalies. The power of glass to resist the action of menstrua is readily tried by exposing it to boiling oil of vitriol, and hot, but *dilute* solution of caustic potassa. Neither of these tests should cause the glass to lose its transparency or to become dim.

Pois., &c. Glass and enamel, both in fragments and in powder, have occasionally been swallowed, with different results. These bodies are insoluble in the fluids of the body, and, consequently, any injurious action they may exert upon the system whilst they are retained in it, must entirely depend upon mechanical attrition or irritation. As *treatment,* we must administer an *emetic* and assist its action by thick *mucilaginous liquids,* and afterwards have recourse to antiphlogistics, if necessary.

Anal., or *Assay.*—*a.* A portion of the sample for examination is heated to dull redness, and then suddenly thrown, whilst still hot, into a vessel of cold water. It is next dried, and reduced to fine powder in an agate or hardened-steel mortar.

b. 100 gr. of the *prepared powder* is thoroughly mixed with 200 gr. of *pure potassa*, and the whole is exposed to heat in a silver or platinum crucible or capsule until *perfect* fusion takes place; when cold, the crucible and its contents are boiled in about half-a-pint of *distilled water; nitric acid* is added to the resulting solution, in excess, and the mixture, together with any sediment, is evaporated to dryness, after which, the heat is gradually increased to 400° or 500° Fahr.; the dry residuum is next reduced to powder, and digested in *water acidulated with nitric acid*, until exhausted of soluble matter; the *insoluble portion* is then carefully dried, gently ignited, and weighed. The weight in grains represents the per centage of SILICA in the sample examined.

c. The *mixed liquid* and "*washings*" of (*b*) is next acidulated with *nitric acid*, and treated to a stream of *sulphuretted hydrogen*, which if it produces a precipitate is continued for some time; the precipitate is collected on a *very small* filter, washed, and dried; the filter with the precipitate is next placed in a beaker glass, and strong *fuming nitric acid* is cautiously added, drop by drop, until complete solution takes place; after boiling the solution for a few minutes, and allowing it to cool, it is precipitated with *sulphuric acid*, in excess; this precipitate (sulphate of lead) is washed, dried, slightly ignited in a porcelain crucible, and weighed. The weight in grains, multiplied by 0·7369, gives the per centage of OXIDE OF LEAD or LITHARGE.

d. The *filtered liquid* from (*c*) is evaporated to dryness, and redissolved in *water* acidulated with *hydrochloric acid*, and treated with a *solution* of *sal ammoniac*, and afterwards with *liquor of ammonia*, in excess; the precipitate (*alumina* and *oxide of iron*) is collected, washed, and boiled in a solution of *caustic potassa;* the undissolved portion is collected on a filter, washed with *boiling water*, ignited, and weighed. This gives the per centage of PEROXIDE OF IRON.

e. The liquid *filtered from the oxide of iron* holds the alumina (if any) in solution; a *solution* of *carbonate of ammonia* is dropped in; the resulting precipitate is washed, dried, ignited, and weighed. This gives the per centage of ALUMINA.

f. The *filtrate* from the *alumina and oxide of iron* (see *d*), after being evaporated to dryness, is redissolved in a large quantity of *distilled water*, and is treated with a solution of *oxalic acid* (a solution of *oxalate of ammonia* is preferable when no baryta is present); the precipitate is washed, dried, gently ignited, and weighed. The weight, in grains, multiplied by 0·56292, gives the per centage of LIME required.

g. The *filtrate* from (*f*) is now mixed with *carbonate of potassa*, in considerable excess, and boiled for a *long time;* the resulting precipitate (if any) is then collected on a filter, slightly washed with *hot water*, dried, and exposed to a *full-red heat* for some time (say 2 hours); the residuum of the calcination is then weighed. This furnishes the per centage value of the sample in MAGNESIA.

h. The *filtrate* from (*f*) is treated with *dilute sulphuric acid* or the *solution of a sulphate*, as long as a precipitate falls; the precipitate (SULPHATE OF BARYTA) is washed, dried, gently ignited, and weighed. The weight, in grains, multiplied by 0·6589 gives the per centage of BARYTA in the sample.

The above may be varied by gently concentrating the liquid filtered from the precipitate of alumina and oxide of iron (see *d*), and precipitating it with *dilute sulphuric acid;* the mixed precipitate is exhausted by digestion in *water* holding *hydrochlorate of ammonia* in solution; the undissolved residuum (SULPHATE OF BARYTA) is washed, dried, and otherwise treated as before; whilst the *solution* with the "*washings*," is treated with a *solution of carbonate of ammonia;* the precipitate is CARBONATE OF LIME, which is to be washed, &c., as directed under (*f*). The liquor, &c., filtered from the lime, is lastly tested for MAGNESIA. (See *g*.)

i. A *second* 100 gr. of the *powdered glass* (see *a*) is mixed with 200 gr. of *fluor spar*, also in powder; the compound is placed in a platinum or leaden capsule, 500 gr. of strong *sulphuric acid* are added, and the whole cautiously stirred together with a silver stirrer or spoon, care being taken to avoid inhaling the fumes; the heat of a spirit lamp is next applied, and at first is kept at about 212° Fahr., but towards the conclusion of the process is raised to 300° Fahr., or even higher, and is continued for at least 2 hours, or until fumes *entirely* cease to be evolved; 5 or 6 fl. oz. of *distilled water* are next poured on the residuary mass, and after thorough agitation, the whole is thrown on a filter, more water being at last poured on to wash out any remains of soluble matter; to the filtrate *carbonate of ammonia* is added in excess, and after a time the earthy salts are removed by filtration; the filtered liquor is now evaporated to dryness, and ignited to *dull* redness for 2 or 3 minutes; the residuum (*sulphate of potassa* or *soda*, or of *both*), after being weighed (the weight being carefully noted down), is redissolved in *distilled water;* a solution of *chloride of barium* is then added as long as it disturbs the liquor, and after a time the whole is again filtered; the *filtrate* is concentrated by evaporation, and solution of *bichloride of platinum* added in excess; the whole is now gently evaporated to dryness, mixed with *alcohol,* collected on a filter, carefully washed with *weak alcohol,* dried at a temperature under 212° Fahr., and weighed. The weight, in grains, multiplied by 0·1940 gives the per centage of POTASSA sought.

k. The *weight* of *sulphate of potassa* in the ignited residuum in (*i*) is calculated from that of the *potassa* last found (47 parts of the one being equal to 87 parts of the other), and *this weight* is deducted from the *gross weight* of the *ignited sulphates ;* the remainder represents the quantity of SULPHATE OF SODA present. The weight of the *latter*, in grains, multiplied by 0·4367, gives the per centage of PURE SODA required.

Concluding Remarks. One of the chief points to which the skilful glass manufacturer directs his attention, is the quality of his materials. Great care is exercised in the selection of the *sand* for all the finer varieties of glass. The usual practice is to test it before using it, by exposing it to a very high temperature. The purest sand is that which is the whitest and freest from iron, and which, consequently, suffers the least alteration by this treatment. The *alkalies* (potash, soda) employed, are purified by solution and crystallization. The *red lead* and *litharge* must be pure and absolutely free from oxide of copper (a common contamination), which gives a green tint to the glass. The former, which is the most costly, is preferable for the finest crystal. Care must also be taken that the *lime, clay, &c.*, are respectively of proper purity; and that the *cullet* or broken glass, which is almost always remelted with the other materials, is of proper quality, and of the *same* kind as that to which it is added. *Potassa* produces a better glass than soda, although the latter is now very generally employed from its lower price. It is, however, quite inadmissible as an ingredient in the manufacture of the better class of *crystal* and *plate glass*, as however pure it may be, it imparts to the product a slight greenish tinge more or less destructive of its beauty. When *sulphate of soda* (Glauber salt) is used as a source of soda, it is gently calcined to dissipate its water of crystallization, and requires the addition of about 8$\frac{0}{0}$ of *charcoal* to effect its reduction in the melting-pot. *Common salt* is also employed as a source of soda in the same manner. Sometimes *native sulphuret of lead* (galena) is used to decompose the sulphate of soda, and in lieu of part of the oxide of lead; in which case about 5 parts of the sulphuret are taken for every 9 parts of the calcined sulphate.

To anticipate the results of his processes, and to carry out with certainty his various intentions, the glass-manufacturer, perhaps more than any other person, requires the aid of science and experience. All his most essential operations depend on chemical principles. The products of his furnaces are not formed by the mere mechanical admixture of their several ingredients whilst in the state of fusion, but result from the play of delicate affinities which only act under certain conditions, and when the materials are presented to each other in uniform and definite proportions. Chemically speaking, the glasses are mixed supersilicates of the respective bases which enter into their composition (*potassa, lime, lead, &c.*), and like all other compounds which are formed by elective attraction, obey the common laws of combination, as developed by Dalton, and now so successfully applied in almost every department of industrial art. It has been shown by the most careful analysis, that in all the more valuable and beautiful commercial glasses, the relative proportions of the materials are conformable to these laws, and that several of them are true atomic compounds, as perfect in this respect, as the crystalline bodies commonly denominated salts. In some of the harder glasses of Bohemia the number of atoms or equivalents of silica are to each of the bases with which it is united, nearly as 5 to 1; whilst in a softer glass of German manufacture, the proportions of the two are found to be as 4 to 1. The celebrated plate glass of St. Gobain, is an atomic compound formed of 1 equivalent of trisilicate of soda, united to one equivalent of trisilicate of lime, with a small per centage of alumina in combination with silicic acid (*silica*), also in atomic proportion. Glasses in which the ingredients bear no atomic ratio to each other, are never homogeneous, but always more or less striated and of unequal colour and refractive power. The absence of atomic proportion between the substances entering into its composition, appears to be the only reason why the best English plate and mirror glass is so greatly inferior to that of France and Germany, that comparison of the two becomes absurd. The only variety of glass in the production of which the English manufacturer excels, is flint glass or crystal, and here he certainly surpasses all his numerous competitors. The subject is doubtless involved in difficulty, owing to the precise temperature necessary to effect the perfect combination of the bases with the silicic acid, varying with the character of the compound, and not being satisfactorily settled by observation or experience. The modifying influence of temperature is shown by the fact that the lower the heat employed in the process, the smaller the quantity of silica which enters into the composition of the resulting glass; whilst at higher temperatures, a part of the base is dissipated in fumes, until such proportions of base and acid result, as are required to produce a permanent atomic compound corresponding to the temperature employed. If the heat is excessive or improperly continued, the loss of base produces an opposite effect, and an opaque, semi-vitrified mass is formed, resembling Reaumur's porcelain. The quality of the resulting glass depends on this change being more or less complete. If the furnace yields the right temperature and the duration of the exposure to its action is neither too short nor too prolonged, nature makes up for the unskilful conduct of the operative, and removes the stumbling blocks which his ignorance had placed in the way of his own attempts at excellence. The proceedings and their results are accidental, but being once obtained, the first are repeated without further trouble or inquiry. This accounts for the same mixture of materials yielding products of different qualities at different times, and in different works, which the operative contents himself with referring to the "going of the furnace." The common plan in this country is to regulate the proportions and firing by experience only, rather than by theory and practice combined. Now, although the chemist has much yet to learn on the precise constitution of the glasses, and although theory may not be able to ensure unvarying success, it is nevertheless certain that, in all cases, it can afford much valuable assistance in that direction. Indeed, it has been asserted by one of the leading Continental chemists, that ingredients that will yield the proper equivalent proportions in the melting pot, *cannot* produce a bad glass, if exposed to such a temperature as to permit of perfect combination taking place.

It is found that those glasses which contain a predominance of alkali are acted on by water, and when this is in great excess, they are perfectly soluble in that fluid. Ordinary *flint glass* is affected by long coction in water, whilst *crown glass*, which contains less alkali, is unaltered by that trial. Glass which contains any considerable quantity of lead, is acted on by sulphuretted hydrogen. This is the cause of the surface of *flint glass*, under certain circumstances, becoming opaque and iridescent. Glasses made of silica and alkali *alone* are incapable of permanently resisting the action of water. The addition of lime or oxide of lead appears to be necessary to give them this quality. Glasses that have a slight greenish or bluish tint may be often *whitened*, or rendered *colourless*, by exposure to light and air. This arises from the peroxidizement of the iron, to whose protoxide they owe their tint. Other glasses become *purpled* by exposure, owing to the peroxidizement of the manganese.

Different colours are communicated to glass by the addition of metallic oxides. Thus, oxide of manganese gives an *amethyst;* oxide of cobalt, a *blue;* oxide of iron, a *brown;* black oxide of copper, a *green;* oxide of gold, a *purple;* suboxide of copper, a *ruby-red;* oxide of tin, a *white;* oxide of silver, a *yellow*, *&c.* These substances are either added to the melted contents of the glass-pot, as in preparing *artificial gems*, *&c.;* or they are applied in a thin layer to the surface of the object, which is then heated until fusion of the coloured compound occurs, as in *enamelling* and *painting on glass.*

Glass is *formed* or *fashioned* into articles by the processes of blowing, casting, drawing, rolling, or spreading. In the process of *blowing glass* the workman begins by collecting a proper quantity of glass in a soft, pasty state, at the end of his *blowpipe* (an iron tube, five or six feet in length, terminated by a mouth-piece of wood), which he then commences blowing through, by which the lump is expanded into a kind of flask, susceptible of having its form modified by the position in which it is held, and the velocity of rotation continually given to the iron tube. If an open-mouthed vessel is to be made, an iron rod, called a "*pontil*" or "*puntil*," is dipped into the glass-pot and applied to the bottom of the flask, to which it thus serves as a handle, the blowpipe being removed by the application of a cold iron to the neck. The vessel is now re-heated, and the aperture enlarged, and the vessel otherwise altered in figure by the aid of a few simple tools until completed. It is then detached, and carried to the "*annealing oven*," where it undergoes slow and gradual cooling during many hours. In this way bottles, flasks, carboys, and an almost infinite variety of other articles are formed. The large circular *tables* of *crown-glass* are made by a joint process of blowing and spreading. The globular flask at first produced, transferred from the blowpipe to the "pontil," is suddenly made to assume the form of a flat disc by the centrifugal force of the rapid rotatory movement given to the rod. *Spread* or *broad glass* is formed into sheets in a nearly similar manner. *Plate-glass* is cast upon a flat metal table, and after very careful annealing, is ground and polished by suitable machinery. *Tubes* are made by rapidly *drawing* out a hollow cylinder; and from these a great variety of useful small apparatus are constructed with the help of a lamp and blowpipe, or still better, the bellows-table of the barometer-maker. *Glass beads* are made from small tubes chopped into pieces of suitable lengths, which are stirred first, in a mixture of *sand* and *wood-ashes*, in the cold, and afterwards in an iron pan over the fire until they assume a rounded form. *Small tubes* are bent in the flame of a spirit-lamp or gas-jet, and cut by a file, a scratch being made, and the two portions pulled or broken asunder in a way easily learned by a few trials. *Large tubes* require the heat of a powerful blowpipe and lamp, or that of a furnace.

The following *Table of Equivalents*, together with the mode of *assaying glass* (see *above*), will be found of great value by the glass manufacturer desirous of improving the quality of his wares:—

Silica	45·5
„ (2 atoms)	91·0
„ (3 „)	136·5
„ (4 „)	182·0
„ (5 „)	227·5
„ (6 „)	273·0

are equal to

Alumina	26
Baryta	77
Carbonate of potassa (dry)	69
„ soda (do.)	53
Chalk	50
Common salt	58·5
Lime	28
Litharge	112
Magnesia	20
Potassa	47
Red lead	114
Soda	31
Sulphate of baryta	117
„ soda (dry)	71

GLASS (Management of). The following hints may prove useful to the inexperienced:—

Annealing. The process of annealing glass has been briefly referred to at p. 68. The *extreme brittleness* of *imperfectly annealed wrought glass* may generally be remedied on the *small scale*, by immersing the articles in a *bath of oil*, or a *concentrated solution of chloride of calcium*, or *common salt*, and heating the whole gradually and cautiously to the boiling point, and letting it again cool,—*the slower the better.* By this treatment, the glass will be enabled to bear any alternations of temperature between the two extremes to which it has been exposed.

Blowing. By the ingenious art of *glass-blowing* and *glass-drawing*, as practised on the small scale, with a blowpipe lamp furnace, a variety of articles of ornament and utility may be made, their number being limited only by the ingenuity of the artist. The details of the various operations are, however, too lengthy to describe here. See *Glass* (above).

Cleaning. Windows, looking-glasses, &c., may be quickly cleaned as follows:—Dip a slightly moistened rag or flannel into *whiting*, *fuller's earth*, *wood-ashes*, or *rotten-stone*, in impalpable powder, with which smear the glass, and wipe it off with a dry soft cloth. This does well when the surface is very dirty. In other cases, a little *thumb blue*, *whiting*, or *chalk*, in fine powder, tied up in muslin, may be dusted on the glass, which should then be cleaned off with chamois leather. This gives a fine polish.

Cutting. Glass may be easily cut with a common well-hardened steel file, provided it be moistened with *oil of turpentine*, or plunged *under water.* It may also be perforated with a common steel brad-awl in the same way. *Glass vessels*, as bottles and tubes, may be readily cut or shortened, by placing a heated iron ring over the spot, or a piece of loose string or cotton dipped in *oil of turpentine* and set on fire, and immediately on the withdrawal of either, applying *cold water* to the part. Glass vessels or tubes thus treated will generally crack round, and may be readily divided into two parts. The ingenious Faraday, in this manner converts a common Florence oil-flask into an evaporating dish and a funnel. By a little practice a crack may be led in almost any direction, or a new one made, by the point of a *red-hot poker* or a *spring coal* (an ignited crayon of prepared charcoal). The parts may then be separated by a little force or a smart rap; and the divided edges smoothed by the flame of a blowpipe, or by grinding them with *powdered emery-and-water* on a flat stone. In this way many broken articles in glass may be converted into others scarcely less useful.

Engraving, Etching. This has been already noticed. (See p. 397.)

Grinding. This, on the *large scale,* like glass-cutting, forms a distinct occupation. On the *small scale,* glass may be roughed or ground by friction with *powdered emery-and-water* and a flat rubber of wood; care being taken that the article, if a plate, is laid on a perfectly flat surface, or, if hollow, is supported by a *core* of cement or plaster. The *frosted appearance* of ground glass is given to the panes of windows by *gently* dabbing the glass over with a piece of *glazier's putty,* stuck on the ends of the fingers. When applied with *a light and even touch,* the resemblance is considerable. *Another method* is to dab the glass over with thin *white paint,* or *flour paste,* by means of a brush, but the effect is much inferior to the above.

Packing. See *Packing, &c.*

Writing on glass may be performed by a piece of *French chalk* or *crayons* prepared for the purpose; or even with a common pen held nearly perpendicular. *Indian ink,* or when the article will be exposed to damp, *shell-lac ink* or *varnish,* thickened with a little *vermilion* or *lamp black,* is best adapted to this purpose. Common ink is not sufficiently opaque.

GLASS. This term was applied by the *older chemists* to various substances to which a vitreous appearance has been given by heat. Thus, we have *glass of antimony, glass of borax, &c.* It is now obsolete.

GLASS (Devitrified). See *Glass* and *Porcelain.*

GLASS (Powdered). Syn. *Vitrum Pulverisatum,*—Lat. *Prep.* Heat the glass red hot, throw it into cold water, dry, and powder it. *Used* to filter acids, and glued upon paper as a polishing powder; also to wear down *corns* upon the feet, after the feet have been well soaked, and dried. It has likewise been blown into the eyes to wear down excrescences.

GLASS (Soluble). Syn. *Vitrum Solubule,*—Lat. *Prep.* 1. *Silica* (or its equiv.), 1 part; *carbonate of potassa* or of *soda,* 2 parts; fused together.

2. (Dobereiner). *Carbonate of soda* (dry), 54 parts; *carbonate of potassa* (dry), 70 parts; *silica,* 192 parts; as last. Soluble in boiling water, yielding a fine, transparent, semi-elastic varnish.

3. (Fuchs.) *Carbonate of potassa* (dry), 10 parts; *powdered quartz* or *pure sand,* 15 parts; *charcoal,* 1 part. Soluble in 5 parts of water. The solution, on evaporation, furnishes a transparent glass, permanent in the air.

Uses, &c. The above, in solution, have been used to render textile fabrics less combustible. The potash compound (*silicate of potassa*) has been recommended as a remedy for gouty concretions by Mr. Ure. *Dose.* 10 to 15 gr., in 6 or 8 fl. oz. of water, twice a day.

GLAUBER SALTS. See *Sulphate of Soda.*

GLAUCIC ACID. A compound discovered by Dr. Runge in several species of *dipsacus* and *scabiosa.* It is obtained by adding *ether* to the *tincture of the dry plant,* dissolving the precipitated flocculi in *water,* treating the solution with *acetate of lead,* decomposing the precipitated *glaucate of lead* with *sulphuretted hydrogen,* and evaporating the filtered liquor to expel the water and acetic acid. A brittle yellow mass, forming salts with the bases called *glaucates.*

GLAUCINE. A peculiar substance forming pearly scales, soluble in hot water, alcohol, and ether; discovered by Probst in *glauceum luteum.* It forms neutral salts with the acids.

GLAUCOPICRINE. White scales, soluble in hot water, alcohol, and ether, and having a bitter taste, obtained by Probst from *glauceum luteum.* It forms neutral crystallizable salts with the acids.

GLAZE. *Gravy* or *clarified soup* boiled until it gelatinizes on cooling. It is used as a species of varnish to cover various dishes for the table, and may be spiced and flavoured according to the fancy of the cook.

GLAZES. These are either *white* or *coloured.* The former, by the addition of the colouring ingredients used for enamels are converted into the latter.

Prep. 1. (With lead.) *White lead* (pure), 53 parts; *quartz* or *ground flints*, 36 parts; *Cornish stone* or *felspar*, 16 parts; *white flint glass*, 5 parts; reduce the whole to an impalpable powder, without fritting. For common earthenware.

2. (Without lead.) *Fine Lynn-sand*, 47¾%; *purified potash*, 38%; *slaked lime*, 9½%; *nitre*, 4¾%; powder, mix, heat the mixture until "fritted," and then again reduce it to fine powder. Sometimes about 1% of *oxide of tin* and a *very small* quantity of *oxide of cobalt* are added before "fritting" the ingredients, in order to take off the brown colour, and make the white turn on the azure. For metallic colours and chemical vessels.

3. (Rose.) *Felspar*, 27 parts; *borax*, 18 parts; *finest silicious sand*, 4 parts; *nitre*, *soda*, and *purest china clay* (Cornish), 3 parts; mix, heat to a "frit," powder, and add of *calcined borax*, 3 parts. For porcelain.

4. (Ure.) *White felspar*, 26 parts; *soda*, 6 parts; *nitre*, 2 parts; *borax*, 1 part; "frit" together as last. Of the *product* take 13 parts; *red lead*, 50 parts; *white lead*, 40 parts; *flints*, 12 parts; reduce the whole to powder as before. For painted stoneware.

Obs. Glazes must be reduced to very fine powder. For *use* they are ground with water to a very thin paste or smooth cream, into which the articles, previously baked to the state called "*biscuit*," are then dipped; they are afterwards exposed to a sufficient heat in the kiln to fuse the glaze. *Another method* of applying them is to immerse the "biscuit" in water for a minute or so, and then to sprinkle the dry powder over the moistened surface.

GLIADINE. A peculiar substance contained in the gluten of wheat.

Prep. Rub fresh-made *gluten of wheat flour* with *alcohol*, and evaporate the filtered solution to dryness. The *gliadine* thus obtained may be purified by extracting the colouring matter and oil by means of *ether*.

Prop., *&c.* A gluey, adhesive substance; hard and translucent, when dry; insoluble in water; soluble in acetic acid and dilute caustic alkali. The presence of gliadine is characteristic of wheat corn. It is *used* to form a test liquor.

GLOBULINE. A species of albumen constituting the principal portion of the blood-globules. See *Hæmatosine*.

GLOVE POWDER. *Prep.* 1. From *Castile soap*, dried by exposure to a warm dry atmosphere for a few days, and then reduced to fine powder in a mortar. *Used* to clean gloves.

2. *Pipe-clay*, coloured with *yellow ochre*, *umber*, or *Irish slate*, q. s., and afterwards scented with a little powdered *orris root* or *cloves*. *Used* to colour gloves made of doeskin and similar leather.

GLOVES. Although gloves are a less costly article of dress at the present day, than they were during the Middle Ages, the following information may nevertheless be sometimes found of value to their wearers:—

Glove cleaning. 1. (Kid Gloves.)—*a.* Damp them *slightly*, stretch them *gently* over a wooden hand of appropriate size, and clean them with a sponge dipped in recently rectified *oil of turpentine* or *camphine;* as soon as they are dry, withdraw them gently from the "stretcher," and suspend them in a current of air for a few days, or until they cease to smell of the turpentine. Heat must be avoided. If ordinary oil of turpentine is used, a little essence of lemon may be added to it; the scentless or "*sweet oil of turpentine*" needs no such addition. The oil should be used liberally, and the first dirty portion should be sponged off with clean oil. By collecting the "washings" separately, and allowing them to deposit the dirt by standing, the same oil of turpentine may be used over and over again.

b. By employing a *saponaceous compound*. See *Ganteine* and *Saponine*.

2. (Doe-skin *and* Wash-leather Gloves.)—*a.* Stretch them on a hand, or lay them flat on a table, and rub into them a mixture of finely-powdered *fuller's earth* and *alum;* sweep it off with a brush, sprinkle them with a mixture of *dry bran-and-whiting*, and, lastly, dust them well off. This will not do if they are very dirty.

b. Wash them in *luke-warm soft water*, with a little *Castile* or *curd soap*, *ox-gall*, or *bran tea*, then stretch them on wooden hands, or pull them into shape *without wringing them;* next rub them with *pipe-clay* and *yellow ochre*, or *umber*, or a mixture of them in any required shade, made into a paste with *ale* or *beer;* let them dry *gradually*, and, when about *half* dry, rub them well, so as to smooth them and put them into shape; when they are dry, brush out the superfluous colour, cover them with paper, and smooth them with a *warm* (not *hot*) iron.

Glove dyeing. Leather gloves, if not greasy, may be dyed with any of the *ordinary dyes* by brushing the latter over the gloves stretched out smooth. The *surface* alone should be wetted, and a second or third coat may be given after the former one has become dry. When the last coat has become *thoroughly* dry, the superfluous colour should be well rubbed out, a smooth surface given them by rubbing them with a polished stick or piece of ivory, and the whole gone over with a sponge dipped in white of egg.

GLOVES (Cosmetic). Syn. *Gants Cosmetiques.* These are mock kid or lamb-skin gloves rubbed over, on the *inside*, with the following composition: — *Spermaceti cerate*, 3 *oz.;* melt, add of *balsam of Peru*, ½ dr., stir for 5 minutes, and after a few minutes' repose, pour off the clear portion; to this add of *oil of nutmeg*, 15 drops; *oil of cassia* and *essence of ambergris*, of each, 6 drops; and stir until cold. *Used* by ladies to soften the hands and to prevent or cure chilblains and chaps. They are commonly worn all night in bed.

GLUCIC ACID. Syn. *Kalisaccharic Acid.* A substance produced by the action of alkalies on sugar.

Prep. Saturate a *solution* of *grape-sugar* with *lime* or *baryta*, and set it aside; after some weeks, precipitate the solution with *basic acetate of lead*, filter, wash the precipitate with water, diffuse it in water, decompose it by *sulphuretted hydrogen*, and evaporate the filtered liquor.

Prop., &c. Sour, soluble, deliquescent; its salts (*glucates*) are all soluble, with the exception of the *glucate of protoxide of lead.*

GLUCINA. Syn. *Glycyna, Berylla, Glucine, Oxide of Glucinium, Sesquioxide of do.* A pulverulent white substance, discovered by M. Vauquelin, in 1798, and hitherto found only in the beryl, emerald, and euclase.

Prep. The *beryl*, in fine powder, 1 part; *carbonate of potassa*, 3 parts; expose the mixture to a strong red heat for half an hour, dissolve the calcined mass in *hydrochloric acid*, and evaporate the solution to dryness; redissolve the residuum in *very dilute hydrochloric acid*, and precipitate with *pure liquor of ammonia;* wash the precipitate well, digest it with a large quantity of *carbonate of ammonia*, filter, and boil the solution as long as *carbonate of glucina* subsides. By exposure to a red heat the carbonic acid may be expelled, and the earth rendered anhydrous.

Prop., &c. Glucina closely resembles alumina, from which, however, it is distinguished by its solubility when freshly precipitated, in a cold solution of carbonate of ammonia, from which it is again thrown by boiling. Sp. gr. 2·967. Glucina is classed with the earths. The beryl contains 14% of this substance. (See *below.*)

GLUCINIUM. Syn. *Glycynium, Glucinum, Beryllium.* The metallic base of glucina. It was first obtained by Wöhler, in 1828, by a similar process to that adopted for *aluminium.* It is a grayish-black powder, of difficult fusibility, unacted on by cold water, and burning when heated in the air, producing glucina. It acquires a metallic gloss under the burnisher. See *Aluminum.*

GLUCOSE. See *Grape Sugar.*

GLUCOSIC FERMENTATION. See *Saccharine Fermentation.*

GLUE. Syn. *Colle, Colle Forte,* — Fr. *Gluten, Glutinum,*—Lat. Inspissated animal jelly, or gelatine, used as a cement.

Prep. Glue is principally prepared from the parings and waste-pieces of hides and skins, the refuse of tanneries, and the tendons and other offal of slaughter-houses. These substances, when intended for the glue-maker, are steeped for 14 or 15 days in *milk of lime*, then drained, and dried by exposure to the air. This constitutes what is termed the "*cleansing*" or "*preparation*," and in this state the *glue-pieces*, as they are called, may be kept for a long time, and transported to any distance without suffering decomposition. Before conversion into glue, they are usually again steeped in weak *milk of lime*, and next, well washed, and exposed to the air for 24 to 30 hours. They are then placed in a copper boiler 2-3rds filled with *water*, and furnished with a perforated false bottom to prevent them from burning, and as much is piled on as will fill the vessel and rest on the top of it. Heat is next applied, and the whole gently boiled or simmered together, until the liquor on cooling forms a *firm* gelatinous mass. The clear portion is then run off into another vessel, and a very small quantity of *alum* (dissolved) added; here it is kept hot by a water-bath, and allowed to repose for some hours to deposit its impurities, after which it is run into the *congealing boxes*, and placed in a cool situation. The next morning the cold gelatinous masses are turned out upon boards wetted with water, and are cut horizontally into thin cakes with a stretched piece of brass wire, and then into smaller cakes with a moistened flat knife. The latter are placed on nettings to dry. The dry cakes of glue are next dipped one by one into *hot water*, and slightly rubbed with a brush wetted with *boiling water*, to give them a gloss; they are, lastly, stove-dried for sale. This furnishes the palest and best glue.

As soon as the *liquor* of the *first boiling* has drained off, the undissolved portion of skins, &c., left in the copper is treated with *fresh water*, and the whole operation is repeated *again* and *again*, as long as any gelatinous matter is extracted. In this way a *second* and other inferior qualities of glue are obtained. The *product* from *dried glue-pieces* is about 50%.

Var. These chiefly depend on the care with which the process is conducted. *Hatmaker's glue* is prepared from the *tendons* of the *legs of neat cattle* and *horses.* It is brown, opaque, and soft; and grows moist in damp weather, but it does not render felt brittle like the other varieties. *Fish glue* is made in like manner from various membranous and solid parts of cetaceous animals. *Parchment glue* is prepared from *shreds* or *shavings of parchment, vellum, white leather, &c.*, dissolved by boiling them in *water.* It is scentless and nearly colourless.

Qual. The best glue is transparent, nearly colourless and tasteless, has very little smell, even when melted, and is extremely adhesive. The presence of more than a trace of alum is objectionable; an undue quantity may be easily detected by the usual tests. The strongest glue is that obtained from skins, more especially from the hides of oxen and cows. That obtained from the bones, cartilages, and tendons, is weaker.

GLUE (Liquid). *Prep.* (M. S. Dumoulins.) *Soft water*, 1 quart; *best pale glue*, 2 *lb.;* dissolve in a covered vessel by the heat of a water-bath, cool, and add gradually, of *nitric acid* (sp. gr. 1·335), 7 *oz.;* when cold put it into bottles. Very strong and does not gelatinize. For the "*liquid glue*" sold in the shops, see *Chinese Cement.*

GLUE (Marine). *Prep.* 1. *Indian rubber* (cut small), 1 part; *coal tar* or *mineral naphtha*, 12 parts; digest in a covered vessel with heat and agitation, and when the solution is complete, add of *powdered shelllac*, 20 parts; continue the heat and stirring until perfect liquefaction has taken place, and pour the fused mass, whilst still hot, on slabs of polished metal or stone, so as to form thin sheets. For *use*, it is heated to its melting point (248° to 250° Fahr.) in an iron vessel, and applied in the liquid state with a brush. Employed in ship-building, &c.

2. *Caoutchouc*, 15 to 20 gr.; *chloroform*, 2 fl. oz.; dissolve, and add of *powdered mastic*, ½ *oz.* It must be kept well-corked and in a cool place, to prevent loss by evaporation. *Used* for small fine work.

GLUE (Portable). Syn. *Bank-note Glue, Mouth do., Indian do.; Colle à bouche,* —Fr. *Prep.* From the *best pale glue*, 1 *lb.; water*, q. s.; dissolve in a double glue pot or water bath, add of *pale brown sugar*, ½ *lb.*, continue the heat until the mixture is complete, and pour it into moulds; or pour it on a marble slab, and when cold, cut it into small pieces and dry them in the air. This glue is very useful to draughtsmen, architects, &c., as it dissolves almost immediately in warm water, fastens paper, &c., without the process of damping, and may be softened for many purposes with the tongue. When great strength is not required, 4 *oz.* more of *sugar* may be used.

GLUTEN. Syn. *Vegetable Gluten.* A peculiar substance found in the grain of wheat. According to M. Taddei it is a compound of *gliadine* and *zimome*, but by more recent analysis it appears to consist of *albumen*, *mucin*, and *glutine* (a distinct principle).

Gluten is believed to be eminently nutritious, and to impart to wheat its superiority as an aliment over the grains of the other cereals. It is the presence of gluten in wheaten flour that imparts to it its viscidity or tenacity, and confers upon it its peculiar excellence for the manufacture of *macaroni*, *vermicelli*, and similar pastes. The superiority of wheaten over other bread depends upon the greater tenacity of its dough, which during the *fermentation* is puffed up by the evolved carbonic acid, and retained in its vesicular texture, so as to form a light loaf.

Gluten is grayish coloured, and extensible whilst fresh and moist, like elastic gum. It turns blue when mixed with guaiacum resin. For the mode of obtaining it, see *Flour* (page 476).

GLUTEN BREAD. *Prep.* 1. From *wheat flour* which has been deprived of about 2-3rds of its *starch* by washing it with *water.*

2. From *gluten flour.* Recommended in diabetes.

GLUTEN CHOCOLATE. (*Gentile's.*) A mixture of *cocoa* and *gluten flour.* As a nutritious and appropriate food in diabetes.

GLUTEN FLOUR. *Prep.* 1. From the *waste gluten of the starch works*, washed, dried, and ground.

2. (*Gentile's*). From the last mixed with about an equal weight of *wheat flour.* (See *above*).

GLUTINE. A substance resembling gluten, from which it chiefly differs in being wholly insoluble in alcohol.

GLYCERINE. Syn. *Oxide of Glyceryle; Glycerinum,*—Lat. A sweet syrupy liquid formed during the saponification of oils and fats.

Prep. An almost inexhaustible supply of *crude glycerine* is furnished by evaporating the water used to make lead plaster, and the sweet liquor of the stearine makers. The operative chemist has therefore only to purify one or other of these products to obtain *pure glycerine.* This may be done as follows:—

1. The *water* and *washings* from lead plaster, are mixed together, filtered, and submitted to the action of a *stream* of *sulphuretted hydrogen,* to throw down the lead; the supernatant liquid is decanted from the precipitate, filtered, and evaporated to the consistence of a syrup in a water bath. To render it quite pure it is diluted with *water,* decoloured with a little *animal charcoal,* filtered and again evaporated to the consistence of a thin syrup, after which it is further evaporated in vacuo, or over sulphuric acid, until it acquires the sp. gr. 1·265.

2. (M. Bruère-Perrin.) From the *sweet liquor of the stearine works.* The quantity of *lime* present in the sample is first determined by means of *oxalic acid,* and the proportion of *sulphuric acid* necessary for its saturation, at once calculated, and added; the *crude liquor* is then concentrated in a tinned-copper vessel, evaporation being promoted by brisk agitation, until the sp. gr. sinks to 10° Baumé; it is next cooled and filtered, and *accurately* neutralized (if it is required) with *carbonate of potassa,* after which it is evaporated to the sp. gr. 24° Baumé; on cooling, it deposits gelatinous sulphate of potassa; the whole is now filtered, the deposit on the filter washed with a little very *weak spirit-and-water,* the *filtrate* and "*washings*" mixed together, and evaporated, as before, with agitation, until the sp. gr. 28° Baumé, whilst hot (30° cold), is attained, when the whole is allowed to cool; the clear liquid is, lastly, decanted, and filtered. In this state it has an amber colour, but may be rendered colourless and odourless by rediluting it with *water,* treating it with *animal charcoal,* filtering, and again evaporating to a proper consistence.

3. By saponifying *olive oil* with *caustic alkali,* decomposing the resulting soap with *dilute sulphuric* or *tartaric acid,* evaporating the aqueous matter to dryness (nearly), dissolving out the *glycerine* with *cold rectified spirit,* and filtering and evaporating the solution as before. The products of all the above are *nearly pure.*

4. (Commercial.) From *sweet stearine-liquor,* by precipitating the lime by a stream of *carbonic acid gas,* or by a solution of *carbonate of soda,* carefully avoiding adding the latter in excess; the liquor is then boiled a little, filtered, evaporated to a syrupy consistence, and again filtered. This is the common glycerine of the shops. It may be further purified as above.

Prop. Pure glycerine is a colourless, odourless, uncrystallizable liquid, sweet to the taste, and of a syrupy consistence; like water, it mixes in all proportions with aqueous liquors, alcohol, and vinegar; it is unctuous and emollient, and softens bodies, like oil, but *without greasing* them; it does not evaporate or change in the air at ordinary temperatures, and is not susceptible of rancidity or spontaneous fermentation; mixed with yeast and kept in a warm place it is gradually converted into *propionic acid;* a strong heat decomposes it, with the production of *acroleine;* it is neutral to test paper, and possesses neither basic nor acid properties; it is easily charged with the aroma of the essential oils, and may be combined with soap, and many other substances, without undergoing change Sp. gr., 1·27.

Uses, &c. Glycerine was discovered by Scheele in 1782, but continued a mere matter of interest to the curious, until comparatively a recent date. At length its value in diseases of the ear was noticed by an English practitioner, and soon afterwards, Dr. Startin announced its efficacy in some cutaneous affections. This led to its action being tested by MM. Bazin and Cazenave, in France; by Mr. Yearsley and Mr. T. Wakley, in London; and in Russia, by Dr. Dallas, of Odessa, by whom its value both as a remedy and a cosmetic has been fully established. It is now extensively employed, either alone, or in lotions, baths, &c., as a soothing emollient, and is added to poultices and dressings, instead of oil, to prevent their hardening. Diluted with water it often succeeds in allaying itching and irritation of the skin when all other means fail. As a *cosmetic,* either made into a lotion or added to soap (*glycerine soap*), or used in small quantities along with the water employed in washing, it imparts a healthy clearness, and a sensation of softness and coolness to the skin, which is very agreeable and refreshing. It is the best remedy known for chapped nipples, hands, lips, &c.; all of which may be prevented by its use as an article of the toilet.

GLYCERYLE. The hypothetical radical of glycerine, according to Liebig.

GLYCION. See *Glycyrrhizine.*

GLYCOBENZOIC ACID. A nitrogenous

compound formed, along with water and pure nitrogen, when *hippuric acid* is treated with *nitrous acid.* It is crystalline, only slightly soluble in water, but freely soluble in alcohol and ether; boiling water resolves it into *benzoic acid* and *glycolic acid.*

GLYCO-CHOLALIC ACID. See *Cholic Acid.*

GLYCOCINE. Syn. *Glycocoll, Glycolamide, Gelatine Sugar.* This substance was originally obtained by the action of cold *concentrated sulphuric acid* upon *gelatine,* but it has been since shown to be formed along with benzoic acid, when *hippuric acid* is treated with boiling *hydrochloric acid.* It is sweet tasted, colourless, crystallizable, freely soluble in water, and unites to form crystallizable compounds with a number of other bodies, like cane and grape sugar.

GLYCO-HYOCHOLALIC ACID. See *Hyocholic Acid.*

GLYCOLAMIDE. See *Glycocine.*

GLYCOLIC ACID. See *Glycobenzoic Acid.*

GLYCYRRHIZINE. Syn. *Glycion, Liquorice Sugar.* An uncrystallizable variety of sugar obtained from the root of common liquorice (*glycyrrhiza glabra,*— Linn.) It is yellow, transparent, soluble in both water and alcohol, and is not susceptible of the vinous fermentation. The stronger acids precipitate it from its solutions.

GLYPHOGRAPHY. An art by which an engraving is produced by voltaic electricity. A drawing having been made through the ordinary etching ground, the plate is etched, and after being dried and covered with a mixture of various substances (*plumbago* answers well), it is suspended in the decomposition cell, and a copper-plate is deposited on it in the usual manner. The design is thus in slight relief, and is intended to be printed from, like a woodcut, by the common system of printing; the lights are, however, apt to take the ink, unless much time and care are spent on them. This fact is well known to the patentee, who refused us a specimen in our pages, unless our printer would permit *him* to "work off" the sheet containing it.

GLYSTERS. See *Enemas.*

GNATS and *Musquitoes.* Smoke and strong fumes of any kind, will drive away these insects. If you only burn a piece of *brown paper* in an enclosed space where they are, they soon after "settle," and appear to become so stupified as to remain inactive for some time after. In those parts of the New World where musquitoes abound, tobacco smoke is commonly had recourse to, in-doors; and large fires made of brush-wood or under-wood, out-of-doors. Old travellers when compelled to bivouac during the season in which they are troublesome, are very careful to keep close on the "lee" of these fires.

GOAT. The *capra* of Linnæus, an animal naturalized almost everywhere. Its *hair* is woven into clothing, and its *flesh* and *milk* furnish us with excellent food. That of the *kid* is much esteemed. The *oriental bezoar* is a concretion found in the stomach and intestines of the goat.

GOITRE. Syn. *Derbyshire Neck; Bronchocele, Tracheocele, Hernia Bronchialis,*— Lat. An indolent tumour on the fore part of the neck, formed by a morbid enlargement of the thyroid gland. It sometimes occurs in Derbyshire, and is endemic in the Alps and several other mountainous districts. *Iodine* and the *iodides* appear to be the only substances capable of curing, or even arresting the progress of this disease.

GOLD. Syn. *Aurum,*—Lat. Gold is the most valuable, and, probably, the longest known of all the metals. From the remotest period it has been esteemed for its beauty and permanence, and has been taken as the standard measure of value amongst all civilized nations. To describe the uses of gold in the arts, and its influence on society in all ages, as a symbol of wealth and an article of ornament and utility, would embrace the whole history of mankind. At the present day it alike contributes to the conveniences, comforts, and luxuries of life, as often exciting the baser passions of the human heart as promoting the cause of benevolence and virtue.

Gold is found only in the metallic state. It occurs as *gold dust* in the sands of various rivers, and in the alluvial soil of auriferous districts, from both of which it is obtained by the simple process of "*washing.*" Traces of it are constantly found in the iron and other pyrites of the more ancient rocks. Sometimes it occurs beautifully crystallized in the cubic form, associated with quartz, oxide of iron, and other substances, in regular veins. In the gold fields of California and Australia lumps of nearly pure gold have been discovered in abundance during the last few years. In the former country a mass of gold weighing 28 pounds was found; whilst in our own colonies, one weighing 106 pounds, was dug out of a quartz rock, near Bathurst. The latter contained upwards of 91$\frac{8}{9}$ of *pure* *gold* and nearly 8½ % of *silver;* being as pure as the English sovereign, or in trade language, "22 carats fine."

Prep. This consists merely in the separation of the gold and its subsequent purification. *Formerly,* the *auriferous sulphurets,* if very poor, were first roasted, then fused into "mattes" and again roasted; they were next melted with *lead,* and the alloy thus obtained was refined by *cupellation.* When the ores were very rich, the preliminary calcination and fusion were omitted, and the alloy of lead at once formed. This plan (*method by fusion*) does not answer well with auriferous copper pyrites or ores very poor in gold. At the present time the *method by amalgamation* is principally followed. When a *vein-stone* is to be wrought for gold, it is reduced to powder (on the *small scale* by hand, on the *large scale* in stamping mills), and is shaken in a suitable apparatus with *water* and *mercury;* an amalgam of gold is formed, which is then separated from the mixture, and its mercury removed by distillation. The gold is next cast into "ingots." Ores containing less than 1-250,000th part of gold will not pay for working.

Refining. Gold obtained by the *first method* usually contains a little copper and silver, and frequently tin or iron. *Tin* may be removed by adding a little *corrosive sublimate* or *nitre* to the gold melted in a crucible. The *process by amalgamation* commonly leaves no other alloy than *silver.* This metal is removed either in the "*dry way,*" by fusing the gold with *sulphur* or *sulphuret of antimony;* or in the "*wet way,*" by *quartation* and *parting.* At the Royal Mint, "when gold ingots contain a certain quantity of silver" (say 2% or 3%), "instead of leaving it, as formerly, to constitute a part of the standard alloy, it pays to extract it, and to substitute copper in its place. To get the silver out of the said ingots, they are melted with about 3 parts of *silver,*—the resulting alloy is *granulated* and boiled with *sulphuric acid,*—the gold remains untouched, and all the silver is dissolved and converted into *sulphate.*" "The *sulphate of silver* is then decomposed by the immersion of *copper plates;* the silver is precipitated in a fine, crystalline powder, washed, pressed into masses, and melted, and so affords PURE SILVER, which is afterwards made standard by alloying it with *copper,* and is used for coinage. The resulting *sulphate of copper*" (which exists in the solution) "is then crystallized, and sold." (Brande.) By first exhausting the gold with *nitric acid,* and then boiling it in *sulphuric acid,* some two or three thousandth part of silver which escaped the action of the nitric acid is dissolved out, and "*perfectly pure gold* is obtained." (Ure.)

By a foreign invention patented in 1851, by Mr. W. E. Newton, the operations of *separation* and *refining* are conducted by one process. The *argentiferous* substance, whether in the state of *ore* or *bullion,* is reduced to a granulated or spongy state, by fusion along with *zinc,* or some other metal cheaper than silver, and the zinc is subsequently removed, by digesting the resulting granulated, laminated, or pulverulent alloy, in *dilute sulphuric acid,* or other acid. The *zinc, &c.,* is recovered by the usual means. This process, carefully conducted, produces metal of great ductility and purity, containing 99% to 99½% of pure gold.

Chemically pure gold is obtained by *dissolving the metal* in *nitrohydrochloric acid,* adding a *solution of protosulphate of iron,* and collecting and washing the precipitate. In this state it is a brown powder, which acquires a metallic lustre by friction or heat.

Prop. The most marked properties of gold are its rich yellow colour, its ductility, malleability, insolubility in all menstrua except aqua regia and aqueous chlorine, and its very slight affinity for oxygen. It melts at a bright red heat (2016° Fahr.,—Daniell), and the fused metal has a brilliant green colour. It forms compounds with chlorine, iodine, oxygen, sulphur, &c.; but its oxides refuse to unite with the acids. The so-called *nitrohydrochlorate* or *nitromuriate of gold* is a true *chloride.* Sp. gr. of *native gold,* 13·3 to 17·7; of *pure gold,* 19·3 (average); its greatest density is 19·5. Gold is the only simple metal which has a yellow colour.

Tests. 1. METALLIC GOLD is characterised by its yellow colour, insolubility in nitric acid, and its ready solubility in aqua regia, forming a rich yellow or amber-coloured liquid, which stains the skin purple.—2. SOLUTIONS OF GOLD exhibit the following reactions:—*a.* Protosulphate of iron gives a brown precipitate, which acquires a metallic lustre when rubbed;—*b.* Protochloride of tin (preferably containing a little perchloride) gives a violet, purple, or blackish precipitate, insoluble in hydrochloric acid;—*c.* Sulphuretted hydrogen and hydrosulphuret of ammonia give a black one insoluble in simple acids;—*d.* Ammonia gives a reddish-yellow precipitate (*fulminating gold*) with tolerably concentrated solutions, either at once or on boiling the liquid;—*e.* Liquor of potassa gives a reddish-yellow precipitate with neutral solutions of gold, insoluble in excess.

Estim. The *estimation* of the *quantity of gold* in an *alloy* is usually obtained by "*assaying*" the sample, in the manner pointed out at *page* 98. In addition to what is there given on the subject, the following information will be found extremely useful to the young assayer—

TABLE *showing the quantity of lead and silver to be taken for the assay of* 10 gr., *of alloys of different "fineness," when the "cupellation" and "quartation" are performed together.*

Richness of Sample.		Silver required.	Lead required.
Gold per cent.	Gold in 10 gr.		
100	10	30	10
90	9	27	100
80	8	24	160
70	7	21	220
60	6	18	240
50	5	15	260
40	4	12	285 to 350
30	3	9	
20	2	6	
10	1	3	

The *richness in gold* of any substance, whether liquid or solid, when the *quantity is small* (and indeed in all other cases), is most simply and economically performed by the common method of chemical analysis. The gold may be thrown down from its solution by adding a solution of *protosulphate of iron;* the precipitate, after being washed, dried, and gently heated, may be weighed as *pure gold.*

Pois., &c. The soluble preparations of gold (*chlorides*) are violent poisons. The *symptoms* resemble those occasioned by corrosive sublimate, but are somewhat less violent. Metallic gold in a minute state of division is also capable of producing very unpleasant consequences, and even endangering life. The *antidote* is iron filings or a solution of sulphate of iron, given conjointly with an emetic.

Uses. The numerous applications of gold in the arts and the daily transactions of life need only be alluded to here. In *medicine,* gold has been given in the form of powder, in scrofula and syphilis, by Chrestien, Niel, and others, with apparent advantage. *Dose.* ¼ gr. to 1 gr., 3 or 4 times a day, in pills, or as a friction on the tongue and gums. An ointment made of 1 gr. of *powdered gold,* and 30 gr. of *lard,* has been applied by Niel to the skin deprived of the epidermis (endermically), in the above diseases.

GOLD (Ammoniuret of). Syn. *Aurum Ammoniatum, Ammoniæ Auras,* — Lat. *Prep.* By adding *liquor of ammonia* to a *solution of gold* in *aqua regia* (terchloride), as long as a reddish-yellow precipitate (*fulminating gold*) forms; the latter must be collected, washed, and dried with the *greatest possible caution.*

Obs. Ammonia fails to precipitate teroxide of gold from solutions which are not tolerably concentrated, and in those containing free acid or ammoniacal salts, the precipitate only forms upon boiling the solution. Before adding the ammonia, it is, therefore, proper to drive off the excess of acid, if any, by the application of heat.

[We have already cautioned the reader of the danger attending both the preparation and use of this substance. The resources of our materia medica would be limited indeed, if the faculty were driven by necessity to its employment as a medicinal. Happily such is not the case. There is no lack of safe remedies without it. See *Fulminating Gold.*]

GOLD (Chlorides of). Of these there are two:—

GOLD (Protochloride of). A yellowish-white mass, formed when a *solution* of *terchloride of gold* is evaporated to dryness and the residium is exposed to a heat of about 450° Fahr., until fumes of chlorine cease to be evolved. It is insoluble in water, which decomposes it, slowly when cold, but rapidly by the aid of heat, into metallic gold and terchloride of gold.

GOLD (Terchloride). Syn. *Chloride of Gold, Chloruret of do., Perchloride of do., Muriate of do.; Auri Chloridum, A. Terchloridum, A. Murias,*—Lat. *Prep.* (P. Cod.) *Gold,* 1 part; *nitrohydrochloric acid,* 3 parts; dissolve, evaporate until vapours of chlorine begin to be disengaged, then set the solution aside to crystallize.

Prop. Orange-red crystalline needles, or ruby-red prismatic crystals; deliquescent; soluble in water, ether, and alcohol, forming a deep yellow solution; at the heat of 400° Fahr., it suffers decomposition. Protosulphate of iron, oxalic, sulphurous, and phosphorous acids, and most of the metals, decompose its solution with the precipitation of metallic gold. Terchloride of gold combines with several of the metallic chlorides, forming a series of double salts, which are mostly yellow when in crystals, and red when deprived of water. Somewhat under a red heat, both the chlorides of gold give up their chlorine, and pure gold remains behind.

Uses, &c. It has been employed by Duportal, Chrestien, Niel, Cullerier, Legrand, and others, as a substitute for mercury, in scrofula, bronchocele, chronic skin diseases, &c.; also as a caustic. *Dose.* $\frac{1}{20}$ gr., dissolved in distilled water, or made into a pill with starch; or, in frictions on the gums, in quantities of $\frac{1}{16}$ to $\frac{1}{10}$ gr. The above is the preparation referred to whenever chloride or muriate of gold is spoken of.

GOLD (Soda-chloride of). Syn. *Soda-muriate of Gold; Auro-chloride of Sodium; Sodii Auro-chloridum, Auri* et *Sodii Chloruretum*,—Lat. *Prep.* (P. Cod.) *Terchloride of gold*, 85 parts; *chloride of sodium*, 16 parts; dissolve in a *little* distilled water, evaporate until a pellicle forms, then put it aside to crystallize. It forms beautiful, orange-coloured rhombic prisms.

Dose, &c. $\frac{1}{20}$ to $\frac{1}{12}$ gr., made into a pill with starch or lycopodium, in the same cases in which the terchloride is ordered. Mixed with 2 or 3 times its weight of orris powder, it has been used in frictions on the tongue and gums; and an *ointment*, made with 1 gr. of the *salt*, mixed with 36 gr. of *lard*, has been applied to the skin, deprived of the epidermis by a blister. (See *above*.)

GOLD (Cyanide of). Syn. *Tercyanide of Gold, Cyanuret of do.; Auri Cyanidum, A. Cyanuretum, &c.*,—Lat. *Prep.* 1. Add a *solution of pure cyanide of potassium* to a *neutral solution of pure chloride of gold*, as long as a precipitate forms, carefully avoiding excess; lastly, wash and dry the powder.

2. (Desfosses.) Boil freshly precipitated *teroxide of gold* (washed, but not dried) in *dilute hydrocyanic acid*, until the liquid assumes a beautiful yellow tint, then evaporate it to dryness over a water bath.

Obs. This salt is a pale-yellow powder, insoluble in water, but very soluble in a solution of cyanide of potassium. *Dose.* $\frac{1}{16}$ to $\frac{1}{12}$ gr., made into a pill, in the usual cases in which gold is administered. (See *above*.) The first formula is essentially similar to that of the French Codex, but divested of all unnecessary diffusedness.

GOLD (Fulminate of). See *Ammoniuret of Gold.*

GOLD (Iodides of). Of these there are two:—

GOLD (Protiodide of). Syn. *Iodide of Gold; Auri Iodidum*,—Lat. *Prep.* (P. Cod.) To a *solution* of *terchloride of gold*, add another of *iodide of potassium* (in excess,—Johnston); wash the precipitate in *alcohol*, and dry it.

Obs. This is the *protiodide of gold.* (Johnston; Liebig.) It is a greenish-yellow powder, slightly soluble in boiling water, and freely soluble in dilute hot solution of iodide of potassium, from which it crystallizes on cooling in beautiful golden yellow scales. M. Meillet recommends the use of *hydriodate of ammonia* as the precipitant, in preference to iodide of potassium, as thereby the *whole* of the chloride of gold is decomposed, which is not the case when the latter salt is used. Iodide of gold loses iodine at common temperatures, and should therefore be kept in a cold place, and in a well-stopped phial. *Dose.* $\frac{1}{16}$ to $\frac{1}{12}$ gr., in pills; in scrofula, syphilis, &c. It is also made into an ointment.

GOLD (Teriodide). This compound is formed when the previous process is reversed, and the *solution* of *terchloride of gold* is added to the *solution* of *iodide of potassium.* (Johnson.) It is a dark-green powder, soluble in solutions of hydriodic acid, and the iodides of potassium and sodium. From the latter, dark-brownish red crystals of *auro-iodide of potassium* are deposited on standing.

GOLD (Oxides of). Three oxides have been noticed by chemists, but only one possesses any practical interest. They are:—

GOLD (Protoxide of). This is the precipitate which forms when a *cold solution of potassa* is added to another of *terchloride of gold.* It is also formed when *liquor of potassa* is digested on the *protochloride.* It is a green powder, slightly soluble in liquor of potassa, and spontaneously changing into metallic gold and teroxide of gold.

GOLD (Binoxide of). This name has been given to the purple powder formed by the combustion of gold leaf.

GOLD (Teroxide of). Syn. *Oxide of Gold, Peroxide of do., Auric Oxide, Auric Acid; Auri Oxydum, A. Teroxydum, &c.*,—Lat. *Crocus of Gold, Solis Crocus*,—Obs. *Prep.* 1. (P. Cod.) *Calcined magnesia*, 4 parts; *terchloride of gold*, 1 part; *water*, 40 parts; mix, boil, wash the precipitate *first* with water, *next* with *dilute nitric acid*, and *lastly*, again with water; it must be dried in the shade.

2. (Pesth.) *Neutral chloride of gold*, containing 1 part of gold; *water*, 12 parts; *carbonate of potassa*, 1 part; (dissolved in) *water*, 2 parts; digest together at 170° Fahr., well wash the precipitate with water, dissolve it in *colourless nitric acid* (sp. gr. 1·400), and decompose the resulting solution by admixture with *water.* The precipitate is *pure hydrated peroxide of gold.*

It may be rendered anhydrous by drying it at a heat of 212°. (Liebig.)

Prop., *&c.* In the state of *hydrate*, teroxide of gold is a reddish-yellow powder, but is dark-brown or black when free from water. It is insoluble in water, and completely decomposed by solar light and a red heat. It dissolves freely in hydrochloric acid and liquid chlorine, and in hydrobromic acid, forming respectively *terchloride* and *terbromide of gold.* It is insoluble in hydrofluoric acid; and in the oxygen acids, with the exception of concentrated nitric acid, from which, however, it is again precipitated on the addition of water. It unites with the alkalies and earths forming salts, which have been termed *aurates*, from the oxide playing the part of an *acid* in their composition.

Uses, *&c.* Teroxide of gold has been given in scrofula, &c., in *doses* of $\frac{1}{12}$ to ½ gr., or 1 gr., in scrofula, syphilis, &c., made into a pill with extract of mezereon. See *Purple of Cassius* (and *above*).

GOLD (Sulphuret of). Syn. *Sulphide of Gold, Tersulphuret of do.; Auri Sulphuretum,*—Lat. *Prep.* Transmit a current of *sulphuretted hydrogen gas* through a *solution of terchloride of gold* in *water;* or add *hydrosulphuret of ammonia* to the same solution; collect the precipitate, wash it with cold distilled water, and dry it in the shade.

GOLD (Dutch). Syn. *Chrysocal, Hamering, Mannheim Gold, Pinchbeck, Red Brass, Similor, Tombac.* The proportion of zinc in this alloy is altered to suit the colour and other properties to the purposes for which it is intended, and often varies from ½ to ⅕, or ⅙ of the weight of the alloy. *Mannheim Gold* contains *copper*, 3 parts; *zinc*, 1 part. At the celebrated works of Hegermühl, near Potsdam, the proportions are *copper*, 11 parts; *zinc*, 2 parts; which produce a metal which is afterwards rolled into sheets for the purpose of making Dutch leaf-gold, and has a very rich, deep gold-colour. See *Brass* and *Mosaic Gold.*

GOLD (Factitious). *Prep.* From *copper*, 16 parts; *platinum*, 7 parts; *zinc*, 1 part; fused together. This alloy resembles in colour, gold of 16 carats fine, or ⅔, and will resist the action of nitric acid, unless very concentrated and boiling.

GOLD (Grain). Syn. *Aurum Granulatum,*—Lat. *Prep.* From *cupelled gold*, 1 part; *silver*, 3 parts; melted together, and poured in a small stream into *water;* the silver being afterwards dissolved out by digestion in *boiling nitric acid*, and the grains, after being well washed in *water*, heated to redness in a crucible or cupel. *Used* to make preparations of gold.

GOLD (Jeweller's). This term is applied to alloys of gold, used for trinkets and inferior articles of jewellery, ranging from 3 or 4 carats fine, upwards; or which are too inferior to receive the *Hall mark.* The lowest alloy of this class is formed of *copper*, 16 parts; *silver*, 1 to 1½ part; *gold*, 2 to 3 parts; melted together. This is worth only from 8*s.* 6*d.* to 9*s.* 6*d.* the oz.

"It has recently been found that gold of the quality of 12 carats, or less, if alloyed with *zinc* instead of the proper quantity of *silver*, presents a colour very nearly equal to that of a metal at least 2½ or 3 carats higher, or of 8*s.* or 10*s.* an ounce more value; and the consequence has been that a large quantity of jewellery has been made of gold alloyed in this manner; and the same has been purchased by some shopkeepers, very much to their own loss, as well as that of the public: inasmuch as a galvanic action is produced, after a time, upon gold so alloyed; by means of which the metal is split into separate pieces, and the articles rendered perfectly useless. *Gold chains*, *pencil-cases*, *thimbles*, and *lockets*, are the articles of which the public and the shopkeepers will do well to take heed, as these have, among some other things, been lately so constructed." (Watherston "*Art of Assaying.*") See *Jewelry*, *&c.*

GOLD (Leaf). Syn. *Aurum Foliatum, A. in libellis,*—Lat. Gold reduced to leaves by hammering it between thin animal membrane. Its preparation constitutes the trade of the *goldbeater.* These leaves are only 1-282,000th of an inch in thickness. Gilt silver is hammered in the same way, but the leaves are thicker. The latter is called "*party gold.*" Both are *used* by artists and gilders, and by druggists to gild pills, &c.

GOLD (Liquid). Syn. *Ethereal Solution of Gold, Potable Gold; Aurum Potabile,*—Lat. *Prep.* Agitate *ether* with a *solution of terchloride of gold* for some time, allow it to repose, and decant the supernatant portion.

Obs. Naphtha and essential oils possess the same property as ether of taking gold from its solutions; the first has the advantage of cheapness. This liquid was formerly held in great esteem as a cordial medicine. It is now only employed for writing on steel, gilding, &c. As it dries, it leaves a coating of pure gold.

GOLD (Mosaic). Syn. *Aurum Musivum,*—Lat. See *Bisulphuret of Tin.*

GOLD (Mosaic). Syn. *Or-molu, Prince's Metal, Pinchbeck.* These names are applied to several varieties of fine gold-coloured brass, differing slightly in colour and the proportions of the ingredients.

Prep. 1. (Parker & Hamilton.) *Zinc* is added to an equal quantity of *copper* previously heated to the *lowest temperature* that will fuse it, and the two are stirred together until they are thoroughly mixed; a *further* quantity of *zinc* is then added, in small portions at a time, until the alloy acquires the desired colour. When the process is successfully conducted, the alloy at once assumes a fine brassy-yellow colour, and on the further addition of small portions of zinc, changes to a purple or violet hue, and lastly, becomes perfectly white, which is the proper appearance of the compound in the fused state. It should be at once cast, so as to avoid remelting it, if possible. The *product*, which is very bright coloured, contains from 52% to 55% of zinc.

2. *Copper*, 2 parts; *zinc*, 1 part. Deeper coloured and tougher than the last. See *Gold* (Dutch), and *Brass*.

GOLD (Powdered). Syn. *Divided Gold, Gilding Powder, Gold Bronze, Gold Colour; Auri Pulvis, Aurum Pulveratum, A. Divisum,*—Lat. *Prep.* 1. *Gold,* 1 part; *mercury,* 7 parts; form an amalgam, and expose it to heat until *all* the mercury is volatilized; or, the mercury may be dissolved out with hot *nitric acid.* In either case, the residuum is to be powdered, washed, and dried. If the quantity operated on is considerable, the process should be so conducted as to save the mercury.

2. (P. Cod.) *Gold leaf* is triturated with 10 or 12 times its weight of *sulphate of potassa* (in crystals) until shining laminæ are no longer visible; the mixture is then passed through a fine sieve, and the sulphate of potassa washed out with *boiling water.*

3. From *gold leaf* and *honey* ground together, as the last, by means of a stone and muller. This is the plan commonly adopted in the *small way* by artists.

4. From a *solution of gold* in *aqua regia,* precipitated by *protosulphate of iron,* the resulting powder being washed, dried, and gently heated. This gives pure gold.

Uses, &c. Powdered gold is employed in gilding by japanners and by artists. It is either sold in powder (*gold in powder*), or made up into shells (*gold shells.*) Its use in *medicine*, has been already noticed.

GOLD (Standard). See *Alloy.*

GOLD DUST. The *gold dust* obtained from the sands of rivers and alluvial soil by "washing," generally requires no further preparation, as an article of commerce, before it goes into the hands of the refiner. Indeed, its purity is often greater than that of our "standard gold." That collected in some parts has been found to be 22½ to 23 carats fine. The gold of Giron, New Granada, is said to be of the uniform "fineness" of 23¾ carats. "To those who traffic in gold, it is sufficient to learn the place where it has been collected, to know its title or value." (Humboldt.) See *Gold* (p. 534).

GOLD DETERGENT (Parisian,—Upton & Co.'s). *Prep.* Take *quicklime*, 1 *oz.;* sprinkle it with a little *hot water* to slake it, then gradually add *boiling water*, 1 pint, so as to form a milk. Next dissolve *pearl-ash*, 2 *oz.*, in *boiling water*, 1½ pint; mix the two solutions, cover up the vessel, agitate occasionally for an hour, allow it to settle, decant the clear, put it into flat half-pint bottles, and well cork them down.

Use. To clean gilding, &c., either alone or diluted with water. It is applied with a soft sponge, and then washed off with clean water. It is essentially a weak solution of potassa, and may be extemporaneously prepared by diluting *liquor of potassa* (Ph. L.) with about 5 times its volume of *water.*

GOLD SHELLS. *Gold leaf* or *powdered gold* ground up with *gum-water*, and spread upon the insides of shells. *Used* by artists.

GOLD SIZE. Syn. *Gilding Size*, *Gilder's do.*, *Gold Colour.* *Prep.* 1. (Oil size.) *Drying* or *boiled oil* thickened with *yellow ochre* or *calcined red ochre*, and carefully reduced to the utmost smoothness by grinding. It is thinned with *oil of turpentine.* Improves by age. *Used* for *oil* gilding.

2. (Water size.) *Parchment* or *isinglass size*, mixed with finely ground *yellow ochre. Used* in *burnished* or *distemper* gilding.

GOLD-BEATER'S SKIN is *prepared* from the *peritoneal membrane of the cæcum of the ox.* It is *used* to separate the leaves of gold whilst under the hammer, as a nearly invisible defensive dressing for cuts, as a fabric for *court plaster, &c.*

GOLDEN COMPOUND. *Prep.* (Beasley.) *Anhydrous tungstate of soda* (or the salt obtained by fusing 2 equiv. of *tungstic acid* with 1 eq. of *carbonate of soda*) is melted in a porcelain crucible, over a spirit lamp, at a temperature not more than sufficient, and small pieces of *pure tin* added to the melted mass. *Cubes* of a *golden colour* instantly form. The process should not be continued too long, or they acquire a purple hue.

GONG METAL. See *Bell Metal.*

GONIOMETRY. The art of measuring the angles of crystals, by means of a *goniometer;* a most important matter in chemistry and mineralogy. The only accurate and simple instrument of this kind is the *reflective goniometer* invented by Dr. Wollaston. Facility in using this instrument is readily acquired by a few trials.

GONORRHŒA. See *Urethritis.*

GOOSE. This bird, the *anas anser* or *anser domesticus*, is a favorite article of food almost everywhere, and may fairly claim a similar position amongst poultry, to that occupied by "good Sir Loin" among joints of meat. The vulgar inuendos occasionally heard to its prejudice, should be directed against the cook rather than the bird, as it is only when it is unskilfully dressed and too highly seasoned, that it is apt to disagree with that "irascible member of the interior," a delicate or overloaded stomach. Undue susceptibility in that quarter, may, however, be generally allayed by an oblation, in the shape of a little *eau de vie*, used as sauce or gravy. Formerly, almost miraculous virtues were attributed to this bird. Its *flesh* was said to promote longevity, to cure hydrophobia, and to be aphrodisiac. The *fat* (*goose grease; adeps anseris*) mixed with honey, was supposed to be "good against the bitings of a mad dog." At the present day it is occasionally used in clysters, and, when *scented*, as a pommade to make the hair grow, for which purpose it is *said* to be superior to *bear's grease.* In quantity it is an emetic of very easy action. The *large feathers* of the wings (quills) are used for writing. The *small feathers* form the common stuffing of our beds.

GOOSEBERRY. The fruit or berry of *ribes grossularis* (ribes uva crispa,—Linn.) *Unripe fruit*, cold and acidulous; *ripe fruit*, wholesome and slightly laxative; but the seeds and skins should not be eaten, as they are very indigestible; the *juice* is made into wine (*English champagne*); the *pulp* forms an excellent sauce for mackerel and other like fish; the *seeds*, washed and roasted, were formerly used as a substitute for coffee (*gooseberry coffee*). Gooseberries are *preserved* by simply "bottling" them, and keeping them in a very cold place. See *Cheese, Fools, Fruit, &c.*

GOULARD, or *Goulard's Extract.* See *Solution of Diacetate of Lead.*

GOUT. Syn. *Arthritis*,—Lat. A painful disease that chiefly attacks the male sex, particularly those of a corpulent habit and robust frame. Persons who live temperately and take much exercise are seldom troubled with gout. Indolence, inactivity, luxurious habits of life, and free living, are the chief exciting causes of this disease; but excessive study, grief, watchfulness, exposure to cold, and the too free use of acidulous liquors, also occasionally bring it on. In some persons it is an hereditary disease.

Gout, like rheumatism, has been called by different names according to the part attacked:—*Chiragra*, gout in the hand; *Gonagra*, in the knee; *Ischias*, in the hip; *Podagra*, in the feet; &c.

Symp. Gout is generally preceded by unusual chilliness of the feet and legs, and a numbness, or a sensation of prickling along the lower extremities; the appetite fails, flatulency, indigestion, torpor, and languor ensue, and extreme lassitude and fatigue follow the least bodily exercise; the bowels become costive and the urine pallid. The fits usually come on in the night; the patient is awakened by the severity of the pain, generally in the first joint of the great toe, or occasionally in the heel, whole foot, or calf of the leg. The pain resembles that of a dislocated joint, accompanied by a sensation resembling the effusion of cold water; the pain increases, rigors and febrile symptoms ensue, accompanied with local throbbing and inflammation. Sometimes both feet or legs are attacked; at others, only one. Towards morning the patient generally falls asleep, and sinks into a state of copious perspiration, from which he awakes comparatively recovered. This constitutes what is called a *fit of gout.* These fits or paroxysms are apt to return at intervals, commonly every evening, with more or less violence; and when frequent, the disease usually extends its action, the joints become affected, and concretions of a chalky nature (*chalk stones, gout do.*, chiefly *urate of soda*) are formed upon them, and they become stiff and nearly immoveable.

Treat. A plain or vegetable diet, moderate exercise, and the use of warm laxatives, gentle tonics, diaphoretics, and diuretics, are among the best preventives. The moderate use of alkaline remedies, as *potassa* and *magnesia*, has also been recommended. To relieve the *fit of gout*, or to check it at its commencement, the effusion of cold water will be often found effective. The use of the *eau médicinale*, or the *vinum colchici* of the Pharmacopœia, may also be had recourse to; a due dose of which taken at bedtime will frequently carry off the paroxysm, and nearly always mitigate the symptoms. The effects of the above remedies do not greatly differ from each other; for "after taking about 60 drops of either, the pulse becomes slower, and at length sinks in about 12 hours, from 10 to 20 strokes per minute below its natural number, at which time the inflammation subsides. The action of both medicines is accompanied with great languor, and a deadly nausea or sickness, which terminates in vomiting or a discharge from the bowels, or both." These symptoms have often reached an alarming extent, and in some constitutions follow even a moderate dose. This method of cure should not therefore be unadvisedly and incautiously adopted. It is, however, generally admitted that *colchicum* properly administered, will almost always alleviate the symptoms, and lessen the frequency of the attacks; and numerous instances are on record where the inroads on the constitution were increasing to an alarming extent, and that at an advanced period of life, in which colchicum seems at least to have lessened the severity of the disease, if not to have been the active agent in its removal.

Another remedy for gout brought before the profession some 2 years since, by Drs. Babington and Rees, is *lemon juice.* The results of the trials of this substance at St. Thomas's and Guy's Hospitals, as detailed by Dr. Babington in the 'Lancet' are truly astonishing, and in many points conclusive of its superiority over all other remedies in the cases in which it was given. The *dose* proposed by Dr. O. Rees, who originated this new treatment, was 2 or 3 fl. oz., twice or thrice a day, but the patients themselves often increased it to several times this quantity. Relating only what we have seen, without giving any opinion on the subject, we may state, that in several cases of gout in which lemon juice has been tried, it has proved entirely successful. In one instance, (that of a licensed victualler, a very free liver, who had been a martyr to attacks of this disease for a great number of years, and whose joints were enormously enlarged and several of them covered with chalk stones,) 6 or 7 fl. oz. of *lemon juice* (and sometimes even ½ pint) was taken 4 or 5 times daily, for above a fortnight. The good effects of the remedy were perceptible within 24 hours after the first dose was taken, and within 10 days a perfect cure was effected. The swollen joints gradually resumed their usual size and flexibility, and the chalky matter returned to the liquid form, and was absorbed. The remedy was continued in smaller doses for several weeks afterwards, and lemonade is still a favorite beverage of the same party. We must add, that though nearly two years have elapsed since the above treatment was adopted, no fresh attack has occurred, and the hands of the person alluded to, are now as small, delicate, and symmetrical, as if they had never been disfigured by gouty enlargements. In this case both colchicum and fluid magnesia had been persevered in under the best medical advice, but had entirely failed to prevent the attacks.

To ensure the efficacy of *lemon juice* it must be expressed from the fruit into the glass shortly before being taken. That purchased at the shops is generally stale and disagreeable, and is often worse than useless. In the case above referred to, the juice was taken *undiluted*, but the more common practice is to mix it with about an equal quantity of water. The only unpleasant symptoms that follow such large doses are those common to an equal bulk of any other cold liquid. In one instance, however, a patient of Dr. Babington's experienced fits of shivering and faintness, and was compelled to reduce the dose. See *Rheumatism*, *Colchicum*, *Lemon Juice*, *&c.*

GOUT CORDIAL. *Prep. Rhubarb*, *senna*, *coriander seed*, *sweet-fennel seed*, and *cochineal*, of each, 2 *oz.*; *liquorice root* and *saffron*, of each, 1 *oz.*; *raisins*, 2½ *lb.*; *rectified spirit of wine*, 2 gall.; digest for 14 days, press, and filter. *Used* in gout and rheumatism. Aromatic and slightly laxative. *Dose.* 1 to 3 table-spoonfuls.

GOUT MEDICINE (Duncan's). A mixture of *wine of colchicum*, *wine of opium*, and *tincture of saffron.*

GOUT REMEDY (Alexander's). According to Dr. Paris this contains—*aniseed*, *cumin seed*, *ginger*, *hermodactyls*, *pepper*, and *scammony.*

GOUT SPECIFIC (Murray's). A mixture of *iodide of potassium*, *sulphate of magnesia*, and *wine of colchicum*, disguised with an *aromatic tincture.*

GOUTTES AMERES. See *Drops.*

GRADUATOR. See *Vinegar.*

GRAFTING COMPO'. *Clay* tempered with *water*, to which a little *linseed oil* is sometimes added. *Used* to cover the joint formed by the scion and stock in grafting.

GRAINS OF PARADISE. Syn. *Guinea Grains*, *Malaguetta Pepper.* The seeds of the *amomum grana-paradisi* (Linn.) and *amomum melaguetta* (Roscoe). Grains of paradise are, hot, acrid, and aromatic, and in general properties similar to the other peppers. In some parts of the world they are used as a condiment. They are principally employed in these countries to impart a false strength to wine, beer, spirits, and vinegar, GRANADINE. Syn. *Grenadine.* A sweet substance found by Latour de Trie in the bark of pomegranate root. It has since been shown to be *mannite.*

GRANILLA. A small inferior variety of cochineal.

GRANULATION. The reduction of metals into grains, drops, or coarse powder. This is done by pouring them, in the *melted state,* into *water.* In many cases they are allowed to run through the holes of a species of colander or sieve to produce minute division; and in order to render the drops spherical, they are allowed to fall from a sufficient height to permit of their acquiring the solid state before striking the water. Lead shot is granulated in this way. Shot towers are often upwards of 100 feet in height. See *Powdering.*

GRANULES. Syn. *Granula,* — Lat. These were introduced into practice by Messrs. Homolle and Quevenne, and are formed of *sugar* and a *medicinal substance* alone. "Their preservation is indefinite, and their solution is always easy. They are intended to supplant common pills, principally in the administration of very active medicines. They generally contain 1 millegramme (1-60 gr.) of the active ingredient." (Trousseau & Reveil.)

GRANULES OF DIGITALINE. Syn. *Granula Digitalinæ,*—Lat. *Prep.* (Homolle.) *Digitaline,* 15½ gr.; *white sugar,* 1½ oz.; *water,* q. s.; beat to a pill-mass, and divide it into 1000 granules. *Dose.* 3 to 6 daily. For other examples see *Pills.*

GRAPES. Syn. *Uvæ,*—Lat. The fruit of *vitis vinifera* (Linn.) or the common *grape vine.* Ripe grapes are cooling and antiseptic, and in large quantities, diuretic and laxative. They are very useful in bilious affections and dyspepsia, and in all febrile, putrid, and inflammatory complaints. The skin and seed, which are indigestible, should be rejected. "Grapes which contain a large quantity of sugar, are, if taken without the husks, the safest and most nutritive of summer fruits." (Cullen.) "The subjects of pulmonary affections, who pass the summer in Switzerland, may try the effects of a course of grapes, '*cure de raisins,*' a remedy held in high estimation in several parts of the Continent." (Sir J. Clark.)

Grapes, in bunches, are *preserved* by wrapping them in *silver paper,* and packing them in *dry bran.* Each bunch is suspended by the stem with the fingers of one hand, whilst the bran is poured round it with the other; the jar being occasionally gently shaken as the process of packing proceeds. Some paper is then laid over the top of the jar, the mouth or cover of which is, lastly, tied firmly over with bladder, to exclude the air and moisture. See *Fruit, &c.*

GRAPHITE. See *Plumbago.*

GRASSES (Fragrant). See *Volatile Oils.*

GRAVEL for *garden walks* is chosen for its fine colour and binding properties. The gravel of Kensington is esteemed the finest in the world.—Gravel walks when once in order may be rendered nearly equal to asphalt by pouring over them *tar* or a *mixture of tar and pitch,* absorption being promoted, if required, by the application of a hot iron.

GRAVIMETER. See *Hydrometer.*

GRAVITY. Weight, heaviness, gravitation. Weight is the measure of gravity. The determination of the relative weights of bodies with reference to a given standard, is explained under "*Specific Gravity.*"

GRAVY. The juice or liquid matter that drains from dressed meat after it is placed on the dish for serving. The common practice among *cooks* is to pour a spoonful or two of *boiling water* or *broth* over the joint, to increase the quantity. The natural gravy that oozes from the meat after it is cut, is the richest and most wholesome. *Made gravies* are prepared by adding *spice* and *flavouring* to the foregoing, or to strong *meat soup.* See *Sauces.*

GRAY DYES. Gray is dyed with the same materials as black, but both the bath and mordant are used in a more diluted state. Sometimes a finishing bath of *archil* or *annotta* is given to soften and beautify them.

GREASE. A general term applied to soft animal fats by the vulgar; as *bear's grease, goose-grease, &c.*

GREASE. An inflammatory affection of the heels of horses, which produces dryness, scurfiness, and stiffness. The *treatment* consists of emollient poultices, accompanied with physic and diuretic balls, to subdue the inflammation, followed by mild astringent lotions or ointments.

GREAVES. Syn. *Graves.* The sediment of melted tallow, consisting chiefly of animal membranes mixed with fat, made up into cakes. *Used* as a coarse food for dogs.

GRECIAN WATER. See *Hair Dyes.*

GREEN DYES. The goods are *first* dyed *blue,* observing to regulate the shade according to that of the intended green; they are then dried, rinsed, and passed through a *yellow* bath, with the like precautions, until the proper shade is produced. See *Blue Dyes*, *Yellow Dyes*, *&c.*

GREEN PIGMENTS. Several of the green pigments of commerce are obtained from copper. Oxide of chromium furnishes a very beautiful one. Some are formed by the mere mechanical admixture of blue and yellow pigments. The bright blues and yellows, when mixed in this way, produce the *liveliest greens;* orange, or red and blue, and the yellowish browns and blue, the more *dingy greens.* In this way are produced all the *extemporaneous greens* of the artist. Nickel and titanium also furnish green colours, but these are not in common use.

The following list embraces all the best-known and most useful green pigments:—

Arsenical Green. Arsenite of copper. See *Scheele's Green.*

Barth's Green. From *yellow lake*, *Prussian blue*, and *clay*, ground together.

Bice (Green). Same as *mountain green.*

Bremen Green is properly *green verditer*, but other preparations are frequently sold under the name.

Brighton Green. From *sulphate of copper*, 7 *lb.; sugar of lead*, 3 *lb.;* each separately dissolved in *water*, 5 pints; mix the solutions, stir in of *whiting*, 24 *lb.*, set the resulting paste on chalk stones, and when dry grind it to powder.

Brunswick Green. This is properly a crude *oxychloride of copper*, but a mixture of carbonate of copper and alumina or chalk, is now commonly sold under the name in the shops.

Prep. 1. A saturated solution of *sal ammoniac*, 3 parts, is poured over *copper filings* or *shreds*, 2 parts, contained in a vessel capable of being closed up, and the mixture is kept in a warm place for some weeks, when the newly formed green pigment is separated from the unoxidized copper, by washing the mixture on a sieve; it is then edulcorated with water, and slowly dried in the shade. Colour very deep and rich. The different shades are produced by the addition of *ceruse*, or *sulphate of baryta.*

2. A *solution* of *crude carbonate of ammonia* or *bone spirit* is added to a *mixed solution* of *alum* and *blue vitriol*, as long as it affects the liquor; in a short time the precipitate is collected, washed, and dried. The various shades of green are produced by using different quantities of alum, which "pales" and "cheapens" it.

Chrome Green. The superb green pigment used by *enamellers* under this name is the *green oxide* or *sesquioxide of chromium.* (See p. 254.) *Caustic ammonia* readily dissolves this oxide when recently precipitated or in the hydrated state, and forms with it a magnificent dark-green liquid, from which, on the addition of spirit of wine, it is again disengaged under the form of a splendid and rather dark-green powder, which was formerly supposed to be *ammonio-chromate of copper* or *cupro-chromate of ammonia.* The readiest way of preparing this permanent and beautiful colour, is to add a *solution of neutral chromate of potassa* to another of *ammoniacal sulphate of copper.*

The *chrome green* of the *oil* and *colour shops* is a *mixture* of *chrome yellow* and *Prussian blue.*

Copper Green. Green bice or mountain green.

Emerald Green. This is an *arsenite of copper*, and for the most part resembles Scheele's green.

Prep. A pulp is formed with *verdigris*, 1 part, and *boiling water*, q.s., and after being passed through a sieve, to remove lumps, is added gradually to a *boiling solution* of *arsenious acid*, 1 part, in *water*, 10 parts, the mixture being constantly stirred until the precipitate becomes a heavy, granular powder, when it is collected on a calico filter, and dried on chalk stones.

Frise or *Friezland Green* resembles Brunswick green.

Gellart's Green is a mixture of *cobalt blue* and *flowers of zinc*, with some *yellow pigment.*

Iris green is prepared by grinding the juice of the *petals* of the *blue flag* (iris nostras) with *quicklime.* It is very fugitive.

Lake (Green). See *Lakes.*

Mineral Green. This is the same as *mountain green.*

Mitis Green is prepared in a precisely similar manner to Scheele's green.

Mountain Green. This pigment is properly the native green carbonate or bicarbonate of copper (*malachite*) ground to powder, either with or without the addition of a little *orpiment* or *chrome yellow.* That of the shops is commonly prepared by adding a *solution of carbonate of soda*, or of *potassa*, to a hot mixed solution of *sulphate of copper* and *alum.* If the solution of copper is employed *cold*, the precipitate has a bluish-green colour. Green verditer is commonly sold for this article.

Prussian Green. The *sediment* of the process of making Prussian blue from bullock's blood or horns, *before* it has had the muriatic acid added to it. It is also prepared by pouring *liquid chlorine* upon *freshly precipitated Prussian blue.*

Rinman's Green resembles that of Gellert.

Sap Green is prepared from the *juice of buckthorn berries.* The berries are allowed to ferment for a week or eight days in a wooden tub. The juice is then pressed out, strained, a *little alum* added, and the whole evaporated to a proper consistence; it is next run into pigs' bladders, and hung up in a dry situation, to harden. An *inferior article* is made from the *juice of black alder,* and of *evergreen privet.* It is a common practice to add ¾ pint of *lime-water,* and ½ *oz.* of *gum arabic* to *every pint* of either of the above juices.

Scheele's Green. This is arsenite of copper.

Prep. 1. *White arsenic* (in powder), 1 part; *commercial potash,* 2 parts; *boiling water,* 35 parts; dissolve, filter, and add the solution gradually, whilst still warm, to a *filtered solution* of *sulphate of copper* (cryst.), 2 parts, dissolved in *hot water,* 50 parts, as long as a precipitate falls; lastly, wash the newly formed pigment with *warm water,* and dry it.

2. (Ure.) *Powdered arsenious acid,* 11 *oz.; carbonate of potassa,* 1½ *lb.; boiling water,* 1 gall.; dissolve, filter, and add the solution, as before, to another solution of *crystallized sulphate of copper,* 2℔, in *water,* 3 gall. *Prod.* 1½ ℔. A very fine grass-green colour.

Schweinfurth Green. This is a superior description of Scheele's green, or arsenite of copper. According to M. Ehrmann, however, it contains fully 10% of combined acetic acid.

Prep. 1. *Acetate of copper* and *arsenious acid,* equal parts, are each dissolved separately in the *least possible* quantity of *boiling water,* and the solutions mixed whilst still as hot as possible; an *olive-green* precipitate falls which is a very permanent colour; but which, by being boiled in the liquor 5 or 6 minutes, changes to a dense granular powder, of a superb green colour.

2. Instead of boiling the solution containing the precipitate, it is allowed to cool and stand for several hours, or until the powder assumes a granular and beautiful tint. Very rich.

3. (Kastner.) *Arsenious acid,* 8 *lb.,* is dissolved in *water* as before; and added to *verdigris,* 9 or 10 *lb.,* diffused through *water,* q. s., at 120° Fahr., the pap of the latter being first passed through a sieve; the mixed ingredients are then set aside till the mutual reaction produces the proper shade.

4. (Dr. Ure.) *Sulphate of copper,* 50 *lb.,* and *lime,* 10 *lb.,* are dissolved in *good vinegar,* 20 gall., and a *boiling hot solution* of *white arsenic,* 50 *lb.,* is conveyed as quickly as possible into the liquor; the mixture is stirred several times, and then allowed to subside, after which it is collected on a filter, dried, and powdered. The supernatant liquor is employed the next time for dissolving the arsenic.

Obs. This is a very fine, permanent, green pigment. The use of a little more *arsenic* turns it on the *yellowish green,* and boiling it with a small quantity of *potash* takes off the *blue colour.* The vessel in which the mixed liquids are set aside should be covered to prevent a premature crystallization on the surface. This pigment is sometimes sold under the name of *Mitis green.* By digesting *Scheele's green* in *vinegar* it is converted into an inferior variety of *Schweinfurth green.*

Verdigris. See *Copper* (Subacetate), and *Verdigris.*

Verditer (Green). This is essentially a mixture of *oxide* and *carbonate of copper,* in uncertain proportions, with *chalk.* Factitious green bice and mountain green have a like composition. See *Verditer.*

Verona Green. The mineral called *green earth.*

Vienna Green. The same as Schweinfurth green.

GREEN SALT (of Magnus). This is obtained by adding *ammonia,* in excess, to a *hot solution* of *protochloride of platinum* and *ammonium;* the salt separates after a time under the form of green crystals, which are insoluble in water. The reactions of this substance are highly interesting to the scientific chemist.

GREEN SICKNESS. See *Chlorosis.*

GREGORY'S SALT. The crude hydrochlorate of morphia, prepared by Gregory's process. It is a double hydrochlorate of morphia and codeia.

GRINDING. The operation of reducing substances to powder by attrition or friction. In the *laboratory,* the term is chiefly applied to powdering by means of a mill or by mechanical power, in opposition to simple pounding or trituration in a mortar or with a slab and muller. All the principal powders, paints, &c., sold by the druggist, drysalter, and colourman, are reduced in the drug or colour mill. Recently machinery has even been applied to the common mortar. An ingenious and very useful contrivance of this kind is the "*mechanical mortar*" of Mr. H. Goodhall, of 5, Peter's Street, Derby.

GRINDSTONES (Artificial). *Washed silicious sand,* 3 or 4 parts; *shell-lac,* 1 part; melt together, and form the mass into the proper shape whilst warm, with strong pressure. The fineness of the sand must depend on the work the stone is intended for. The same composition is formed upon pieces of wood, as *corn rubbers,* and for the purpose of sharpening knives, and cutting stones, shells, &c. See *Emery.*

GROATS. Syn. *Grits; Grutellum, Avena Decorticata, Avenæ Semina; Avena,*—Ph. L. The common oat deprived of its exterior integuments or husks. This is generally effected in a mill, which, at the same time, cuts them into two or three pieces. When crushed flat, they are denominated *Embden Groats.* The "naked oat" or "pilcorn" (*avena nuda,*—Linn.) is preferred for making groats.

GROSSULINE. The name given by Guibourt to a peculiar principle found in gooseberries and some other acid fruits.

GROUT. *Mortar* reduced to a thin paste with *water;* used to fill up the joints of masonry and brickwork. A finer kind is used to "finish off" the best ceilings.

GRUEL. Syn. *Oatmeal Gruel, Water do.; Decoctum Avenæ,*—Lat. *Oatmeal* or *groats* boiled with *water* to a proper consistence and strained. It is variously flavoured to suit the palate; but the addition of a little white sugar, and finely powdered Jamaica ginger, with or without a glass of wine, is the least likely to offend the stomach. Nutmegs, cinnamon, &c., frequently disagree with invalids. Sometimes *milk* or *butter* is added. *Embden groats* require less boiling than the common groats. Of oatmeal, the *Scotch* is commonly said to be the best.

The following *directions* for *making gruel* from *oatmeal* are from the pen of Dr. A. T. Thomson:—*Oatmeal,* 2 *oz.; cold water,* 1½ pint; rub the meal in a basin, with the back of a spoon, in some of the water, pouring off the fluid after the grosser particles have subsided, but whilst the milkiness remains; repeat this with fresh water, unite the washings, and boil until a soft, thick mucilage is formed.

GUAIACINE. Syn. *Guaiacic Acid, Pure Guaiacum Resin.* A substance discovered by Trommsdorff in the wood and bark of *guaiacum officinale.* (Linn.)

Prep. The *tincture of guaiacum* is treated with *hydrate of lime,* and the *guaiacate of lime* thus formed is decomposed with dilute *sulphuric acid;* it is purified by dissolving it in *alcohol.*

Prop., &c. Insoluble in water; soluble in alcohol and ether; it unites with the caustic alkalies forming *alkaline guaiacates* (guaiacum soaps); air and light turn it green; gluten, mucilage of gum arabic, &c., turn it blue; nitric acid and chlorine turn it successively green, blue, and brown; tincture of guaiacine added to hydrocyanic acid and sulphate of copper, produces an intense blue colour. (Pagenstecher.) A delicate *photogenic paper* may be formed by washing *unsized paper* with an *alcoholic solution of guaiacum resin,* and afterwards with one of *neutral acetate of lead.* (Johnston.)

GUAIACUM. Syn. *Gum Guaiacum, Guaiacum Resin; Guaiacum,* — Ph. L. *Guaiaci Resina,*—Ph. L. 1836. The "resin prepared by means of fire from the wood" of "*guaiacum officinale.*" (Ph. L.) This substance is often adulterated. When pure, its "fresh fracture is *red,* slowly passing to *green;* the tincture slowly strikes a lively blue colour on the inner surface of a thin paring of a raw potato." (Ph. E.) Adulteration with resin may be generally discovered by the odour evolved when the guaiacum is heated. An alcoholic tincture of guaiacum, rendered milky with water, recovers its transparency on the addition of caustic potassa in excess; but this is not the case when resin is present.

Guaiacum is stimulant, sudorific, and alterative. *Dose.* 10 to 20 gr., either in powder, or pills; in chronic rheumatism, gout, obstinate chronic skin diseases, scrofula, syphilis, &c. It forms the active ingredient of the once celebrated "*Chelsea pensioner,*" and the "*gout specific*" of Mr. Emerigon. The latter was made by digesting 2 oz. of *guaiacum resin* in 48 fl. oz. of *rum,* for 7 or 8 days. The *dose* of this was a table-spoonful every morning fasting for a twelvemonth. Its other properties are similar to those of *guaiacine,* but are less marked. Sp. gr. 1·20 to 1·22.

GUAIACUM WOOD. Syn. *Lignum Vitæ; Guaiaci Lignum,*—Ph. L. The wood of *guaiacum officinale,* (Linn.) This is employed under the form of shavings, raspings, and saw-dust, in decoctions only. See *Decoctions* and *Balsams.*

GUANINE. A substance closely corresponding to xanthic oxide found in guano. With the acids it forms crystallizable salts.

GUANO. Syn. *Huanho,*—Peruv. This substance, now so extensively used in agriculture, is the excrement of certain aquatic birds, chiefly the common penguin (*alca torda, a. pica*), which congregate in countless myriads on the barren and uninhabited islets and rocks on the western coasts of South America, and the coast of Africa. It abounds in ammonia and the phosphates, and is undoubtedly the richest natural manure known. Under judicious application, the increase of the crops of grain, turnips, potatoes, and grass, consequent upon its use, is about 33%; and at its present price of £10 per ton, the cost of this increase is "considerably under the cost of all other manures, whether farm-yard dung and composts, or artificial compounds." "Guano is, moreover, peculiarly adapted to horticultural and floricultural improvement, by its relative cleanliness and facility of application." (Ure.)

In a chemical point of view, guano may be regarded as consisting chiefly of impure uric acid in a remarkable state of decomposition, in which further change is suspended, or at least impeded, by the absence of moisture. In inferior samples, and in those at a lower state of desiccation, this change is in active progress, and then corresponds to the eremacausis or decay of Liebig, which ultimately leads to the destruction of the azotized compound, and, consequently, of the principal value of the guano as a manure.

According to Dr. Ure, the *composition* of a sample of guano from South America (Bolivia), given as a type of that substance in the best state, is as follows:—

Soluble Matter, 31·5%; consisting of	Urea . . .	5·00
	Sulphate of potassa .	7·90
	Chloride of sodium .	5·00
	Biphosphate of ammonia . . .	5·50
	Oxalate of ammonia .	·60
	Water . . .	6·50
Insoluble Matter, 69·50%; consisting of	Silica . . .	2·25
	Subphosphate of lime . . .	9·00
	Double phosphate of ammonia and magnesia . . .	1·25
	Urate of ammonia .	15·27
	Undefined azotized organic matter .	41·73
		100·

representing

Ammonia (*ready formed*)	4·20%
" (*latent*) .	17·05%
Total *richness in ammonia* . .	21·25%

The following is the "average result" of numerous "analyses of genuine guano, in reference to its agricultural value," as given by the above authority:—

1. *Azotized animal matter,* including *urate of ammonia,* together capable of affording from 8 to 16% of ammonia by decomposition in the soil . . .	50
2. *Water*	8 to 11
3. *Phosphate of lime* .	12 to 25
4. *Phosphate of ammonia, sulphate of do.,* and *ammonio-phosphate of magnesia,* together containing from 5 to 9 parts of ammonia	13
5. *Silicious sand* . .	1
	100

"Among the many samples of '*African Guano*' which I have had occasion to analyse for the importers, none has contained any appreciable quantity of *uric acid,* or by consequence of potential (*latent*) ammonia. The best afforded me 10% of ready-formed ammonia, existing, chiefly, in the state of phosphate. Its specific gravity was so low as 1·57. It contained—

Moisture (separable by a heat of 212° Fahr.) . . .	21·5
Subphosphate of lime . .	23·0
Magnesian phosphate of ammonia	3·0
Alkaline sulphates and *muriates*	1·5
Silica	1·0
Decayed organic matter, with *phosphate of ammonia,* and a little *carbonate,* equiv. to ½ gr. of ammonia . . .	50·0
	100·

"Other '*African Guanos*' have afforded from 24 to 36% of *moisture; no* uric acid; *no* potential ammonia, but decayed organic matter; from 5 to 7% of *ready-formed ammonia* (phosphate, and a little carbonate); from 25 to 35% of *subphosphate of lime;* 5 or 6% of *magnesian phosphate of ammonia;* more or less *oxalates* from the decomposition of the uric acid; and 3 to 5% of *fixed alkaline salts.*" (Ure.) It will thus be seen that "*South American*" *guano* is richer in *ammoniacal salts* than "*African guano*;" but the latter contains more *phosphates.*

Pur., &c. Guano, owing to its high price, is very commonly adulterated, or is in an advanced stage of decomposition when sold. Much of what is vended under the name is altogether a *factitious* article. These artificial mixtures are made to look so like genuine guano, that the mere practical man who goes only by their appearance, is very often deceived by them, and owing to the failure of his crops in consequence, is led to distrust the efficacy of guano as a manure. A sample of pretended guano examined by Mr. Johnston, was found to contain, in the state in which it was sold, *more* than *half its weight* of *gypsum,* the *rest* being *peat* or *coal ashes,* with a little *common salt, crude sulphate of ammonia,* and either *dried urine,* or the *refuse of the glue manufactories,* to give it a smell. "I could not satisfy myself that it contained a particle of real guano." (*Elem. of Agric. Chem.*) Vessels which sail hence for the guano stations, are now very commonly ballasted with rough *gypsum* or *plaster of Paris.* This substance is mixed with the guano, as it is loaded, and enables the importers to deliver from the vessel, a "nice-looking light-coloured article." Parties purchasing guano are very desirous of having it delivered from the vessel, as they believe they thus obtain it pure. The favorite material for the adulteration of guano, at the present moment, is a variety of *umber,* which is brought from Anglesea in large quantities. The rate of admixture is said to be about 15 *cwt. of umber* to about 5 *cwt. of Peruvian guano,* from which an excellent-looking article is manufactured, which is sold under the name of "*African guano.*"

Pure guano has a pale brown colour, a more or less offensive odour, and the average sp. gr. of 1·63 to 1·64. If the sp. gr. *exceeds* 1·75 it is either damaged or adulterated, and if it is less than 1·62 it contains an undue quantity of moisture. The best is neutral to test paper, and, sometimes, has even an acid reaction; but that of commerce has generally an alkaline reaction, owing to the presence of free ammonia, and in consequence, turns turmeric paper *brown,* and gives white fumes when a glass rod dipped in hydrochloric acid is held over it. Triturated with quicklime or caustic potassa, good guano evolves a powerful odour of ammonia; digested in water fully one half of it is dissolved; dried by the heat of boiling water it does not lose more than from 7 to 9% in weight; and burned upon a red-hot shovel, it leaves a white ash, not a red or dark-coloured one. (See *below.*)

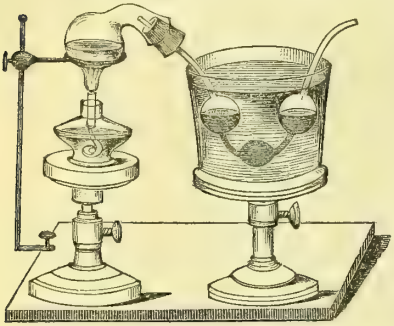
Anal., or *Assay.* The quantitative analysis of guano, so as to exhibit the names and proportions of all its numerous component substances, is an extremely tedious and difficult matter in the hands of persons unaccustomed to chemical manipulations. As, however, its value to the agriculturalist depends, chiefly, on its richness in ammonia, potassa, and phosphoric acid, the analysis of guano for practical purposes, may be reduced to an assay for these articles. Indeed the presence of ammonia (the most valuable of them) in the proper quantity, may be fairly taken as evidence of the presence of the rest. The following methods of testing guano are both simple and accurate, and are so arranged as to permit its *per centage richness* in one or more of its leading constituents to be determined without much trouble or expense.

1 — *a.* 100 gr. of the *sample for examination* (fairly selected) are crushed to powder, and placed on a small, weighed, and perfectly dry paper-filter, and then desiccated, by exposure for 2 or 3 hours to the heat of *boiling water.* The *loss in weight,* taken in grains, after deducting 9, indicates the quantity per cent. of WATER *or* MOISTURE which the sample contains in *excess* of that present in good or pure guano.

b. The *paper filter, with its contents,* is next suspended for some time over *concentrated sulphuric acid* (oil of vitriol) contained in a wide-mouthed bottle or jar, by means of a thread attached to the cork or stopper; care being taken to exclude the *external* air. The exposure in this way is continued until the guano ceases to diminish in weight, which is ascertained by weighing it at intervals after the first 3 or 4 hours. When this point is arrived at, the filter and its contents are very carefully weighed. The difference between its *present weight* and its *original weight* (before the desiccation in *a*), taken in grains, gives the *gross quantity* of WATER per cent.

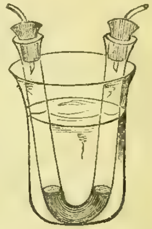
c. The *dried guano* from (*b*) is next placed in a weighed, smooth crucible or capsule, and exposed to a low red-heat until *all* the organic matter is completely destroyed, and the whole is reduced to a white ash, which is weighed as soon as it has become cold. This *weight*, in grains, gives the gross weight per cent. of NON-VOLATILE MATTER (*alkaline* and *earthy chlorides*, *phosphates*, and *sulphates*) ; the total *loss of weight* by combustion, denotes the gross per centage of COMBUSTIBLE and VOLATILE MATTER (*urea, uric acid, ammoniacal salts*, and *organic matter*). The latter should *not* be *less* than 55 to 60%.

2—*a.* A *second* 100 gr. of the *guano*, selected as before, is distilled along with about 75 gr. of *fresh-slaked quicklime*, and a *little water*, in a small mattrass connected with a tubular, triple bulb-condenser containing cold *distilled water*, and immersed in a basin of *ice-cold water*. (See *Engr.*) The condenser is charged by plunging one of its extremities into the water, and sucking at the other, until the liquid reaches the level indicated in the margin. A very gentle heat only, cautiously increased, need be employed. After the process is over, the strength of the *solution of ammonia* found in the condenser, is tested, either by taking its density in a small specific-gravity bottle, or by determining its saturating power in the manner described under *Alkalimetry*. This furnishes the per centage of READY-FORMED AMMONIA sufficiently accurate for all ordinary purposes, provided proper care is taken.

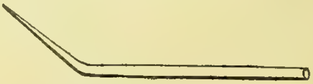


When *extreme accuracy* is required, the condenser is charged with a weighed quantity of *dilute hydrochloric acid* of a known strength, instead of water, and after the process is over, this is tested as before. The quantity of *ammoniacal test-liquor* (see *Alkalimetry*) now taken to saturate it, deducted from what it would have taken *before* the exposure in the condenser, gives the per centage sought.

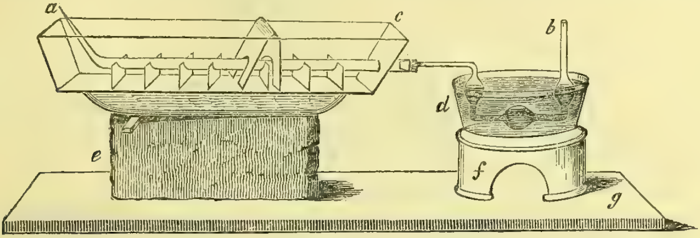
Another method, giving very accurate results, is to use a rather strong *hydrochloric acid* (sp. gr. about 1·13) for the condenser; after the operation is over, the contents of the latter are poured into a glass or porcelain capsule, a solution of *bichloride of platinum* is added, in excess, and the whole is then gently evaporated to dryness; the residuum is rubbed to powder, and exhausted with a *mixture* of *two measures of alcohol* and *one measure of ether ;* the undissolved portion is next dried at a heat not exceeding 212° Fahr., and weighed. The *weight*, in grains, of the *ammonio-chloride of platinum* thus obtained, multiplied by 0·0763, gives the per centage of *ready-formed ammonia*, as before. When *hydrochloric acid* is used for the condenser, a simple U tube and beaker glass may be employed, if a bulb-condenser is not at hand. (See *Engr.*) The advantages resulting from the use of acid instead of water, for the condenser, is, that with the former no ammonia can possibly escape being absorbed, whilst little care is required to keep the condenser cool.



b. 25 gr. of the *guano* are next weighed, and after being slightly moistened with a little *dilute hydrochloric acid*, are thoroughly dried by the heat of *boiling water ;* the dried sample is then mixed in a warm unglazed porcelain mortar with 10 times its weight of a *mixture* of 2 parts of *quicklime* to 1 part of *hydrate of soda* (both quite dry). This mixture is introduced into a combustion tube of hard Bohemian glass, about 16 or 18 inches long, and ¾ of an inch in diameter. (See *Engr.*) The mortar is rubbed out with a little of the *soda-lime mixture*, which is also introduced into the tube with that already put there; a little plug of *ignited asbestos* is then loosely placed over the whole, and the tube is *immediately* connected with a tubular bulb-condenser, great care being taken that the joints are made air-tight, which may be determined by the operator sucking a few bubbles out of the apparatus. If, after suction, the liquid remains at a higher level in the furthest bulb (*b*) it is a sign that the con-



nection is sound. This being done, heat is applied to the combustion-tube by means of spirit-lamps; or, more conveniently, by means of the furnace now usually employed in organic analysis. (See *Engr.*) The tube is next gradually surrounded with *red-hot charcoal*, by shifting, by degrees, the screen (*c*) and adding *more charcoal* so as to gradually expel the ammonia. The disengagement of gas should take place *uninterruptedly*, but not too rapidly, in order that the acid may not ascend into the combustion-tube and spoil the experiment. The non-condensable volatile matters which pass off, furnish a key to the progress of the operation. The heat is at length increased to a full red. When gas ceases to be evolved, and the mixture in the tube has become *quite white*, the experiment is at an end. The point (*a*) of the combustion-tube is broken off, and the ammonia which remains in the tube is expelled by sucking gently at the extremity (*b*) of the bulb-condenser. The latter is then disconnected with the apparatus, and emptied into a glass or porcelain capsule, in order to be tested, as directed under 2, *a*. The quantity of ammonia, in grains, thus found, multiplied by 4, gives the WHOLE QUANTITY of AMMONIA, per cent., both *actual* and *potential*, producible from the sample of guano examined.



c. The quantity of *ready-formed ammonia* (see 2, *a*) deducted from the quantity last found (see 2, *b*), gives the quantity of LATENT OR POTENTIAL AMMONIA that will be slowly developed by the decomposition of the guano in the soil, and become available for the food of plants. This is the *most valuable* product of this substance as a manure, and can only be obtained in quantity from well-preserved, dry guano. (See *above*.)

3—*a*. A *third* quantity of 100 gr. of the *guano*, selected as before, is triturated and digested for some time with 12 times its weight of *hot distilled water*, and the whole being thrown on a filter, the undissolved portion is washed with a little *warm distilled water;* the solution and "washings" are then mixed together, and acidulated with *nitric acid;* a solution of *pernitrate of iron* is next added, and afterwards, *solution of ammonia*, in excess; the liquid is next heated for a short time, and the bulky reddish-brown precipitate is collected, washed with hot water, dried, ignited, and weighed. The *weight*, in grains, *less* the *weight of the peroxide of iron* in the *pernitrate* consumed, gives the weight of PHOSPHORIC ACID present in the *soluble phosphates* contained in the sample. The pernitrate of iron is made by direct solution in hot *strong nitric acid*, of *twice* as much *pure iron wire* as there is phosphoric acid suspected to be present in the liquid. A slight excess will not alter the result. The number of grains of metallic iron used to form the solution, multiplied by 1·4286, give the weight of the peroxide of iron which is to be deducted from the gross weight of the precipitate.

b. The *filtrate* and "*washings*" left from 3, *a*, are mixed, and treated with a little *oxalate of ammonia* to throw down any lime, and then carefully evaporated to dryness and ignited; the residuum of the ignition, when cold, after being carefully weighed, is treated with the *smallest* portion of *water* that will dissolve it; the solution is acidified with *hydrochloric acid*, and a solution of *bichloride of platinum* added, in excess; some *strong alcohol* is next poured in, the precipitate carefully collected on a filter, washed with *rectified spirit*, dried at 212° Fahr., and weighed. The *weight*, in grains, multiplied by 0·1940, gives the per centage of POTASSA sought.

c. The *weight of the potassa* multiplied by 1·852, and deducted from the weight of the *ignited residuum* in 3, *b*, already found (see *above*), gives the quantity of CHLORIDE OF SODIUM *or* COMMON SALT (nearly).

4—*a*. The *insoluble residuum* from 3, *a*, dried, and ignited, *or* the *ash* from 1, *c*., is digested for 10 or 12 hours in 600 times its weight of *water* (to which a little *common salt* or *sal ammoniac* may be added), after which the whole is thrown upon a filter; a solution of *chloride of barium* is then added to the filtrate as long as a precipitate (if any) forms; the latter is collected, washed, dried, ignited, and weighed. The weight, in grains, multiplied by 0·5843 denotes the quantity of *gypsum* or SULPHATE OF LIME which has been used to adulterate the sample.

b. The *insoluble residuum* last left on the filter, is digested for some time in warm *dilute hydrochloric acid;* the whole is then thrown upon a filter, and the undissolved portion (SILICA or SAND, with, perhaps, a trace of *alumina*) is washed, dried, ignited, and weighed. It should *not weigh more* than 3 to 3½ gr. (3 to 3½ %).

c. The *filtrate* and "*washings*," from *b*, are next mixed together; the mixed liquid is acidified with *dilute sulphuric acid*, and heated until *all* the hydrochloric acid is expelled and the whole reduced to a soft pasty-mass; *rectified spirit* is now poured in, and after active stirring for some time, the mixture is thrown on a filter, and the *solid portion* washed with a little more *rectified spirit;* it is then dried, ignited, and weighed. The weight, in grains, multiplied by 0·7650 gives the quantity of PHOSPHATE OF LIME per cent. required.

d. The *filtrate* from *c*, is diluted with *water*, and after being boiled for a few minutes, *ammonia* is added in slight excess, followed by a solution of *sulphate of magnesia* (previously mixed with as much *sal ammoniac* as will prevent ammonia producing a precipitate in it), slowly dropped in as long as it disturbs the liquor; the whole is now allowed to rest for 10 or 12 hours, when the precipitate is collected on a filter, and washed with *water alkalized with ammonia*, as long as the filtering liquid is rendered turbid by chloride of barium; it is next dried, submitted to *intense* ignition for *some time* in a covered platinum crucible, and when cold, carefully weighed. The weight, in grains, multiplied by 0·6429 indicates the per centage of PHOSPHORIC ACID in the *insoluble phosphates* (phosphates of lime, magnesia, &c.) in the sample examined.

5. A *fourth* 100 gr. of *guano* is weighed, and exhausted by trituration and digestion with *hot water* (see 3, *a*); the solution is evaporated to dryness by a gentle heat, and the residuum of the evaporation, after being weighed, is powdered and enclosed in a stout phial with 8 times its volume of *alcohol*, sp. gr. 0·825 (63 o. p.); the phial is next securely corked and guarded, and exposed for some time, with agitation, to the heat of 212° Fahr.; the whole is then allowed to cool, the contents of the phial filtered, the undissolved portion washed with *hot alcohol*, and both the filtrate and the "washings" gently evaporated to dryness, and weighed. This gives the richness of the sample in UREA, one of the most valuable constituents of the best guano. Its presence is "a certain proof of its entire soundness." (Ure.)

6—*a. Another* 100 gr. of the *guano* is taken and after being exhausted with water, is dried at 212° Fahr., and weighed; it is then digested with heat in 20 times its weight of *borax-water* (containing 1% of borax), or in a *solution of caustic potassa*, and after a time, the whole is thrown on a weighed filter, washed with a little *cold distilled water*, dried by a heat not higher than that of boiling water, and again carefully weighed. The loss, in grains, indicates the proportion per cent. of URIC ACID.

The accuracy of the result may be verified by adding *dilute hydrochloric acid*, in slight excess, to the filtrate, collecting the bulky, crystalline precipitate of uric acid which forms, washing it carefully with a little *rectified spirit*, drying it, and weighing it, as before. This weight, which in general is a *very little* under that denoted above, is the more accurate of the two. The precipitate is shown to be uric acid by its assuming a rich crimson colour when treated with a little nitric acid, which turns to a rich purple (*murexide*) when it is moistened with ammonia water.

b. The quantity of *uric acid* last obtained, multiplied by 1·1012, gives the per centage of URATE OF AMMONIA.

Obs. Amongst the numerous constituents of guano, none are so valuable in an agricultural point of view as the three substances referred to in the last two sections. Indeed almost all the ammonia furnished by this substance to the soil, after the latter, manured with it, has been exposed to the air and rain, is derived from the slow decomposition of *urea*, or *urate of ammonia.* It is these substances from which the store of *latent*, or, as Dr. Ure terms it, *potential* ammonia, is derived. The ammonia existing in the guano under the form of carbonate, or of soluble salts (*ready-formed ammonia*), is either soon dissipated in air or is washed away by heavy rains, and, therefore, forms the least valuable and durable portion of this manure. It may be even added artificially, a matter almost impossible with the former. An assay, therefore, for the *latent ammonia*, or the UREA, or the *urate of ammonia, any one of them singly*, at once furnishes us, as we have already hinted, with evidence of the quality of the guano examined, without the expense and trouble of a *complete* analysis of this substance. *Urea* and *uric acid* are only to be found in the *very best* samples of guano, and their presence is a positive proof of entire soundness and superior quality. The other valuable portions of guano are *potassa* and *phosphoric acid* (phosphate of lime chiefly); the rest are of little importance. (See 2, *c*, above.)

GUARANA. Syn. *Paullinia.* A powder prepared by the Indians of Para from the seeds of *paullinia sorbilis.* It is tonic and astringent.

GUARANINE. A crystalline substance, discovered by M. Martius, in the fruit (seed) of *paullinia sorbilis,* closely resembling, if not identical with caffeine.

GUDGEON. The *cyprinus gobeo* (Linn.), a small fresh-water fish, common almost everywhere. The "white" is considered the best. It was formerly used in medicine.

GUM. Syn. *Gummi,*—Lat. Inspissated vegetable mucilage. The purest substance of this kind, and the type of a vast number of others, is that called *gum arabic*, or *gum acacia.* The gums are employed as demulcents in *medicine*, and are used as cements, and for giving stiffness and gloss to textile fabrics. Among the vulgar the term is often incorrectly applied to the resins and gum resins.

GUM ARABIC. Syn. *Gum Acacia, Turkey Gum; Gummi Turcicum, G. Arabicum, G. Acaciæ; Acacia,*—Ph. L. "From various species" (of acacia) "yielding gum" (Ph. L. & E.), chiefly *acacia arabica* and *a. vera.* "Whitish or yellowish, transparent or cracked on the surface, and opaque; brittle; it dissolves freely in water." (Ph. L.) It is scentless, and may be bleached by exposure to the sun and air, at the temperature of boiling water. Sp. gr. 1·355. (Ure.) *Barbary* or *Morocco gum* (gummi Barbaricum), *Gum Senegal* (gummi Senegalense), and *East India gum* (gummi Indicum), are inferior commercial varieties of the same substance from other species of acacia.

Powdered gum arabic (pulvis acaciæ) is frequently adulterated with flour or farina, or with Senegal or other inferior gums. The first may be detected by agitating a little of the powder with *cold water;* the pure gum dissolves rapidly, whilst the starch or flour falls to the bottom of the vessel. Or, a little of the powder may be mixed with *boiling* water, and when cold, tested with *tincture of iodine;* if it contains starch or flour, the paste will assume a *blue* colour. If it contains *cherry-tree gum* or *tragacanth*, it will be only partly soluble in cold water, and the paste will be partly coloured, and more or less interspersed with gelatinous clots.

Much of the white *gum arabic* of the shops is formed by *bleaching* gum Senegal, by what is called "*Picciotto's process.*" The *gum* is dissolved in *water*, and *sulphurous acid gas* passed through the solution. The liquid is afterwards boiled to expel the sulphurous acid, a little of which, however, still remains behind. To obtain the gum in a still whiter state, *carbonate of baryta* is added, and after agitation, the *mixture* is filtered; it is afterwards shaken with *gelatinous alumina*, again filtered, and evaporated. The product (*bleached gum*) is very white, but lacks the peculiar toughness and adhesiveness of the best gum acacia.

GUM (British). Syn. *Dextrine, Starch Gum; Leicomme; Artificial Gum, Factitious do.* Starch converted by the action of acids, diastase, or heat, into a soluble substance resembling gum.

Prep. 1. *Malt* (crushed small), 1 *lb.; warm water*, 2 gall.; mix, heat the whole to 145° Fahr., add of *potato starch*, 5 *lb.*, raise the heat to 160° or 165° Fahr., and mash for about 25 minutes, or until the liquid becomes thin and clear; it must then be *instantly* run off, and raised to the boiling point to prevent the formation of sugar; after boiling for 3 or 4 minutes, the whole must be filtered, and evaporated to dryness by a steam heat.

2. By exposing *dry potato starch*, in a stove, to a heat of about 400° Fahr. Yellow and inferior.

3. (M. Payen.) *Dry starch*, 1 ton; is moistened uniformly with *concentrated nitric acid*, 4½ *lb.;* (diluted with) *water*, q. s., and the paste or dough is made up into small bricks or loaves, and dried in a stove; it is next reduced to coarse powder, and exposed in a stove-room for some time to a current of air at 160° to 165° Fahr.; it is next ground, sifted, and exposed, as before, to a heat of about 228° Fahr.; it is, lastly, ground, and passed through the "bolting machine." Very white and superior. This process has been patented in France by M. Henzé.

4. (Pinel.) *Water*, 100 gall.; *nitric acid*, ½ gall.; and *hydrochloric acid*, ½ pint; are mixed together, and as much *potato starch*

is added as will form a thin paste; in two hours the liquid is drained off, and the solid matter is made up into lumps, which are dried by a gentle heat in a stove-room; they are next coarsely pulverized, and the powder is exposed on three successive days to the respective temperatures of 100°, 150°, and 190° Fahr.; the whole is then sifted, and, lastly, exposed to a heat ranging from 300° to 350° Fahr. Darker coloured than the last. To give it the appearance of *gum arabic*, it is made into a paste with *water containing* 1% *of nitric acid*, and after being spread on copper plates in layers ¾ to 1 inch thick, it is exposed to a stove heat ranging from 240° to 300° Fahr.

Prop., &c. White; insipid; transparent; friable; soluble in cold water, and in *dilute spirit;* insoluble in alcohol and ether; its solution yields a precipitate with acetate of lead (*dextrinate of lead*). Iodine commonly turns *commercial* dextrine *blue*, but does not affect the colour of *pure* dextrine. It is distinguished from ordinary gum by its right-handed polarization of light, and by yielding oxalic but not mucic acid, when treated with nitric acid.

Dextrine is nutritive, emollient, and agglutinant. In France it is largely employed by the pastry-cooks and confectioners, and in *medicine* as a substitute for gum. The French surgeons also commonly employ it as a "*stiffening*" for the splints used for fractured limbs. In this country it is chiefly used as a fine dressing for muslins, silk, and other textile fabrics, and in calico printing. Recently, it has been made up into tear-like masses, and sold for gum arabic, to which, however, it is vastly inferior as an agglutinant. See *Dextrine.*

GUM (Cherry-tree). Syn. *Fruit-tree Gum, Plum-tree do; Gummi Cerasi, G. Pruni,*—Lat. An exudation from the stems of *cherry, plum,* and some other of the *rosaceæ.* It is only partly soluble in cold, but wholly soluble, by long digestion, in boiling water.

GUM RESINS. Syn. *Gummi Resinæ,*—Lat. Inspissated vegetable juices, consisting of extractive or mucilage, and resinous matter. They are partly soluble in water, and partly in alcohol. Many of them form a species of emulsion when triturated with the former fluid. The principal gum resins are—*aloes, ammoniacum, assafœtida, euphorbium, frankincense, galbanum, gamboge, myrrh, olibanum, opoponax,* and *scammony.*

GUM (Seed). Syn. *Gummi Seminum,*—Lat. A species of soluble gum extracted from the *seed* of the *flax* (linseed), *quince, &c.*

GUM TRAGACANTH. Syn. *Tragacanth, Gum Dragon; Gummi Tragacantha, G. Draconis; Tragacantha,*—Ph. L. The gummy exudation of the *astragalus verus* or *tragacanthus*, hardened by the air. When digested in water it swells considerably, a portion is dissolved, and the whole combines to form a thick mucilage. It is totally soluble in boiling water. Sp. gr., 1·384. It is chiefly employed in calico-printing, and by shoemakers and lozenge-makers; by the latter to give toughness to the saccharine mass.

Powdered tragacanth is often adulterated with flour or starch, and not unfrequently with the commoner varieties of gum arabic. According to M. Planche, a mixture of *pulverized tragacanth* and *gum arabic* forms, with *water*, a thinner mucilage than the same quantity of either of these gums alone. This fraud may be detected as follows:—Make a *mucilage* of the *suspected gum*, and add thereto a few drops (2 or 3 to the dr.) of *alcoholic tincture of guaiacum*, taking care to stir it all the while. If the sample contains any gum arabic, the mixture, in the course of a few minutes, assumes a fine blue colour, whilst it does not change colour if the gum tragacanth is pure. 5% of gum arabic can be thus detected. When the quantity is very small, one to four hours may elapse before the colour is developed. Starch and flour are detected in the manner noticed under *Gum Arabic.*

GUN BARRELS. See *Browning.*

GUN COTTON. This is commercial pyroxyline, and must not be confounded with xyloidine, which resembles it in many particulars. See *Collodion* and *Pyroxyline.*

GUN FLINTS. These are now superseded by the *percussion cap*, which see.

GUN METAL. See *Cannon Metal.*

GUNPOWDER. This substance is a mechanical mixture of saltpetre, charcoal, and sulphur. It is seldom prepared on the *small scale.*

Prep. The *saltpetre* having been trebly refined is melted into cakes, which are then brushed to remove any adhering grit or dirt, broken into pieces with a mallet, ground to a fine powder in a mill, and sifted through a fine bolting sieve of brass wire. The *charcoal* is that of the dog-wood, alder, or willow, and is carefully burnt, as described at p. 229, and is then reduced to powder. The *sulphur* is refined and ground to the same fineness as the charcoal and saltpetre. The ingredients are weighed out in the proper proportions, and mixed by placing them gradually in a wooden vessel, in alternate and equal layers, after which the whole is thoroughly and perfectly mixed together. The mixture is then sifted, and carefully ground to a paste with *water*, and pressed into a hard cake, which is next broken into pieces, granulated by agitation in parchment sieves, and after being glazed by friction, and the dust separated, is dried, with proper precautions, in a stove heated to about 100°.

Table *showing the composition of the more celebrated Commercial and Government Gunpowders.*

Authorities, or Place of Manufacture.	Nitre.	Charcoal.	Sulphur.
English:			
Royal Mills, Waltham Abbey	75	15	10
Sporting powder (Marsh)	78	12	10
,, (Marsh)	76	15	9
* ,, Hall, Dartford (Ure)	76·2	14	9
* ,, Pigou & Wilks (Ure)	77·4	13·5	8·5
* ,, Curtis & Harvey (Ure)	76·7	12·5	9
*Battle powder (Ure)	77	13·5	8
Miners' ,, (Marsh)	65	15	20
Common ,, (Marsh)	75	12·5	12·5
French:			
Government powder	75	12·5	12·5
Sporting ,,	78	12	10
Miners' ,,	65	15	20
Gunpowder of Bâle	76	14	10
,, of Grenelle	76	12	12
,, of M. Guyton-Morveau	76	15	9
,, ,,	77·33	13·44	9·24
,, of M. Riffault	77·5	15	7·5
United SS. Government powder	75	12·5	12·5
Russia ,,	73·78	13·59	12·63
Prussia ,,	75	13·5	11·5
Austria ,,	72	17	16
Spain ,,	76·47	10·78	12·75
Sweden ,,	76	15	9
Switzerland ,,	76	14	10
China ,,	75	14·4	9·9
Theoretical proportion for the best gunpowder	75	13·23	11·77

* These powders also contained from ·5 to 1·1$^{0}_{0}$ of water.

Obs. The *quality of gunpowder* is best estimated by actual trial of its power and cleanliness in use. It should be dry, hard, and free from dust; the grains should be of an uniform size, and glossy, and the colour a dark-gray or brownish-gray, *not* perfectly black. A very little placed on a piece of paper and fired, should instantly explode with a flash, and neither leave an appreciable residue on the paper, or burn it. Dried by the heat of boiling water, or in vacuo, it should not lose more than ½ to 1$^{0}_{0}$ of its weight. Damp powder rapidly "fouls" the gun. Gunpowder, containing more than 7$^{0}_{0}$ of water, does not recover its strength by simply drying it. The sp. gr. ranges between 1·795 and 1·800.

GUNPOWDER (White). Syn. *Blasting Powder. Prep.* 1. See *Blasting Powder*, No. 3.

2. *Yellow prussiate of potash* and *white sugar*, of each, 1 part; *chlorate of potassa*, 2 parts; powder each separately, and mix them well, but carefully, with a bone or wooden knife. It may be granulated like gunpowder, by making the powder into a paste with a little water, and pressing the mass through a parchment sieve. For *cautions*, see p. 141.

GUNJAH. See *Indian Hemp.*

GUT (Fishing). Syn. *Silkworm Gut.* This is obtained from the *bombyx mori* (Linn.) or *silkworm caterpillar. Prep.* The *silkworms*, when just ready to spin, are steeped in *strong vinegar* for 12 hours, in warm weather, or 2 or 3 in cold weather, and are then broken in half, and stretched out as far as possible on a board, furnished with slits or pegs to hold them; in this state they are allowed to dry in the sun or a warm place.

Obs. Used by anglers. The worms may be known to be going to spin by refusing food, and by having a fine silken thread hanging from the mouth. (Nobb's *Art of Trolling.*)

GUTTA PERCHA. A species of imperfectly formed caoutchouc brought from Singapore, Borneo, and some other islands of the Indian Archipelago. The honour of its discovery is due to Mr. Thomas Lobb, a talented agent of the well-known florists, Messrs. Veitch, of Exeter. This gentleman, after carefully examining the tree which produced it, sent home specimens of the parts necessary to decide its botanical characters, together with small sections of the dried wood, and of the hardened juice. In April, 1843, Dr. D'Almeida presented some pieces of gutta percha to the Royal Society of Arts, of London, who simply acknowledged the receipt of the gift. Shortly after, Dr. W. Montgomerie, through Mr. Solly, placed before this Society several specimens of the same substance in different stages of preparation, and ere long the Society's gold medal was awarded to the Doctor, "for his very valuable discovery" (?), forgetful of the unpretending botanist, or the less influential foreigner, who by priority was entitled to it. The numerous purposes to which gutta percha was soon afterwards applied, and the rapid development of its manufacture on the large scale are well known.

Prop., &c. Gutta percha is a hydrocarbon which has the same ultimate composition as Indian rubber, from which it chiefly differs in being non-elastic, and in becoming soft and plastic at a heat ranging between 135° and 165° Fahr. At 200° it is soft and ductile, without stickiness, and may be moulded into any form. At 248° it melts, and on cooling continues in a pasty, glutinous state. By distillation it yields a peculiar ethereal oil, identical in chemical constitution with caoutchoucine. It is unacted on by strong alkaline lyes, and by most of the acids, even when concentrated; nitric acid and oil of vitriol, however, rapidly destroy it. Its *best solvents* are chloroform, bisulphuret of carbon, ether, benzole, rectified mineral naphtha, and rectified oil of turpentine. All these dissolve it readily; those having priority on the list, do so with the greatest facility. Immersed in water, buried in damp earth, or exposed in a dark, moist situation, it is very durable; but freely exposed to light and air, it becomes, as it were, resinified, in which state it is brittle and non-elastic, like common resin. This change progresses in exact proportion to the impurity or careless manufacture of the sample. We have a specimen now before us which is several years old, and is still as tough and flexible as ever. Yet we have seen others that after a short exposure might be broken like a stick of sealing wax, or crushed in the hand to powder. One of the large speaking tubes stretched across the court yard of the works in which it was manufactured, broke down, by its own weight, after barely 10 months' exposure to the weather. Unfortunately, most of the substance now sold as gutta percha in the shops, is of this description, notwithstanding all that may be stated to the contrary.

According to M. Payen, the gutta percha of commerce consists of a pecular substance (*gutta* or *gutta percha*, properly so called), which forms fully 75 to 82% of its weight; a crystalline white resin (*crystalbane, albane*), forming 16 to 14% of the mass, very soluble in oil of turpentine, ether, chloroform, and bisulphuret of carbon, and fusing at a temperature ranging from 320° to 350° Fahr.; and a yellow resin (*fluavile*) varying in quantity from 6 to 4%, which is freely soluble in *cold* alcohol and the other liquids named above, and which is pasty at 122°, but does not melt below 225° Fahr. Besides these it contains a small quantity of a vegetable acid, and some caseine; hence its cheesy odour in the raw state. Sp. gr., (commercial) 0·970 to 0·975. Its density may be increased by stretching and rolling it, until it equals that of water.

Uses. These are numerous and varied. No substance, perhaps, has been "tortured" to so many different purposes, in so short a time, as gutta percha. For some of these it is admirably suited; for others just the reverse. To the indomitable perseverance and energy of Mr. Samuel Statham, the Manager of the Gutta Percha Works, Wharf Road, the Submarine Electric-telegraph Companies are indebted for that perfect insulation of their wires, which *alone* has rendered their undertakings successful. For this purpose, there is no known substance like gutta percha; but the practical difficulties to be surmounted in its application in this quarter, were so great, that nothing but unusual skill and perseverance, supported by large capital, could possibly have overcome them.

A solution of *gutta percha* in *chloroform*, or *bisulphuret of carbon* forms an excellent dressing for incised wounds, and a protection for abraded surfaces, burns, &c. It is used in the same way as collodion. See *Traumaticine.*

Dr. Riddell, the officiating superintending surgeon of the Nizam's army, in making experiments on the muddar plant of India (*asclepia gigantea*), had occasion to collect the milky juice, and found that as it gradually dried it became tough and hard, like gutta percha, which substance it exactly resembled in all its properties. The muddar also produces an excellent fibre, useful in the place of hemp and flax. The poorest land suffices for the growth of this tree; and no doubt, if well cultivated, there would be a large yield of juice, and a finer fibre. A nearly similar substance is procurable from the juice of the *euphorbia tirucalli,* only when it hardens after boiling it becomes brittle. The subject is most important; and the discovery, if followed up, will have made a material addition to the productive resources of the country.

GYPSUM. This is native sulphate of lime. When baked, to deprive it of water, and ground, it forms *plaster of Paris.* Gypsum is an excellent manure for certain soils. See *Alabaster.*

HADDOCK. A small sea-fish, allied to the cod, and esteemed an excellent article of food. It is the *gadus æglefinus* of Linnæus. Split, smoked, and dried, it is common in the smaller shops of London.

HÆMATOSINE. A species of albumen on which the colour of the blood is supposed to depend. It may be obtained from *blood,* previously well stirred to separate the fibrine, by mixing it with 6 times its volume of a *saturated solution of sulphate of soda,* filtering, boiling the globules with *alcohol acidulated with sulphuric acid,* again filtering, adding *carbonate of magnesia,* to separate the sulphuric acid, and after filtering, evaporating to dryness. In this state it is a dark reddish-brown mass, soluble in water and in alkaline lyes. The solution has a rich crimson colour. Carbonic and sulphuric acid blacken this solution; oxygen and atmospheric air brighten it; protoxide of nitrogen turns it purple; sulphuretted hydrogen and the alkaline sulphurets change it to a dirty greenish-black.

Hæmatosine differs from the other animal principles in containing, as an essential ingredient, the sesquioxide of iron.

HÆMOPTYSIS. Spitting of blood. It generally arises from extreme fulness of the blood-vessels of the lungs, or the rupture of blood-vessels, as a consequence of ulceration; but sometimes it is induced by excessive exertion or external violence. *Depletion, aperients, acidulous* and *astringent drinks,* and *nauseants,* are the usual remedies. *Sugar of lead,* in small doses, has been recommended for this affection. When this substance is given, it should be accompanied with a sufficient quantity of *free* acetic acid, to prevent its being converted into the poisonous carbonate of lead in the system.

HÆMORRHAGE. Syn. *Hemorrhage; Hæmorrhagia,*—Lat. A bleeding or flow of blood. Bleeding may be divided into *active, passive,* and *accidental.—Active hæmorrhage* is that arising from a full state of the vessels, or plethora,—*passive hæmorrhage,* from general debility of the system, and of the blood-vessels in particular,—*accidental hæmorrhage,* from external violence, as blows, wounds, &c. The *first* generally requires depletion, and the *second* the usual treatment to establish the general health and vigour of the body. The *bleeding from wounds,* if extensive, should be arrested by tying the ruptured blood-vessels; or where this cannot be done, and in less important cases, by the application of *styptics,* as *creasote, sulphate of iron, infusion of galls, compound tincture of benzoin, &c.*

Artificial hæmorrhage or *bloodletting,* is adopted, under certain circumstances, for the cure or prevention of disease; but the practice is now much less common than formerly in this country, as well as on the Continent, owing to the Faculty distrusting its efficacy, except in peculiar and emergent cases. In America, however, bleeding is carried to a fearful extent. At a discussion between Drs. Draper and Watson, which recently took place in Boston, U. S., the latter *boasted* that he had, during the short period of 4½ years, taken from the citizens of Boston and its vicinity, "*one hundred barrels of blood,* and had exhibited *upwards* of 49 ℔ of *mercury!*" Astounding, if true! See *Cupping, Leeches, Venesection, &c.*

HAIR. Syn. *Capillus, Pilus,*—Lat. The hair of the human head has continually formed a subject for the chisel of the sculptor, the pencil of the artist, and the lay of the poet. Nor is this surprising, since all the features of the face, as well as the head it covers, derive from it additional finish, and unequalled grace. The hair is, indeed, one of the greatest auxiliaries of personal beauty, and imparts to it some of its principal charms. All nations, in all ages of the world, have been unanimous in their admiration of luxuriant and flowing, or gracefully arranged hair.

Of all organic substances hair is the one least liable to suffer spontaneous change. It is also less affected by aqueous liquids than most other substances. Hence its value in various branches of the useful arts.

The *preservation* of the *hair of the head*, independently of its connection with personal beauty, is a matter of the utmost importance in relation to hygiene. In other parts of this work, we have referred to its management under various conditions, and must here confine our remarks to its *cutting* and *arrangement*. The former is a matter that is commonly little understood, and very carelessly performed. When the hair is in a weakly state, and either falls off or grows feebly, frequently cutting it will be found of the greatest service. In doing this, some attention and trouble are requisite. The *short* and *impoverished* hairs must be cut as well as the *long* ones, with the view of giving them strength and improving their growth. According to the common method adopted by the hairdressers, the latter only come under the operation of the scissors. Mr. Williams, an ingenious tradesman of Cheltenham, has made this plan the basis of his system of hair-cutting, with the happiest results; but few of his craft have energy or enterprise enough to follow his excellent example.

"In the *arrangement of the hairs* on the surface of the body, it might be inferred, that little existed to excite attention; but this is not the fact, if we are to judge by the careful investigations to which the subject has given rise. The hair-tubes are not placed perpendicularly, but obliquely, in the skin; hence the direction of the hairs, after their escape from the tubes, is in the same sense inclined towards the surface; and the 'set' of the hair, from the root to the point, is governed by a law as precise as that which regulates any other of the secondary vital functions. Thus, on the head, the hair radiates from a single point, the crown, to every part of the circumference, making a gentle sweep, behind, towards the left, and in front, to the right. The direction of this sweep is naturally indicated on the heads of children, and is that in which the hair is turned." (Eras. Wilson.) The same occurs on the face and other parts of the body. In making our toilet, this natural arrangement of the hair should be interfered with as little as possible. Combing it or banding it in an opposite direction to that which it naturally assumes, is highly prejudicial to its healthy growth, and if long persevered in, leads to its premature and rapid decay. The practice now common among ladies, of throwing the hair from the forehead towards the back of the head, is of this reprehensible character.

In addition to our remarks elsewhere, we may here observe, that all the various systems proposed for strengthening, or restoring the hair, depend for their efficacy upon simple "*excitation* or *stimulation* of the skin." Friction with the hair-brush, and the use of the ordinary *hair-oils*, *pommades*, and *washes*, are of this kind. The various advertised nostrums for *reproducing* or *restoring* the hair, are either stimulants or rubefacients of more or less activity, or are emollients, which are directed to be applied by friction, in such a manner as to set up a considerable amount of irritation. When the affection depends on the languid circulation of blood in the part, this treatment often succeeds; but when the hair-bulbs are withered or decayed, or the scalp much attenuated, the restoration of the hair is an impossibility. See *Baldness*, *Hair Dyes*, *Oils*, *&c.*

HAIR DYES. Syn. *Tinctura Capillorum*,—Lat. The practice of dyeing the hair is of great antiquity; and though not so common as formerly, it is still far from infrequent at the present day. The numerous preparations vended for this purpose have generally a basis of lead or silver. Bismuth, pyrogallic acid, and certain astringent vegetable juices, are also occasionally thus employed. The following list embraces all those of any value:—

Prep. 1. *Litharge*, 1 part; *fresh-slaked lime* and *starch*, of each, 2 parts; all in fine powder, and perfectly dry; mix, and keep the compound in well-corked bottles. This powder is to be made into a thin paste or cream with water (for a *black*), or milk (for a *brown*), and applied to the hair, (previously freed from grease with soap-and-water, and dried,) by means of a sponge or brush, or the fingers; observing to rub it well into the roots, and to pass a comb for some time through it, to ensure its coming in contact with every part. The whole must be then covered with a *moist* leaf of cotton wadding, or some brown paper several times doubled and well-damped with hot water, and allowed to remain so for 3 or 4 hours, or even longer;

or an oil-silk cap, or a bladder, may be worn, the object being simply to prevent the evaporation of the moisture. After a sufficient time has elapsed, the powder may be removed by rubbing it off with the fingers, and afterwards washing it out with warm soap-and-water. A little pomatum or hair-oil will restore the usual gloss to the hair. *Another method* of operating is, to apply the cream or paste as before, and then to keep rubbing it about the hair with a brush as long as may be required, occasionally adding a few drops of hot water to preserve the whole moist. In this way the action of the dye is facilitated, and the process concluded in a much shorter time.

2. *Lime* (slaked in the air), 2 parts; *carbonate of lead* (pure white lead), 1 part; mixed and applied as the last.

3. (*Aqua Orientalis.*) From *grain silver*, 2 *dr.; steel filings*, 4 *dr.; nitric acid*, 1 *oz.; soft water*, 1½ *fl. oz.;* digested together, the solution being afterwards diluted with *water*, 3½ fl. oz. and filtered. Applied by means of a fine-toothed comb, or a half-worn tooth-brush to the hair, previously well cleaned with soap-and-water, and dried.

4. (*Argentan Tincture.*) From *nitrate of silver*, 1 dr.; *eau de rose*, 1 fl. oz.; *nitrate of copper*, 2 gr., or q. s. to impart a slight greenish tint. *Used* as the last.

5. (Dr. Cattel.) *Nitrate of silver*, 11 dr.; *nitric acid*, 1 dr.; *distilled water*, 1 pint; *sap green*, 3 dr.; *gum arabic*, 1½ dr.; digest together. *Used* as No. 3.

6. (Chevallier.) *Fresh-slaked lime*, 5 dr.; *water*, 1½ *oz.;* mix, strain through gauze, and pour the milk into a four-ounce bottle. Next dissolve *sugar of lead*, 5 dr., in *water*, 3 fl. oz.; add to this solution, dry *slaked lime*, 1 dr., stir well together, wash the precipitate with a little soft water, drain off the water, then add it to the milk of lime in the bottle, and shake the whole well together, and again before use. Applied as No. 1; but it acts much more quickly.

7. (*Delcroix's.*) From *acetate of lead*, 2 *oz.; prepared chalk*, 3 *oz.; quicklime*, 4 *oz.*; each in an impalpable powder. *Used* as No. 1.

8. (*Eau d'Afrique,*—Hopekirk's.)—*a. Nitrate of silver* (cryst.), 1½ dr.; *distilled water*, 2 fl. oz.; dissolve, and pour the solution into the bottles labelled "*Solution* No. 1."—*b. Liquor of potassa*, 3 dr.; *hydrosulphuret of ammonia*, 7 dr.; *water*, 1 fl. oz.; mix, and pour the liquid into the bottles labelled "*Solution* No. 2." For *use*, the hair is moistened by means of a small-toothed comb or a tooth-brush, with the solution No. 1, either alone or diluted with a little water; care being taken to avoid touching the skin, if possible. After the lapse of 8 or 10 minutes the solution No. 2, diluted with at least 5 times its measure of water is applied in the same manner, and any spots on the skin removed by rubbing them with the corner of a napkin wetted with the liquid. The skin is then sponged clean with a little warm water, and wiped dry, and the hair is arranged with the comb as usual. It is better to avoid rubbing it or washing it for a few hours. Sometimes the process is reversed, and the liquid No. 2, applied first. In this way, the stains on the skin are more readily removed, but the dye is less permanent than when the other plan is adopted.

9. (*Eau d'Egypte.*) Resembles No. 4, (above).

10. (*Essence of Tyre.*) Resembles the last.

11. (*Grecian Water.*) Resembles No. 3, or 4.

12. (Dr. Hanmann.) *Litharge*, 275 gr. (say, 1 part); *quicklime*, 1875 gr. (or 6¾ parts); *hair powder* (or starch), 930 gr. (or 3½ parts); all in fine powder. *Used* as No. 1.

13. (*Hewlet's*). Resembles *Spencer's.*

14. (*Instantaneous.*) Moisten the hair first with a *solution of nitrate of silver* in *water* (1 to 7 or 8), and then with a *weak solution of hydrosulphuret of ammonia.* The colour of the hair, unaltered by the silver solution, instantly turns black when moistened with the sulphuret. See *Eau d'Afrique.*

15. (*La Forest's.*) See *Washes.*

16. (*Orfila's.*) From *litharge*, 3 parts; *quicklime*, 2 parts; *starch*, 1 part. The original form for this article is as follows:—*Sulphate of lead*, 4 parts; *dry fresh-slaked lime*, 5 parts; *water*, 30 parts; boil 1 hour, collect the paste on a piece of *calico*, and apply it in a similar manner to No. 1.

17. (*Pommade Dye.*)—*a. Nitrate of silver*, 1 part; *nitric acid*, 2 parts; *iron filings*, 2 parts; mix, and let them stand together for 4 or 5 hours, then pour them on *oatmeal*, 2 parts; next add, *lard*, 3 parts; and mix well together.

b. From *nitrate of silver* and *cream of tartar*, of each, 1 dr.; *liquor of ammonia*, 2 dr.; dissolve, add of *lard*, 4 dr., and mix well together.

18. (*Poudre d'Italie.*) Resembles *Orfila's.*

19. (*Pyrogallic Stain.*) A weak solution of *crude pyrogallic acid.* Another article sold under this name, is prepared by distilling *nutgalls* (coarsely powdered) in a

retort, dissolving the *solid acid* which sublimes in a little *hot water*, and after mixing this with the *acid liquid* which also passes over, adding a little *rectified spirit*. The floating oil is then separated and the solution filtered.

20. (Redwood.) *Litharge*, 2 *oz.; slaked lime* and *powdered starch*, of each, 1 *oz.*; *liquor of potassa*, 2 dr.; *water*, q. s. to form a thick cream. *Used* as No. 1.

21. (Redwood.) *Liquor of potassa* and *distilled water*, of each, 1 pint; mix, and pass *sulphuretted hydrogen* through the liquid until it is saturated. Of *this solution* take 20 *oz.; liquor of potassa*, 4 *oz.*; mix, and label it "*Solution No.* 1." Next dissolve *nitrate of silver*, 1 dr., in *distilled water*, 2 *oz.;* and label the liquid "*Solution No.* 2." *Used* in the same manner as No. 8 & 14.

22. (*Spencer's.*) From *sap green*, ½ dr.; *nitrate of silver*, 1 dr.; *hot water*, 1 *oz.* Applied as No. 3.

23. (*Tinctur zum Schwarzfarben der Haare.*) A strong *tincture* of the *shells of green walnuts*, scented with *oil of lavender*.

24. (Ure.) *Litharge*, *fresh-slaked lime*, and *bicarbonate of potassa*, mixed in various proportions according to the shade of colour desired. *Used* like No. 1.

25. (*Warren's.*) From *litharge*, 1 *oz.*; *white lead*, 2 *oz.; quicklime*, (in fine powder), 16 *oz.;* mix, sift through lawn, and at once bottle the mixture. *Used* like No. 1. Mixed with water it is said to dye the hair black; with milk, brown.

26. *White lead*, 1 *oz.; fresh slaked lime*, 1½ *oz.; litharge* and *ozide of bismuth*, of each, ½ *oz.; water*, 1 pint; mix, boil 15 minutes, with frequent agitation, cool, pour it into a bottle, add of *liquor of ammonia*, ¼ fl. oz., shake the whole frequently for some hours, and the next day pour off the liquid portion from the white sediment which forms the dye, *Used* like No. 1. It is applied for 8 or 10 minutes for a *brown;* 30 minutes, or longer, for a *black.* For the first it is washed off with water containing a little common soda.

27. The *juice* of the *bark* or *shell of green walnuts*, applied with a sponge. (Paulus Ægineta.)

28. A *leaden comb* used daily is said to darken the hair, but we have known persons persevere in its use for months without any perceptible change occurring. Premature baldness is a frequent consequence of its use.

Obs. It is right to inform the reader that all those compounds which contain *nitrate of silver* stain the *skin* as well as the hair. These stains may be removed when quite recent, by rubbing them with *water* containing a little *hydrosulphuret of ammonia* (see *above*) or *iodide of potassium* in solution; but as this is attended with some trouble and inconvenience, the best way is to avoid the necessity of doing so. The hair-dressers adopt the plan of smearing *hard pomatum* over the skin immediately surrounding the hair, to protect it from the dye. By very skilful manipulation, and the observance of due precautions, the hair may be thoroughly moistened with the above fluids, without touching the adjacent skin, but this can only be done, in the case of the hair of the head, by a second party. This has led to a preference being given by many to the compounds containing *lead*, as the *plumbite of lead* formed in them, and on which their action depends, does *not stain the skin.* The hue given by the latter (*when pale*), is very apt to possess an unnatural redness; but *all* the shades of colour given by the preparation of silver, are rich and unexceptionable. *Pyrogallic acid*, and the *juice of walnuts*, also stain the skin, although less intensely and permanently than nitrate of silver.

The *detection* of *dyed hair* is often a matter of importance in medico-legal research. The *presence of silver* may be shown by digesting the hair in a little *weak chlorine water* or *hydrochloric acid*, when the resulting chloride of silver may be dissolved out with *liquor of ammonia*, and submitted to the usual tests. *Hair* containing *lead* when digested in dilute nitric acid, gives a solution of nitrate of lead, in which form it is readily detected. See *Lead* and *Silver*.

All the preceding compounds are for dying *living hair* (human); *horse-hair*, *bristles, &c.*, and other *dead hair* may be readily stained by steeping them in any of the ordinary liquid dyes; more especially those employed for wool and silk. See *Pommades*, *Washes*, *&c.*

HAIR PAINTS. See *Cosmetique* and *Pommades.*

HALL MARKS. The *Hall Marks* on articles in gold and silver not only inform us of their fineness, but furnish us with other important particulars.

The *Hall Mark* (proper) denotes the place of manufacture or assay, being an anchor for *Birmingham;* a dagger or 3 wheat sheaves, for *Chester;* hibernia, for *Dublin;* castle and lion, for *Edinburgh;* castle with 2 wings, for *Exeter;* tree and salmon with a ring in its mouth, for *Glasgow;* leopard's head, for *London;* 3 castles, for *Newcastle-on-Tyne;* a crown, for *Sheffield;* and five lion's heads and a cross, for *York.*

The *Duty Mark* is the head of the Sovereign, showing that the duty is paid.

The *Date Mark* is a letter of the alphabet, which varies every year, and with the different companies, thus; the *Goldsmith's Company of London* have used from 1716 to 1755 Roman Capital letters; from 1756 to 1775 small Roman Letters; from 1776 to 1795 old English letters; from 1796 to 1815 Roman Capital letters, from A to U, omitting J; from 1816 to 1835 small Roman letters, a to u, omitting j; from 1836 old English letters.

The *Standard Mark* for *Gold* is, for *England,* a lion passant; *Edinburgh,* a thistle; *Glasgow,* a lion rampant; *Ireland,* a harp crowned. For *silver,* a figure of Britannia. If under 22 carats, gold has the figures 18.

The *Manufacturer's Mark* is the initials of the maker, as S. H., W. T., C. E., &c. See *Gold, Jewellery, &c.*

HALOGENS. A name given by Berzelius to those substances which by their combination with the metals produce saline compounds. Bromine, chlorine, cyanogen, fluorine, &c., are halogens. The compound bodies thus formed are termed *haloid salts.*

HAMS. These are usually prepared from the *legs of bacon pigs,* but those of the *sheep* are also sometimes used for the same purpose. *Smoked ham* is strong eating, and rather fit for a relish than for diet, and should be particularly avoided by the dyspeptic, and by convalescents.

Choice. A sharp knife thrust under the bone should have a pleasant smell when withdrawn. The recently cut fat should be hard and white, the lean fine-grained, and of a lively red. Those short in the hock are the best.

Curing. An ordinary sized ham requires nearly three weeks, if *wet salted,* and about a month if *dry salted,* to cure it perfectly. At the expiration of this time, they are ready for smoking. *Mutton hams* should not lie in pickle longer than 12 or 14 days.

Cooking. Hams should be put into the water *cold,* and should be gradually heated. A ham of 14 *lb.* will take about 4 hours; one of 16 *lb.* will take 4½ hours, and one of 20 *lb.* about 5½ hours to dress it properly. "If it is an old ham it should be soaked for 12 hours previously." (Soyer.)

Pres. Most grocers and dealers in hams enclose them, after being smoked, in *canvass,* for the purpose of defending them from the attacks of the little insect, the *dermestes lardarius,* which, by laying its eggs in them, soon fills them with its larvæ or maggots. This troublesome and expensive process may be altogether superseded by the use of *pyroligneous acid,* applied by means of a painter's brush.

HANDS. *Dirty and coarse hands* are no less the marks of slothfulness and low breeding, than clean and delicate hands are those of cleanliness and gentility. To promote the *softness* and *whiteness* of the skin, mild emollient soaps, or those abounding in oil, should alone be used, by which means chaps and chilblains will generally be avoided. The coarse, strong kinds of soap, or those abounding in alkali, should for a like reason be rejected, as they tend to render the skin rough, dry, and brittle. The immersion of the hands in alkaline lyes, or strongly acidulated water, has a like effect. When the hands are *very dirty,* a little good soft soap may be used with warm water, which will rapidly remove oily and greasy matter. *Fruit* and *ink stains* may be taken out by immersing the hands in *water slightly acidulated* with *oxalic acid* or a *few drops* of *oil of vitriol,* or to which a little *pearlash* or *chloride of lime* has been added; observing afterwards to well rinse them in clean water, and not to touch them with soap for some hours, as any alkaline matter will bring back the stains, after their apparent removal by all the above substances, except the last. The use of a little *chloride of lime* and *warm water,* or *Gowland's lotion,* imparts a delicate whiteness to the skin; but the former should be only *occasionally* used, and should be well washed off with a little clean water to remove its odour. *Glycerine* employed in the same manner renders the skin soft, white, and supple. The use of a little *sand* or *powdered pumice stone* with the soap, will generally remove the roughness of the skin, frequently induced by exposure to cold. The hands may be preserved *dry,* for delicate work, by rubbing a little *club moss* (*lycopodium*), in fine powder, over them. A small quantity of this substance sprinkled over the surface of a basin of water, will permit the hand to be plunged to the bottom of the basin without its becoming wet.

HANGING. In cases of *suspended animation* from *hanging,* the assistance must be prompt and energetic. The body, on its discovery, should be instantly relieved from the state of suspension, and all pressure about the throat. The *remedial treatment* chiefly consists, in the severer cases, in cupping the temples or opening the jugular vein, and so relieving the head of the blood which is accumulated in its superficial veins in consequence of strangulation. When the body is cold, friction, and the other means used for restoring the animal heat in drowned persons should be resorted to. See *Animation* (*Suspended*) and *Drowning.*

HARDNESS. Compactness; solidity; the power of resisting abrasion. *Mineral substances* are frequently distinguished and identified by their relative hardness. This is ascertained by their power to scratch or be scratched by one another. A valuable table on this subject will be found in the article on *Gems.*

HARMALINE. Syn. *Harmalina.* A basic substance, forming yellow-brown crystals, discovered by Gobell in the seeds of *peganum harmala.* It has a bitter astringent and acrid taste, is soluble in alcohol, and forms yellow, soluble salts with the acids. It has been proposed as a yellow dye. By *oxidation* it yields another compound (*Harmine*), which is a magnificently red dye-stuff, easily prepared and applied. (Göbel.) The seeds are produced abundantly in Russia.

HARNESS POLISH. See *Blacking, &c.*

HARTSHORN. Syn. *Cornu Cervi, C. Cervinum; Cornu,*—Ph. L. The "*horn*" of the "*cervus elephas*" (Ph. L.) or stag. (See *below.*)

HARTSHORN (Burnt). Syn. *Cornu Ustum,*—Ph. L. *Cornu Cervi Ustum,*—Ph. L. 1787. *Prep.* (Ph. L. 1836.) Burn *pieces* of *harts' horns* until perfectly white, then grind and prepare them in the same way as directed for "prepared chalk."

Obs. Finely powdered bone-ash is usually sold for burnt hartshorn, and possesses exactly the same properties. *Dose.* 10 to 30 gr., or more, 2 or 3 times a day, in rickets, &c. See *Phosphate of Lime.*

HARTSHORN SHAVINGS. Syn. *Hartshorn Raspings; Rasura Cornu Cervi, Ramenta C. C.,*—Lat. Obtained from the turners. Boiled in water, it yields a nutritive jelly. *Used* by straw-plait workers to stiffen bonnets, &c.

HATCHETINE. A species of fossil resin found in certain varieties of mineral coal.

HATCHING. See *Incubation.*

HATS. Those should be chosen possessing a *short,* smooth, fine nap, and a good black colour; and sufficiently elastic to resist ordinary wear and tear, without breaking or giving way. The *hat brush* for *daily* use should be made of soft hairs, but a *stiffer one* should be employed *occasionally,* to lay the nap smooth and close. *Grease* may be removed by means of porous brown paper, and pressure with a hot iron.

HEADACHE. Syn. *Cephalalgia,*—Lat. The symptoms of this very general complaint are too well known to require any description. According to pathologists, headache arises, either from a sympathy with the stomach and chylopoietic (chyle-forming) viscera, or from a weakness or exhaustion of the power of the encephalon. The former may be called *sympathetic,* and the latter *nervous headache.* When it attacks only *one* side of the head it is called *Hemicrania.* The TREATMENT of the first form should consist in restoring the healthy action of the stomach, by the administration of *aperients,* and by the use of proper food, and exercise; or when that viscus is overloaded with undigested food, by the exhibition of an *emetic.* For this purpose ¼ to ½ an *oz.* of *ipecacuanha wine* may be taken in a cupful of *warm water,* which will generally relieve the stomach, especially if its action is assisted by drinking *copiously* of warm water. Headache is a common accompaniment of indigestion and stomach disease, and in general it will be found that whatever will remove the one, will also cure the other. *Nervous headaches* are relieved by nervous tonics and stimulants; as *bark, cascarilla, calumba, gentian, camphor, ammonia, ether,* and *wine;* the latter in a state of considerable dilution. A *cup* of *strong coffee* or *strong green tea* often acts like a charm in removing this species of headache. Small doses of *tincture of henbane* have also often a like effect. 20 or 30 drops of *laudanum,* or preferably, half that number of *liquor opii sedativus,* may be taken with advantage as an anodyne, and to induce sleep. Amongst *popular remedies* may be mentioned "*nasal stimulants,*" as snuff (cephalic), smelling salts, and aromatic vinegar, the use of which is familiar to every one; and *local applications,* as very cold water, ether, vinegar, strong spirits, Cologne water, &c.; all of which are rubbed over the part of the head affected, with the fingers; or a linen rag dipped in them is laid thereon instead. Pressure on the head has also been used with advantage. *Silence, darkness,* and *repose,* are powerful remedies, alike suitable to every variety of headache; and *change of air, scene,* and *occupation,* are especially beneficial to those resulting from excessive mental anxiety or exertion. *Blisters* are sometimes applied behind the ears in cases of violent headache.

Headache is often *symptomatic* of other diseases, especially those of the inflammatory and nervous kind, rheumatism, &c. In all these, the primary disease should be sought out and attempted to be cured. In many cases these attacks rapidly yield to a few doses of *compound decoction of sarsaparilla* containing a little *iodide of potassium*. *Headache in pregnancy* may generally be removed by proper attention to the bowels; observing to assist their action, should they require it, by the use of some *mild aperient*, as castor oil, lenitive electuary, seidlitz powders, &c. When the constitution is very robust, blood may be taken. *Headache in bed* may frequently be relieved by washing the head with *cold water*, and discontinuing the use of a nightcap; at the same time preserving the feet warm by wearing worsted socks or stockings.

HEADING. Syn. *Beer Heading, Cauliflower do. Prep.* 1. *Alum* and *green copperas*, equal parts, both in fine powder.

2. *Alum*, *copperas*, and *common salt*, equal parts.

Used by brewers to make their beer keep its head or froth.

HEALTH. That state of the living body in which all its functions are duly performed. See *Hygiene.*

HEARING. See *Deafness, Ear, &c.*

HEARTBURN. Syn. *Cardialgia, Cordolium,*—Lat. Anxiety and pain about the region of the stomach, generally attended by a sense of gnawing and heat; hence its popular name. Faintness, nausea, and eructation of a thin, acidulous, watery liquid, especially in the morning, are common symptoms of this complaint. The usual *causes* of heartburn are excess in eating or drinking, the use of improper food, and sedentary habits. A *good remedy* is a teaspoonful of *carbonate of magnesia*, or *carbonate of soda*, in a *glass of peppermint* or *cinnamon water*, to which a little *powdered ginger* may be added with advantage. This dose may be taken 2 or 3 times daily until the disease is removed. Articles of food that easily undergo fermentation should at the same time be avoided, and a *dry* diet had recourse to as much as possible. *Soda-water*, *toast-and-water*, and *weak spirit-and-water*, are the most suitable beverages in this complaint.

HEAT. Syn. *Calor*, *Caloricum*,—Lat. The consideration of this subject belongs to *physics* and *chemistry*. Much useful information, in connection with it, will, however, be found in this work, under the heads, *Ebullition, Evaporation, Expansion, Refrigeration, &c.*

HEAVY SPAR. Native sulphate of baryta. See *Baryta.*

HECTIC FEVER. Syn. *Febris Hectica*, —Lat. An ill-defined constitutional febrile affection, more or less of an intermittent character, attended by debility, a small quick pulse, paleness, loss of appetite, emaciation, and excessive perspiration. It is often symptomatic of some other disease. When it is an idiopathic affection, sarsaparilla, or the lighter bitter tonics, and mild aperients, judiciously administered, often prove useful; especially when supported with a light and regular diet, regular hours, gentle out-of-door exercise, and warm bathing or the shower bath.

HEDERINE. Syn. *Hederina.* From the *decoction* of the *ground seeds of ivy* (hedera helix), boiled in *water*, along with a little *slaked lime* or *magnesia*, the precipitate being afterwards digested in *rectified spirit*, and the filtered tincture evaporated. Febrifuge and sudorific.

HEDGES. The economising of land in agriculture, is next in importance only to its careful cultivation. The Rev. Mr. Rham calculates the *loss of land* in *hedges* and *ditches* to be 1 acre in 25; by taking the estimates made by Mr. John Grant, in Devonshire, and those made in Kent, it gives the average at 1 acre in 27; and even in a closely-cultivated county, 5 acres were *gained* on a farm of 203 acres by rooting up the hedges; 3 acres were gained on a farm of 180 acres in a similar manner. The advantage, therefore, of substituting fences for hedges, and throwing small enclosures into large ones, can no longer be questioned, however much it may tend to lessen the beauty of our rustic scenery.

HELENINE. Syn. *Elecampane Camphor.* A peculiar substance obtained from the fresh root of *inula Helenium* (elecampane), by digestion in *hot alcohol* or distillation along with *water.* It is crystalline, soluble in alcohol, ether, and essential oils, melts at 162° and boils about 530° Fahr. Its vapour has an odour resembling that of patchouli. Nitric acid converts it into a resin-like substance (*nitrohelenine.*)

HELICINE and *Helicoidine*, are products, along with *anilotic acid*, resulting from the action of *dilute nitric acid* on *salicine.* (M. Piria.)

HELIOGRAPHY. See *Photography.*

HELLEBORE. Syn. *Black Hellebore; Helleborus*,—Ph. L. "The rhizome and root" of "*helleborus niger*" (Ph. L.) or black hellebore. It is alterative and emmenagogue, in *small doses* (2 to 8 gr.); and a drastic hydragogue purgative and anthelmintic in *larger ones* (10 to 20 gr.)

HELLEBORINE. Syn. *Soft Resin of*

Hellebore. An odourless, acrid substance, extracted by alcohol from *black hellebore,* and on which, according to Vauquelin, the activity of that drug depends.

HEMATINE. Syn. *Hæmatine, Hæmatoxyline.* A principle obtained by Chevreul from common logwood (*hæmatoxylon campechianum*), and on which its colour appears to depend.

Prep. 1. Infuse *logwood chips* in *water,* at a temperature of about 130° Fahr., for 12 hours, filter, and evaporate to dryness in a water-bath; digest the residuum in *rectified spirit,* for 24 hours, again filter and evaporate; then add a *little* water, again gently evaporate and set aside the solution in a cold place that crystals may form; these must be washed in *rectified spirit* and dried.

2. Digest *powdered hard extract of logwood* in *rectified spirit,* and proceed as last.

Prop., &c. Brilliant reddish-white crystals, soluble in boiling water, forming an orange-red solution which turns yellow as it cools, but resumes its former colour on being heated. Alkalies in excess change its colour successively into purple, violet, and brown; acids brighten it; with the metallic oxides it forms compounds, having a blue, purple, or violet colour.

HEMIDESMIC ACID. Syn. *Hemidesmine; Smilasperic Acid.* A volatile and crystallizable substance obtained by Mr. Garden from the root of *hemidesmus indicus* or *Indian scented-sarsaparilla.* It possesses the taste, odour, and medicinal properties of the root.

HEMIPINIC ACID. Syn. *Semi-opianic Acid.* A new bibasic acid obtained from a mixture of *binoxide of lead, opianic acid,* and *sulphuric acid.*

HEMLOCK. Syn. *Cicuta; Conium,*—Ph. L. E. & D. "The fresh and dried leaf of the wild herb, *conium maculatum*" (Ph. L.) or *spotted hemlock.* The first are used to make the *extract;* the last, the *tincture* and *powder.*

Hemlock is a powerful narcotic acrid poison, occasioning stupor, delirium, paralysis, convulsions, coma, and death. In *small doses* it is anodyne, alterative, resolvent, antispasmodic, and anaphrodisiac, and has been exhibited in cancer, dropsy, epilepsy, rheumatism, scrofula, syphilis, and other diseases. *Dose.* 3 or 4 gr. of the powder, twice or thrice daily, until some obvious effect is produced.

Hemlock, whether in leaf (*conii folia*) or powder (*pulvis conii*) rapidly deteriorates by keeping. When good "the powder, triturated with *solution of potassa,* exhales a powerful odour of conia." (Ph. E.)

In cases of *poisoning* by *hemlock,* the treatment is similar to that noticed under *Aconite.*

HEMP. The common hemp of which cordage is made, is the *cannabis sativa* (Linn.) A variety of this plant, or perhaps the same, simply rendered more active by climate, is the *cannabis Indica* or *Indian hemp,* now so frequently used in medicine. The parts employed in Asia for the purposes of intoxication, and in Europe as medicine, are the *herb* or *leaves* and the *resin.* The *Gunjah* sold in the bazaars, in the East Indies, is the plant, just after flowering, dried and pressed together. *Bang, banga, subjee,* or *sidhee,* consists of the larger leaves and capsules without the stalk. The tops and tender parts of the plant collected after inflorescence, forms *Hashish.* The concrete resinous exudation from the leaves, stems, and flowers, is called *Churrus,* and in this country—*resin of Indian hemp.*

Indian hemp is anæsthetic, anodyne, exhilarant, antispasmodic, hypnotic, and narcotic. In the East it is commonly used as an intoxicant, either by smoking it, like tobacco, or swallowing it. The inebriation produced by it is of an agreeable or cheerful character, exciting the party under its influence to laugh, dance, sing, and to commit various extravagancies. It also acts as an aphrodisiac, augments the appetite for food, and, in some cases, occasions a kind of reverie and catalepsy. In this country its action is less marked. It has here been chiefly administered under the form of alcoholic or resinous extract. See *Cannabine* and *Extracts.*

The *fruit* of common hemp (*hemp seed*) is demulcent and oleaginous. It is said that the plumage of bullfinches and goldfinches fed on it for too long a time, or in too large a quantity, changes from red and yellow to black. (Burnett, *Outlines of Botany.*)

HENBANE. Syn. *Hyoscyamus,*—Ph. L. E. & D. "The *fresh* and *dried* stalk-leaf of the biennial herb, *hyoscyamus niger*" (Ph. L.) or common *biennial* or *black henbane.* The first are used for preparing the *extract;* the *last,* for the *powder* and *tincture.*

Henbane is anodyne, hypnotic, antispasmodic, and sedative. It differs from opium in not being stimulant, and by not confining the bowels; and hence may be administered in cases in which that drug would be improper. In large doses it acts as a powerful narcotic poison; producing obscurity of vision, dilation of the pupils, delirium, phantasms, coma, &c. *Dose.* 3 to 10 gr., in powder. It is usually given in the form of extract or tincture. The *antidotes, &c.*, are the same as those noticed under *Opium.*

HEPAR. Syn. *Liver.* A name given by the older chemists to various combinations of sulphur, from their brown colour; as *hepar sulphuris*, sulphuret of potassium; *hepar antimonii*, crude oxysulphuret of antimony, *&c.*

HEPATIC AIR. See *Sulphuretted Hydrogen.*

HERBARIUM. Syn. *Hortus Siccus.* A collection of dried specimens of plants; hence called hortus siccus or dry garden. The common plan is to press the branches, flowers, &c., of the plant flat, between porous paper, and after drying them in the sun, or otherwise, to glue or gum them to sheets of paper. The preparation of a herbarium offers an almost endless source of amusement to the ingenious, whilst the specimens so collected, if well preserved, are as useful to the botanist as the living plants.

HERBS. Syn. *Herbæ*,—Lat. The *collection* and *drying of herbs* for medicinal purposes and perfumery, are noticed under *Vegetables.*

Amongst *cooks*, several aromatic herbs, either fresh or dried, are used for seasoning. "In many receipts is mentioned a *bunch* of *sweet herbs*, which consists, for some stews and soups, of a small bunch of *parsley*, two sprigs of *thyme*, and one *bayleaf;* if no parsley, then of four sprigs of *winter savory*, six of *thyme*, and one *bayleaf.*" (Soyer.)

HERNIA. See *Rupture.*

HERPES. See *Tetters.*

HERRING. A well-known small sea-fish, the *clupea harengus*, of Linnæus, belonging to the Cuvierian order, *malacopterigii abdominales.* As an article of food, herrings are of vast importance to a large proportion of the population of Europe. When *recently* caught and dressed by broiling or boiling, they are wholesome and agreeable; but if fried, or long kept, they become strong and oily, and are then apt to offend the stomach. The preparation of salted and dried or smoked herrings (*bloaters, blown herrings, red do.*) furnishes employment for thousands, both in these countries and Holland. Real *Yarmouth bloaters* and *Dutch herrings* are highly esteemed by many as a relish. Salted herrings are said to be diuretic. The *pickle* was formerly used in clysters, dropsies, &c. Mr. Winkles found large quantities of *trymethylamine* in the liquor in which salt herrings are preserved. M. Soyer calls this fish "the poor man's friend," and tells us that after being "cleaned and scaled, and the head removed," it should be "opened in the *back*, and the gut taken out." Also that "the way to ascertain if a herring is too salt, is to take the fish in the left hand, and pull out a few of the fins from the back, and to taste them. You may thus find out the quality and flavour. This plan is adopted by the large dealers."

HESPERIDINE. Syn. *Aurantine?* A peculiar substance obtained from the white portion of the rind of oranges, lemons, &c. It forms crystalline silky needles, is odourless, tasteless, fusible, soluble in alcohol, less soluble in water, and is reddened by oil of vitriol.

HICCOUGH. Syn. *Hickup; Singultus*,—Lat. A convulsive motion of the diaphragm and parts adjacent. The *common causes* are flatulency, indigestion, acidity, and worms. It may generally be *removed* by the exhibition of *warm carminatives, cordials, cold water, weak spirits, camphor julep*, or *spirits of sal volatile.* A *sudden fright* or *surprise* will often produce the like effect. An instance is recorded of a delicate young lady that was troubled with hiccough for some months, and who was reduced to a state of extreme debility from the loss of sleep occasioned by it, that was cured by a fright, after medicines and topical applications had failed. A *pinch of snuff*, a *glass* of *iced soda-water*, or an *ice-cream*, will also frequently remove this affection.

HIERA PICRA. See *Powder of Aloes and Canella.*

HIPPOCRAS. An aromatic medicated wine, formerly much used in England, and still employed on the Continent.

Prep. *Lisbon* and *Canary wine*, of each, 12 pints; *cinnamon*, 2 *oz.; white canella*, ½ *oz.; cloves, mace, nutmeg, ginger*, and *galangal*, or *cardamoms*, of each, 1 dr.; bruise the spices, and digest them in the wine for three or four days; strain, and add of *lump sugar*, 2½ *lb.*

HIPPURIC ACID. Syn. *Acidum Hippuricum*,—Lat. A compound discovered by Liebig in the urine of the horse, cow, and other graminivora, in which it exists in combination with potassa or soda.

Prep. Concentrate the *urine* by a gentle heat, acidulate it with *hydrochloric acid*, and set it aside to crystallize. It may be decoloured by redissolving it in *boiling water*, and treating it with *animal charcoal*, or with a little *chloride of lime* along with some *hydrochloric acid*, and re-crystallizing it.

Obs. Hippuric acid, when pure, forms long, slender, milk-white, square prisms; it is soluble in 400 parts of cold water, but is easily dissolved by boiling water; it is also soluble in alcohol. When strongly heated, benzoic acid and benzoate of ammonia distil over in a liquid state, accompanied by a strong odour of Tonka beans, and afterwards of hydrocyanic acid. "The urine of horses or cows, left to itself for some time, or evaporated at a boiling temperature, yields not a trace of hippuric acid, but only benzoic acid." Nitric acid and hot oil of vitriol convert it into benzoic acid. Boiling hydrochloric acid converts it into *benzoic acid* and *glycocoll.* With the bases it forms salts, which are called *hippurates.* See *Benzoic Acid.*

HIPS. Syn. *Heps; Rosa Canina,*—Ph. L. The fresh fruit of the *dog rose* (rosa canina,—*Linn.*) or *wild briar. Used* to make a *conserve.*

HIRCIC ACID. A name given by Chevreul to an oily liquid, obtained by saponifying the fat of goats. It is *prepared* in the same way from *goat fat*, as capric, caproic, and butyric acids are from butter. It is soluble in alcohol, and possesses a mixed smell of vinegar and goats. With the bases it forms salts called *hircates.*

HIRCINE. An oily fluid extracted by Chevreul from goat-fat, and which also may be obtained from mutton suet. It smells strongly of the male goat. By saponification it yields *Hircic Acid.*

HOLLANDS. Syn. *Geneva, Hollands Gin, Dutch do. Prep.* 1. The materials employed in the distilleries of Scheidam in the preparation of this excellent spirit, are two parts of the best *unmalted rye*, and 1 part of *malted bigg*, reduced to the state of coarse meal by grinding. About a barrel (36 gall.) of *water*, at a temperature of from 162° to 168° Fahr., is put into the mash tun for every 1½ cwt. of *meal*, after which the *malt* is introduced and stirred, and lastly, the *rye* is added. Powerful agitation is next given to the magma till it becomes quite uniform, when the mash-tun is covered over with canvass, and left in this state for two hours. Agitation is then again had recourse to, and the transparent *spent wash* of a preceding mashing is added, followed by as much *cold water* as will reduce the temperature of the whole to about 85° Fahr. The gravity of the wort at this point varies from 33 to 38 *lb.* A quantity of the *best pressed Flanders yeast*, equal to 1 *lb.* for every 100 gall. of the mashed materials, is next stirred in, and the whole is fermented in the mash tun for about 3 days, or until the attenuation is from 7 to 4 *lb.* (sp. gr. 1·007 to 1·004). During this time the yeast is occasionally skimmed off the fermenting wort. The wash, with the grains, is then transferred to the still, and converted into "*low wines.*" To every 100 gall. of this *liquor*, 2 *lb.* of *juniper berries* (3 to 5 years old), and about 1 *lb.* of *salt*, are added, and the whole is put into the *low-wine still*, and the fine spirit drawn off by a gentle heat, one receiver only being employed. The *product* per quarter varies from 18 to 21 gall. of spirit, 2 to 3 *o. p.*

2. (*Best hollands; Brandewyn von Koorn voorloof drie quart.*) Hollands rectified to the strength of 24° Baumé (sp. gr. 0·9125, or about 6 *o. p.*)

3. (*English-made.*)—*a.* From *juniper berries* (at least a year old, and crushed in the hands,) 3 *lb.; rectified spirit,* 1½ gall. (or *proof spirit,* 2½ gall.); digest, with agitation for a week, and then express the liquor; after 24 hours' repose, decant the clear portion, add it to *good corn spirit*, at 2 or 3% overproof, 90 or 100 gall., and mix them well together.

b. From *juniper berries,* 2½ *lb.; sweet fennel seed,* 5 *oz.; caraway seed,* 3½ *oz.; proof spirit,* 2 gall.; *corn spirit,* 90 or 100 gall.

c. As the last, with the addition of *Strasburgh turpentine*, or *Canadian balsam*, 1 *lb.*

d. To either of the last two or three, add a very small quantity of *ground cardamoms* or *horse-radish.* Some compounders also add 4 or 5 cloves of *garlic*, or about 15 gr. of *assafœtida*, with 1 gr. of *ambergris* rubbed to a powder with a little *white sand* or *lump sugar.* Good *plain gin* may be advantageously employed in lieu of the corn spirit ordered above, when expense is no object.

Obs. The last four forms, which are only given as examples, produce a very pleasant spirit, if it is kept for some time to "*mellow.*" Age is *one* of the principal causes of the "creaminess" of foreign gin, which usually lies in bond for some time before being consumed. The product is, however, much superior if the ingredients are rectified along with 20 gall. of *water*, and about 14 *lb.* of *salt*, by a gentle heat.

It will be seen from the above, that the superior flavour of Hollands spirit depends more on the peculiar mode of its manufacture than on the quantity of juniper berries employed; 2 *lb.* of them, when new, being barely equivalent to 1 *oz.* of the *essential oil;* and when old, to less than ½ *oz.*, a quantity *wholly insufficient* to flavour 100 *gallons of spirit.* The Dutch distillers, most noted for this liquor, add a little pure *Strasburgh turpentine*, and a handful or two of *hops* to the spirit, along with the juniper berries, before rectification. The former substance has a pale yellowish brown colour, and a very fragrant and agreeable smell, and tends materially to impart that fine aroma, for which the best Geneva is distinguished. At Rotterdam *sweet fennel seed* is commonly added as a flavouring; and at Weesoppe, *Strasburgh turpentine* and *fennel seeds*, or the *essential oil of fennel*, are frequently substituted for a large portion of the juniper berries.

Schiedam Hollands is considered the *best;* the *next quality* is that of *Rotterdam;* after these comes that of *Weesoppe.*

Attempts have been made by Mr. Robert Moore and others, to introduce into general consumption in this country a home-made liquor, resembling, and prepared in the same manner as Foreign Geneva, "but the palates of our gin-drinkers were too corrupted to relish so pure a spirit."

HOMŒOPATHY. A medical hypothesis promulgated at the commencement of the present century by the late Dr. Hahnemann, of Leipsig, according to which, diseases may be cured by the administration of minute doses of medicines capable of producing in healthy persons affections similar to those it is intended to remove. The doctrine that "*similia similibus curantur,*" as well as the opposite one of "*antipathy,*" had long previously been practically acted on, to a limited extent, in certain cases, in legitimate medicine (*allopathy, heteropathy, &c.*), although not verbally recognized as belonging to its system. The administration of infinitesimal doses is an absurdity which homœopathy, however, alone can claim. According to this method, the *millionth of a grain* is often an excessive dose; whilst *billionths* and *decillionths*, quantities so small as to be vastly beyond human perception, form the *common* doses. This reduces the whole practice of homœopathy to a system of *doing nothing* beyond regulating the diet and habits of the patient. "All judicious practitioners have long been agreed, that there are many cases which are best treated in the manner just mentioned, and in which physic does more harm than good; in which, in short, a sensible physician endeavours to amuse the patient, whilst nature cures the disorder; so that the frequent success of homœopathic treatment may be explained, without admitting the principle upon which it is presumed to be founded." (Brande.) Surely Hahnemann must have intended his theory as a grand satire on the practice of medicine current in his day, rather than as a system of itself!

HONEY. Syn. *Mel,*—Ph. L. E. & D. The sweet substance elaborated by the domestic bee from the juices of the nectaries of flowers, and deposited in the cells of wax forming the honeycomb.

Var.—*Pure honey* consists of a syrup of uncrystallizable sugar and crystalline saccharine grains, resembling grape sugar.—*Virgin honey* is that which flows spontaneously from the comb.—*Ordinary honey*, that obtained by heat and pressure. The former is pale and fragrant; the latter darker, and possessing a less agreeable taste and smell.—*English honey* (Mel Anglicanum) is chiefly collected from furze and broom flowers, and is more waxy than that from the South of Europe;—*Narbonne honey* (Mel Narbonense), chiefly from rosemary, and other labiate flowers, very fine; —*Minorca honey* (Mel Minorcense);—*East country honey*, inferior and bad tasted; —*Poisonous honey*, found near Trebisond, in Asia, narcotic and poisonous.

Pur. Honey is frequently adulterated with treacle, potato-sugar syrup, potato farina, starch, and wheat flour. The *first* may be detected by the colour and odour; the *second*, in the way noticed under "Sugar;" and the others by the honey not forming *a nearly* clear solution with cold water, and striking a blue colour with iodine. When it contains wheat flour, and is heated, it at first liquefies, but on cooling it becomes solid and tough. "If, when dissolved in *water* by a heat approaching the 170° and cooled again, it be mixed with *iodide of potassium* and *dilute nitric acid*, it exhibits no blue colour." (Ph. L.)

Uses, &c. Honey is nutritive and laxative, but rather apt to gripe. It is employed in the preparation of oxymels and gargles, and also to cover the taste of nauseous medicines, which it does better than sugar. Clarified honey is alone ordered to be used in medicine.

HONEY (Clarified). Syn. *Refined Honey, Strained do.; Mel Depuratum,*—Ph. D. *Mel Despumatum,*—Ph. D. 1826. *Mel Præparatum, Mellitum Simplex, &c.* The honey is simply melted by the heat of a water bath, and strained whilst hot through flannel, (Ph. D.); or—it is melted as last, and the scum removed, (Ph. U. S., 1830); or—it is melted with 1-3d its weight of *water*, skimmed, strained through flannel, and evaporated until it reaches the sp. gr. 1·261, (P. Cod.)—It is not to be employed without being despumated,—(Ph. L.)

Obs. Clarified honey is less agreeable than raw honey, and has lost the crystalline character of the latter; but it is less liable to ferment and gripe. The use of copper and iron vessels or implements should be avoided, as honey acquires a dark colour by contact with them. Berlin ware, stone-ware, or well-silvered or tinned copper pans should alone be used. On the *large scale*, one or other of the following plans are adopted:—

1. The *honey* is mixed with an equal weight of *water* and allowed to boil up 5 or 6 times without skimming; it is then removed from the fire, and after being cooled, brought on several strong linen strainers, stretched horizontally, and covered with a layer of clean and well-washed sand, an inch in depth; the sand is rinsed with a little *cold water*, and the mixed liquor is finally evaporated to the thickness of syrup.

2. Dissolve the *honey* in *water*, as last, clarify with *white of egg*, and evaporate to a proper consistence.

3. Dissolve in *water*, add 1½ *lb.* of *animal charcoal* to every ¼ cwt. of honey, gently simmer for 15 minutes, add a little *chalk* to saturate excess of acid, if required, strain or clarify and evaporate.

4. *Honey*, 1 cwt.; *water*, 9 gall.; *fresh burnt animal charcoal*, 7 ℔; simmer for 15 minutes, add a little *chalk* to saturate free acid, (if required,) strain or clarify, and evaporate as before.

HONEY (Prepared). Syn. *Mel Præparatum*,—Lat. *Prep.* (Ph. U. S., 1830.) *Clarified honey*, ½ pint; *dilute spirit* (sp. gr. 0·935), 1 pint; mix, add of *prepared chalk*, ½ oz., stir occasionally for 2 hours; heat to boiling, filter, and evaporate over a water bath until the sp. gr. when cold, is 1·32. An expensive and useless preparation.

HONEYS (Medicated). Syn. *Mellita*,—Lat. This is a minor class of preparations, now almost superseded by 'Syrups' (*Syrupi*). The *Mellita* of the Ph. L., including two oxymels, are only four in number.

Honey of Borax, Mellite of do.; *Mel Boracis*,—Ph. L. E. & D. *Prep.* (Ph. L.) *Powdered borax*, 1 dr.; *clarified honey*, 1 oz.; mix. Astringent, detersive, and cooling. It is employed in aphthæ of the mouth, excessive salivation, &c. It is *incompatible* with acids, and is decomposed by compound infusion of roses, with which it is commonly ordered. The formulæ of the other Pharm. are similar.

Honey of Colchicum; Mel Colchici,—Lat. *Prep.* (Beasley.) *Dried colchicum*, 1 part; *water* (at 140°), 16 parts; infuse for 12 hours, strain, let it settle, and boil the clear liquor with *white honey*, 12 parts, to the consistence of a syrup. See *Colchicum.*

Honey of Hellebore; Mel Helleboratum,—Lat. *Prep.* (Ph. L. 1746.) *Hellebore root* (bruised), 1 ℔; *water*, 4 pints; digest for 3 days; boil, strain, add of *honey*, 2 ℔, and boil to a syrup. Cathartic; in mania.

Honey of Liquorice; Mel Glycyrrhizatum,—Lat. *Prep.* (Ph. Hamb.) *Honey* and a *strong infusion of liquorice* boiled to a proper consistence. Emollient, pectoral, and laxative.

Honey of Male Fern; Mel Filicis,—Lat. *Prep.* (Dunglison.) *Ethereal extract of male fern*, 30 gr.; *honey of roses*, 4 dr.; mix. In tape-worm. *Dose.* One-half at bed-time, followed by the remainder in the morning.

Honey (Mercurial); *Mel mercuriale*,—Lat. *Prep.* (Ph. L. 1746.) *Juice of the herb mercury* and *honey*, equal parts; boiled to a proper consistence. Detergent; applied to old ulcers.

Honey of Mercury, Mel Hydrargyri,—Lat. *Prep.* (Bell.) *Quicksilver*, 1 dr.; *honey*, 1 oz.; triturate till the globules disappear. Allard adds of *oil of cloves*, ½ dr. Properties similar to those of mercurial pill. It is chiefly used as an application to ulcers of the throat.

Honey of Roses; Mel Rosæ,—Ph. L. *Mel Rosaceum*,—Ph. L. 1746. *Mel Rosatum*,—Ph. L. 1721. *Prep.* 1. (Ph. L.) *Dried petals of the red rose* (the leaves separated), 4 oz.; *boiling water*, 16 fl. oz.; macerate for 2 hours, lightly press them in the hand, and strain; then add 8 fl. oz. more of *boiling water* to the *roses*, macerate for a short time, and again gently express the liquor; to this add *half* of the *first infusion*, and set aside the other half; next add to the mixed liquors, *honey*, 5 ℔, and evaporate in a water bath, so that the infusion which was set aside, being added, it may become of a proper consistence.

2. (Ph. E.) *Dried rose petals*, 4 oz.; *boiling water*, 2½ pints; infuse for 6 hours, and gently squeeze out the liquor; after the impurities have subsided, decant the clear, add of *honey*, 5 ℔, and evaporate, as before, to a proper consistence; removing the scum which forms. *Used* to make

astringent gargles. It must not be boiled in a copper or iron vessel, as they will spoil the colour. The last form is that commonly adopted in trade.

Honey of Squills; Mel Scillæ, — Lat. *Prep.* 1. *Thick clarified honey,* 3 *lb.; tincture of squills,* 2 *lb.;* mix.

2. (Soubeiran.) *Dried squills,* 1 oz.; *boiling water,* $\frac{3}{4}$ pint; infuse 2 hours, strain, add of *honey,* 12 oz., and evaporate to a proper consistence. Resembles oxymel of squills (nearly).

Honey of Violets; Mel Violæ, — Lat. *Prep.* From *clarified honey,* 2 parts; *expressed and depurated juice of violets,* 1 part. Resembles syrup of violets.

HONEY DEW. Syn. *Ros Mellitus,*— Lat. A sweetish matter ejected upon the leaves of plants by certain aphides.

HOOPING COUGH. See *Whooping Cough.*

HOPS. Syn. *Lupulus,*—Ph. L. *Humulus, H. Lupulus,*—Ph. E. & Ph. L., 1824. "The catkins" of "humulus lupulus" (Linn.) or common hop plant. (Ph. L.) The hop or hops of commerce are the strobiles or catkins (*lupuli strobili, l. amenta*) of the hop plant. The *yellow powder* or small lupulinic grains or glands (*lupuline, lupulina*) which are attached to the strobiles, are the portion on which their characteristic qualities chiefly depend. Of this, dried hops yield about 1-6th part of their weight, when rubbed and sifted.

In the *choice of hops,* care should be taken to select those that have large cones or strobiles, that are the most powerfully odorous, and most free from leaves, stems, scaly fragments, and sticks, and which, when rubbed between the hands, impart, in the greatest degree, a yellowish tint and glutinous feeling to the skin. The tightness with which they are packed should also be noticed; as without being *very firmly* pressed together, and *quite solid,* they soon spoil by keeping. The finest flavoured hops are those grown in East Kent, and termed the "*golden bine;*" these possess a lively golden yellow colour, and are principally employed for the finer class of ales. *Mid Kent* and *Sussex hops* are also used for ale, but have an inferior colour and flavour. "*Countrys*" and *Farnham hops* have a greenish yellow colour, and are more expensive than any other variety; they are almost exclusively used for malt liquor that it is intended to keep for a long time, as they do not impart their full flavour to the beer before it has been kept at least a year. They are chiefly employed for ale. The *best hops* are packed in sacks of fine canvass termed "*pockets,*" weighing from $1\frac{1}{4}$ cwt. to $1\frac{3}{4}$ cwt. each; and the inferior qualities, in coarse "*bags,*" of about double this size. The former are mostly purchased by the ale brewers, and the latter by the porter brewers. When hops are older than of the last season's growth, they are termed "*yearlings,*"—when of the second season's growth, "*olds,*"—and when three years, or older, "*old olds.*" See *Extracts, Tinctures, Brewing, &c.*

HORDEINE. This name was given by Proust to the peculiar starchy matter of barley meal; but according to Raspail, it is merely bran more minutely divided than that which remains in the sieve. Dr. Ure says that it is a "mixture of the starch, lignine, and husks, which constitutes barley meal." Others regard it as allied to starch, but to differ from it sufficiently to constitute a distinct substance.

HOREHOUND. Syn. *White Horehound; Marrubium Vulgare,*—Linn. This herb has long been a popular remedy in chronic pulmonary complaints, especially catarrh, and in uterine and liver affections. *Horehound tea* (thea marubii, infusum marubii) is prepared by infusing 1 *oz.* of the herb in boiling water, 1 pint, for an hour;—*syrup of horehound* (syrupus marubii) by thickening the infusion or tea with sugar;—*candied horehound* (marubium conditum) by mixing 1 pint of horehound juice, with 8 or 10 *lb.* of white sugar, boiling the mixture to a candy height, and pouring it, whilst warm, into moulds, or small paper cases, well dusted with finely-powdered lump-sugar; or by pouring it out on a dusted slab, and cutting it into squares.

HORN. For the purposes of the turner and comb-maker, those of the goat and sheep are preferred on account of their superior whiteness and transparency. For medical purposes, those of the stag (*hartshorn*) are ordered to be employed.

Horn is *dyed* with the same dyes, and in a similar manner to bones and ivory.

Horn is *softened, bent,* and *moulded* by means of heat and pressure. For these purposes boiling water, and a screw press, are commonly employed.

Horn is reduced to *plates* or *sheets,* by sawing it, and then exposing it to powerful pressure between hot iron plates; the pith having been previously removed, and its texture softened by soaking for some days in water, and subsequent boiling in that liquid.

The *surfaces* and *edges* of *pieces of horn* may be *united* or *cemented* together by softening it by the heat of boiling water, placing the parts in contact under strong pressure, and exposing the whole thus arranged to the heat of boiling water.

Horn is stained or *party-coloured* to *imitate tortoise-shell*, by a solution of *terchloride of gold*, for the RED portion; *nitrate of silver*, for the DARK BROWN and BLACK; and *nitrate of mercury* (hot), or a paste made of *red lead*, and *potash* or *quicklime*, for the BROWN. When the last is used, the horn must be heated and exposed to its action for some hours.

HORSE. The *equus caballus* (Linn.), belonging to the solipedous family of the pachydermata. (Cuvier.) Of all animals the horse is most useful to man. Independently of its value as a beast of burden and draught, its *skin*, its *hide*, *intestines*, and *bones*, furnish us with leather, the thongs of whips, catgut, grease, bone-black, manure, &c. The *excrement*, *fat*, and *hoof*, were included in the Materia Medica of the Ph. L. 1618. The *flesh* is eaten as beef in some countries, and was formerly esteemed to possess many virtues.

Injuries of a serious character, and even death, are often occasioned by horses "*running away*," or becoming unmanageable. Various methods have been proposed to prevent accidents of this kind, and to place the animal entirely under the power of its rider or driver. In Russia, around the horse's neck, near the neck strap, is placed a cord with a running knot. To this slip-noose is attached a pair of reins, which always lie thrown over the dashboards, ready to be seized at once. When the horse starts, and becomes unruly, the gentleman takes up this cord, and tightens the horse's throat, so that he cannot take breath. The most most furious horse stops instantly, and will not fall or kick.

HORSE BALLS. See *Veterinary Medicine.*

HORSE POWER. This term was employed by Mr. Watt, to express a power capable of raising 33,000 *lb.* one foot high per minute. The effective pressure on the surface of the piston was estimated at 7 *lb.* to the square inch, and hence the *area of the piston*, in square inches, multiplied by 7, gave the gross *effective moving pressure*, and the space passed over by the piston in a minute, gave the *distance* through which this pressure was exerted, or the weight was raised. From these data the horse-power was easily calculated. For—

$$\frac{\text{effective pressure on piston} \times \text{space passed over by piston}}{33{,}000} = \text{nominal horse power.}$$

In process of time, improvements in the formation of boilers and steam engines, increased the effective pressure on the piston, and, consequently, the power of the engine. In modern engines the *actual power* is commonly from 2 to 4 times greater than the *nominal power*, which is, however, still retained as the unit of power in commercial calculations. The actual power can, therefore, be only correctly ascertained by experimentally determining the amount of pressure on the piston by means of an instrument called an "Indicator." The *nominal power* may be determined as follows:—

$$\frac{(\text{diam. of cylinder, in inches})^2 \times \sqrt[3]{\text{length of stroke, in feet}}}{47} = \text{nominal horse power.}$$

HORSE-RADISH. Syn. *Armoracia*,—Ph. L. *Radix Cochlearia Armoraciæ*,—Ph. E. "The fresh root" of "*cochlearia armoracia*," Linn. (Ph. L.) Horse-radish is pungent, acrid, stimulant, and rubefacient. It is also regarded as diaphoretic, diuretic, and antiscorbutic. It forms a useful masticatory in hoarseness, sore-throat, and toothache. As a *condiment*, it provokes the appetite and assists digestion. Reduced to shreds (*scraped horse-radish*) it forms a common and excellent accompaniment to roast beef. The root of aconite or wolfsbane, which somewhat resembles it in appearance, has occasionally been mistaken for it, with fatal results; the two are, however, readily distinguished from each other, as the taste of *horse-radish* is warm and pungent, approaching that of mustard, whilst *aconite* is bitter, and its odour is earthy, and disagreeable, and after a few minutes' contact with the lips, tongue, and fauces, produces a sensation of numbness and tingling. See *Infusions*, *Spirits*, *&c.*

Horse-radish Powder is prepared from the roots gathered in November or December, and dried by a gentle heat or exposure to a current of dry air. *Used* as a condiment.

HORTICULTURE. The cultivation of a garden. The term is commonly restricted to the culture of the *kitchen garden* and *orchard.* According to Loudon, *horticul-*

ture differs from *agriculture*, chiefly in the comparatively limited space over which it extends, and in being conducted by manual labour; whilst the latter is performed jointly by human and animal labour, in fields, or in an extensive tract of land called a farm.

HORTUS SICCUS. See *Herbarium*.

HOSPITAL GANGRENE. Syn. *Phagedæna Gangrenosa*,—Lat. A species of ulcerating mortification, particularly characterised by its infectious nature, and its tendency to attack wounds and ulcers in crowded hospitals, so that often the most trifling operation cannot be performed with safety. Under its influence the parts are rapidly destroyed, not by the formation of ordinary sloughs, as in common mortification, but by their conversion into an ash-coloured viscid substance interspersed with bloody specks. The *treatment* is similar to that noticed under *Mortification*, but here, above all things, thorough ventilation must be established, and persevered in, and when possible, change of situation sought. The recent great loss of life from this affection among our brave soldiers in the East, renders it a subject of painful interest.

HOT BEDS. A cheap and excellent substitute for the glass used in the frames of hot-beds, greenhouses, &c., may be produced by applying, with a common painter's-brush, *boiled oil* or *Canadian balsam* diluted with a little *oil of turpentine*, to the surface of *white calico* previously stretched out and fastened in the position it is intended subsequently to occupy.

HUILE. (Fr.) Oil; a term applied to various substances and preparations on account of their smoothness, consistence, or real or imaginary emollient or oleaginous nature. See *Liqueurs*, *Oils*, *Perfumery*, *&c.*

HUILE ACOUSTIQUE. *Prep.* From *bullock's garlic* and *bay leaves*, of each, ½ oz.; *olive oil*, ½ ℔; boiled together for 15 minutes, and strained. *Used* in ear-ache and deafness. A little is dropped on cotton wool and placed in the ear.

HUILE ANTIQUE. See *Hair Oils*.

HUILE LIQUEUREUSE. *Prep.* 1. (*De la rose.*) From *eau de rose*, 1 part; *simple syrup*, 2 parts; mixed together.

2. (*Des Fleurs d'Oranges.*) From *orange-flower water*.

3. (*De Vanille.*) From *essence of vanilla*, 1 dr.; *simple syrup*, 1 pint.

Obs. The above are kept in small decanters, and used to flavour water, grog, liqueurs, &c., instead of sugar or capillaire; also to perfume the breath. Other flavoured syrups, for the same purposes, are prepared in a similar manner.

HUMIC ACID. See *Humus*.

HUMULINE. The narcotic principle of the hop extracted from the *lupulinic grains* by means of *rectified spirit*. It is a mixture of volatile oil, lupulite, and resin.

A beautiful *extract* or *essence of hops* lately vended under the name of HUMULINE, we find is made as follows:—

A *concentrated tincture of hops* is prepared by percolation with *rectified spirit*; the *same hops* are then exhausted with *water*; the spirit is removed from the *tincture* by careful distillation, and the upper aqueous portion is skimmed off, and added to the infusion, which latter, is then evaporated to the consistence of a soft extract; the *oleo-resinous residuum* of the *tincture* is next added, and well-mixed in; after which the whole is put into pots and carefully tied over for sale. The *product* possesses all the fragrant, tonic, and bitter qualities of the hop in a highly condensed form.

HUMUS. Syn. *Humine*. When wood, or woody fibre, is exposed to the joint action of air and moisture, it suffers eremacausis or decay, and crumbles down into a dark-brown or black powder, commonly called *mould*, and to which chemists have given the name of *humus*. In this state it exists in fertile soils, in which it is derived from the decay of plants. By the action of alkalies this new substance is converted into *humic acid*, which is soluble, and forms salts called *humates*.

HUNGER. The peculiar sensation arising from the want of food. When severe, it increases to actual pain, the coats of the stomach are acted on by its own juices, the respiration becomes less frequent, the circulation languid, and there is a general diminution of the heat of the body and of the secretions. The return of hunger is accelerated by exercise and labour, and by the exposure of the body to a low temperature. Long fasting is injurious, more particularly to the young and the debilitated. See *Appetite*, *Nutrition*, *&c.*

HUSBANDRY. The business of the farmer; by some restricted to the joint operations of farming and gardening on the small scale. It is also sometimes used synonymously with agriculture. See *Agriculture*, *Butter*, *Cheese*, *Dairy*, *&c.*

HYACINTH. Crystallized yellow or brown zircon. See *Gems* and *Zircon*.

HYDRACIDS. Acids which contain hydrogen as one of their essential elements. The substance thus acidified is termed the *radical.* Hydrogen (or water) is probably the only universal acidifier. Its presence, even in the oxygen acids (*oxyacids*), appears necessary to the development of their acid properties. Oil of vitriol itself, deprived of *all* its water, or rendered anhydrous, a condition in which it consists of sulphur and oxygen only, ceases to redden litmus, and has lost the other properties of an acid. In this state, if thrown into water, it hisses like a hot iron, from the violence with which combination occurs, and it returns to the normal condition of liquid sulphuric acid (*oil of vitriol*).

HYDRAGOGUES. Syn. *Hydragoga*,—Lat. Medicines which cause the removal of water from any of the cavities of the body. Many cathartics, as *gamboge, jalap, &c.*, are classed under this head.

HYDRARGYRO - CHLORIDES. Syn. *Hydrargo-Chlorids.* Salts in which bichloride of mercury plays the part of an acid. The only one that has been applied to any useful purpose, is the *hydrargyro-chloride of ammonia*, or the *sal alembroth* of pharmacy. *White precipitate* may also, perhaps, belong to this class. Similar salts have been formed with the chlorides of other metals, to which the names *auro-chlorides, cupro-chlorides, ferro-chlorides, cobalto-chlorides,&c.,&c.*,have been applied.

HYDRARSINE. An ethereal volatile substance, having an intolerably fetid odour, formed by the action of air on *alkarsine.*

HYDRATES. Compounds containing water in a state of chemical combination and in definite proportion. Thus, slaked lime is a *hydrate of lime;* caustic potassa, a *hydrate of potassa;* and oil of vitriol, a *hydrate of sulphuric acid.* The term *hydrated* is used as an adjective, in the same sense as hydrate is as a substantive. The *latter* is, however, for the sake of euphony, usually applied to simple names, as *hydrate of lime, hydrate of potassa, &c.;* and the *former*, to compound names, as *hydrated acetic acid, hydrated oxide of iron, &c.* Many instances of the use of these terms will be found in this work.

HYDRAULIC. See *Cements, Expression, Press, &c.*

HYDRIDE. See *Hydruret.*

HYDRIODATE. Syn. *Hydriodas,*—Lat. A compound formed of hydriodic acid with a base. The *hydriodates* are easily made by saturating the *acid* with the *oxides* or *hydrates* of the bases; or, more economically, by acting on the bases in water, with iodine. When deprived of their water they are true *iodides.* See *Hydriodic Acid, &c.*

HYDRIODIC ACID. Syn. *Acidum Hydriodicum,*—Lat. An acid compound of iodine and hydrogen.

Prep. 1. (*Gaseous.*)—*a.* Into a glass tube, closed at one end, introduce a little *iodine*, then a small quantity of *roughly-powdered glass moistened with water*, next a few small fragments of *phosphorus*, and upon this some more *glass;* this order (iodine, glass, phosphorus, glass) is to be repeated until the tube is one half or two thirds filled; a cork and narrow tube are then to be fitted in, a gentle heat applied, and the gas collected over mercury, or passed into *water*, when *liquid hydriodic acid* will be obtained.

b. Pour a little *water* over some *periodide of phosphorus*, previously put into a small glass retort, apply a gentle heat, and collect the gas, as before.

c. (F. d'Arcet.) Evaporate *hypophosphoric acid* until it begins to yield phosphoretted hydrogen, then mix it with an equal weight of *iodine* placed in a retort, and apply a gentle heat, as before.

d. (Dr. Glover.) Place *pure iodide of barium* in a retort, and decompose it with *sulphuric acid.* All the above are chemically pure.

2. (*Liquid.*)—*a. Iodine*, in fine powder, is suspended in water, and a stream of *washed sulphuretted hydrogen* passed through the mixture as long as sulphur is deposited, or until it becomes colourless; the liquid is then gently heated to expel the excess of sulphuretted hyrogen, and either decanted or filtered. A cheap and excellent process.

b. (*Medicinal Hydriodic Acid,* — Dr. Buchanan.) *Tartaric acid,* 264 gr.; *pure iodide of potassium,* 330 gr.; dissolve each separately in *water*, 1½ fl. oz., mix the solutions, and when settled, decant the clear liquid and add *water*, q. s. to make it up to 6¼ fl. oz. The liquid retains a little bitartrate of potassa in solution, but this does not interfere with its medicinal properties. *Dose.* ½ to 1 fl. dr., gradually increased to 2 or 3 fl. dr., twice or thrice daily.

Prop., &c. Gaseous hydriodic acid, is colourless, fumes in the air, is very soluble in water, and has a density about 4·4. Liquid hydriodic acid, when strong, is very liable to change, and should be kept in well-stoppered bottles. The latter "possesses all the therapeutical powers of iodine, without its irritating properties." (Pereira.)

HYDROBENZAMIDE. *Prep.* (Laurent.) *Hydruret of benzoyle* (pure oil of bitter almonds) is digested with 20 times its volume of *concentrated liquor of ammonia,* in a stoppered bottle for 10 or 12 hours, at a temperature of about 120° Fahr.; the resulting crystalline mass is washed with *cold ether*, and dissolved in *alcohol;* the alcoholic solution, by spontaneous evaporation, yields colourless crystals of *hydrobenzamide.*

Prop., &c. Freely soluble in alcohol; insoluble in water; decomposed by heat; by boiling, or by the addition of hydrochloric acid, the solution is resolved into ammonia and hydruret of benzoyle. Hydrobenzamide is chiefly interesting on account of the number of *derivatives* it furnishes when submitted to the action of chemical processes; amongst which *amarine* or *benzoline* is, perhaps, the most important.

HYDROBROMATE. Syn. *Hydrobromas,*—Lat. A salt of hydrobromic acid. In the dry state, they are *bromides.*

HYDROBROMIC ACID. Syn. *Acidum Hydrobromicum,*—Lat. An acid compound of hydrogen and bromine. It is prepared from *bromide of phosphorus, bromide of barium, &c.*, by similar processes to those adopted for *hydriodic acid.* The evolved gas is either collected in dry glass bottles, in the manner directed for chlorine, or over mercury, in the pneumatic trough. When passed into *water* it forms *liquid hydrobromic acid.* Under the first form (*gaseous hydrobromic acid*) it is a colourless, acidulous, and pungent gas; dissolved in water, it forms a limpid and colourless liquid. In both conditions it closely resembles the corresponding compounds of iodine and chlorine. Its salts are the *hydrobromates* or *metallic bromides.* These are formed in a precisely similar manner to the hydriodates and iodides.

HYDROCARBONS. Compounds of carbon and hydrogen. Under the fanciful name of *Carbo-hydrogen,* oil of turpentine or camphine has been lately vended at a price much higher than could possibly be obtained for it, under its common appellation. Dutch liquid is often called *chloride of hydrocarbon.* See *Hydrocarburets* and *Olefiant Gas.*

HYDROCARBURETS. Syn. *Hydrocarbons, Carbo-hydrogens.* Compounds of hydrogen and carbon. The principal of these are—1. *Light carburetted hydrogen,* or the fire-damp of miners, consisting of two equivalents of hydrogen, and one equiv. of carbon; burns with a pale blue flame. —2. *Olefiant gas,* consisting of two equiv. of hydrogen and two equiv. of carbon; burns with a very white and luminous flame.—3. *Light gas* or *coal gas,* consisting of a mixture of the preceding in no definite proportions.—4. *Quadricarburetted hydrogen, quadrihydrocarbon,* or *etherine,* consisting of 4 equiv. each of carbon and hydrogen; it is produced during the destructive distillation of oil, and burns with a dull fuliginous flame.—5. *Bicarburetted hydrogen,* also obtained by the destructive distillation of oil, and consisting of 3 equiv. of hydrogen and 6 equiv. of carbon. See *Hydrogen.*

HYDROCELE. A collection of water or serous fluid between the membranes of the scrotum, or the coats of the testicle and its vessels. Its *treatment* belongs to *pure surgery.*

HYDROCEPHALUS. Syn. *Dropsy of the brain, Dropsy of the head.* There are several forms of this disease noticed by nosologists,—*internal, external, acute, chronic, &c.* The *acute* form of hydrocephalus is almost limited to childhood. The *symptoms* are those of fever; there is pain in the head, accompanied with a sensation of heaviness, and in very young children, there is often actual enlargement. The eyes are irregularly directed, and only partially closed in sleep, and the pupil is more or less dilated. Delirium, coma, convulsions, and paralysis, commonly follow. The *treatment* recommended is bleeding from the temporal artery or jugular vein, cold applications to the head, brisk purgatives (*calomel* combined with *scammony* or *jalap*), a liberal supply of nutriment, and exercise in a pure atmosphere. The bleeding can only be performed by a surgeon, but the other part of the treatment may be safely had recourse to by emigrants and others in the absence of medical assistance.

HYDROCHLORATE. Syn. *Muriate, Chlorhydrate; Hydrochloras, Murias,*—Lat. A salt of hydrochloric acid. See *Chloride* and *below.*

HYDROCHLORIC ACID. Syn. *Chloride of Hydrogen, Chlorhydric Acid, Muriatic do.; Acidum Hydrochloricum,*—Ph. L. & D. *A. Muriaticum,*—Ph. E., & Ph. L. 1824. *Spirit of salt, spiritus salis,*—Ph. L. 1746. *Marine Acid, Acid of Salt, &c.,*—Obs. An acid compound of chlorine and hydrogen, long known in the state of solution, under the name of marine acid or spirit of salt; but first obtained in the pure or gaseous form by Priestly, in 1772.

Prep. 1. (Ph. L. 1836.) *Sulphuric acid,* 20 oz.; *water,* 12 fl. oz.; mix in a retort, and when cold, add of *dried chloride of sodium,* 2℔., and gradually distil in a sand-bath into a receiver containing *water,* 12 fl. oz. Sp. gr. 1·160. In the *present Ph. L.* this acid is included in the Materia Medica, the same strength being ordered as before.

2. (*A. M. Purum,*—Ph. E.) *Dried purified chloride of sodium* and *pure sulphuric acid,* of each, 3 parts; *water,* 1 part; mix as last, and distil with a gentle heat into a well-cooled receiver containing, *water,* 2 parts, as long as any liquid passes over. Sp. gr. 1·170. Nearly pure.

3. (Ph. D.) Sp. gr., 1·160.

4. (Gregory.) *Pure dried chloride of sodium,* 3 parts; and *pure sulphuric acid,* 5 parts, diluted with *water,* q. s. to reduce the sp. gr. to 1·6 (about 2 parts); are mixed in an alembic furnished with a double-bent tube, the end of which is plunged about ⅓rd of an inch beneath the surface of the *distilled water* in the receiver (about 3 parts), the latter being surrounded by ice or ice-cold water; a *gentle* heat is now applied and continued as long as any gas comes over. In about 2 hours the process is finished, and the water in the receiver has increased 2-3ds in volume, and has the sp. gr. 1·14 to 1·15. By dividing the water between two receivers, connected together, that in the *first* one will be a fuming acid sp. gr. 1·21; that in the last one, about sp. gr. 1·12.

5. (Winckler.) *Dry* and *pure chloride of sodium,* 24 parts; *pure oil of vitriol,* 44 parts, diluted with *water,* 7 parts, and allowed to cool; mix in a large retort, connect it by a rectangular bent glass tube, at least 3 feet long, with a capacious receiver, containing *distilled water* 20 parts, well cooled, and distil over 44 oz., by weght, of acid of 30%, or sp. gr., 1·14.

6. (*Gaseous.*) This is obtained as above, or by gently heating the *liquid acid* and collecting the evolved gas over mercury.

Prop. Pure hydrochloric acid is a colourless invisible gas, having a pungent odour and an acid taste, and fuming on coming into contact with air. It is irrespirable and uninflammable. Its sp. gr. is 1·2695 (Berzelius.) Under a pressure of 40 atmospheres it is liquid. Water at 40° Fahr. absorbs 480 times its volume of this gas, and acquires the sp. gr. 1·2109 (Davy.) and the volume is increased from 100 to 142. (Ure.) In this state the liquid contains about 42% of real acid. One cubic inch of water at 69° Fahr. absorbs 418 cubic inches, and the sp. gr. becomes 1·1958. (Thomson.)

Pure *liquid hydrochloric acid* is colourless, fumes in the air, evolves a strong odour of hydrochloric acid gas, is intensely sour, reddens vegetable blues, and erodes organic substances. It is entirely separated by heat from the water that holds it in solution. It dissolves many of the metals with the evolution of hydrogen gas; it also dissolves metallic oxides, and the majority of the bases, their hydrates, and carbonates; in each case forming the compounds termed *chlorides, muriates, chlorohydrates,* or *hydrochlorates.* The acid of the London Pharmacopœia consists of 32·32% of real hydrochloric acid, and 67·68% of water. The *hydrochloric acid* of *commerce* has generally a straw yellow colour, and a sp. gr. ranging between 1·16 and 1·17, and is generally very impure.

Pur. Pure hydrochloric acid is "free from colour. Exposed to the air, it evolves white and extremely acrid vapours. It is *entirely* dissipated by heat. Diluted with distilled water, no precipitate is formed on the addition of chloride of barium, ammonia, or sesquicarbonate of ammonia. It has no action on gold leaf, even when this is boiled in it, nor does any precipitate fall if protochloride of tin be afterwards added. It does not decolour a solution of sulphate of indigo. Sp. gr., 1·16. 100 gr. are saturated by 132 gr. of crystallized carbonate of soda." (Ph. L.) Sulphuretted transmitted through it, does not produce a yellow or brown colour.

Commercial hydrochloric acid generally contains iron and sulphuric acid, and frequently, chlorine, nitrous acid, bromine, and sometimes, selenious acid. The *first* may be detected by the precipitate it forms when the acid is supersaturated by ammonia,—the *second,* by giving a white precipitate with chloride of calcium or of barium, or with the nitrate of lime or baryta,—the *third, fourth,* and *fifth,* by the power the acid possesses of dissolving gold leaf, and decolouring solution of indigo,—and the *last,* by the acid depositing a reddish powder (*selenium*) when long kept.

Uses. Hydrochloric acid is used for various purposes in the arts, in chemistry, and in medicine. It is refrigerant, tonic, and antiseptic, in small doses diluted with water; but corrosive and poisonous in larger doses, and when undiluted. *Dose.* 10 to 20 drops, in a sufficient quantity of any bland diluent; in stomach complaints, typhus fever, syphilitic affections, worms, scrofula, &c. It is also used in gargles and lotions.

Ant. Chalk, whiting, magnesia, or carbonate of soda, mixed with water; or milk, white of eggs, and demulcents of any kind. See *Acids.*

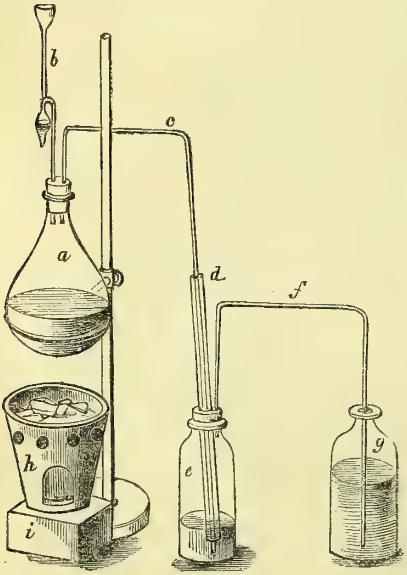
Tests. The *liquid acid* is detected by—1. Its volatility;—2. By giving white fumes when a glass rod dipped in liquor of ammonia is held near it;—3. By giving with nitrate of silver a white cloudy precipitate, which is insoluble in nitric acid, freely soluble in liquor of ammonia, and blackened by exposure to the light.—4. The *hydrochlorates* or *chlorides* are detected in a similar manner. See *Chloride.*

Estim. The strength of liquid hydrochloric acid is usually estimated from its specific gravity; but it may be more correctly ascertained by the power it possesses of saturating the bases. "In general a good approximation may be found to the per centage of real muriatic acid in any liquid sample, by multiplying the decimal figures of the sp. gr. by 200." (Ure.) See *Acidimetry* and the following *Table:*—

Table *of Hydrochloric Acid.* By Dr. Ure.

Acid of 1·20 in 100.	Specific gravity.	Chlorine.	Hydrochloric Acid Gas.	Acid of 1·20 in 100.	Specific gravity.	Chlorine.	Hydrochloric Acid Gas.
100	1·2000	39·675	40·777	50	1·1000	19·837	20·388
99	1·1982	39·278	40·369	49	1·0980	19·440	19·980
98	1·1964	38·882	39·961	48	1·0960	19·044	19·572
97	1·1946	38·485	39·554	47	1·0939	18·647	19·165
96	1·1928	38·089	39·146	46	1·0919	18·250	18·757
95	1·1910	37·692	38·738	45	1·0899	17·854	18·349
94	1·1893	37·296	38·330	44	1·0879	17·457	17·941
93	1·1875	36·900	37·923	43	1·0859	17·060	17·534
92	1·1857	36·503	37·516	42	1·0838	16·664	17·126
91	1·1846	36·107	37·108	41	1·0818	16·267	16·718
90	1·1822	35·707	36·700	40	1·0798	15·870	16·310
89	1·1802	35·310	36·292	39	1·0778	15·474	15·902
88	1·1782	34·913	35·884	38	1·0758	15·077	15·494
87	1·1762	34·517	35·476	37	1·0738	14·680	15·087
86	1·1741	34·121	35·068	36	1·0718	14·284	14·679
85	1·1721	33·724	34·660	35	1·0697	13·887	14·271
84	1·1701	33·328	34·252	34	1·0677	13·490	13·863
83	1·1681	32·931	33·845	33	1·0657	13·094	13·456
82	1·1661	32·535	33·437	32	1·0637	12·697	13·049
81	1·1641	32·136	33·029	31	1·0617	12·300	12·641
80	1·1620	31·746	32·621	30	1·0597	11·903	12·233
79	1·1599	31·343	32·213	29	1·0577	11·506	11·825
78	1·1578	30·946	31·805	28	1·0557	11·109	11·418
77	1·1557	30·550	31·398	27	1·0537	10·712	11·010
76	1·1536	30·153	30·990	26	1·0517	10·316	10·602
75	1·1515	29·757	30·582	25	1·0497	9·919	10·194
74	1·1494	29·361	30·174	24	1·0477	9·522	9·786
73	1·1473	28·964	29·767	23	1·0457	9·125	9·379
72	1·1452	28·567	29·359	22	1·0437	8·729	8·971
71	1·1431	28·171	28·951	21	1·0417	8·332	8·563
70	1·1410	27·772	28·544	20	1·0397	7·935	8·155
69	1·1389	27·376	28.136	19	1·0377	7·538	7·747
68	1·1369	26·979	27·728	18	1·0357	7·141	7·340
67	1·1349	26·583	27·321	17	1·0337	6·745	6·932
66	1·1328	26·186	26·913	16	1·0318	6·348	6·524
65	1·1308	25·789	26·505	15	1·0298	5·951	6·116
64	1·1287	25·392	26·098	14	1·0279	5·554	5·709
63	1·1267	24·996	25·690	13	1·0259	5·158	5·301
62	1·1247	24·599	25·282	12	1·0239	4·762	4·893
61	1·1226	24·202	24·874	11	1·0220	4·365	4.486
60	1·1206	23·805	24·466	10	1·0200	3·968	4·078
59	1·1185	23·408	24·058	9	1·0180	3·571	3·670
58	1·1164	23·012	23·650	8	1·0160	3·174	3·262
57	1·1143	22·615	23·242	7	1·0140	2·778	2·854
56	1·1123	22·218	22·834	6	1·0120	2·381	2·447
55	1·1102	21·822	22·426	5	1·0100	1·984	2·039
54	1·1082	21·425	22·019	4	1·0080	1·588	1·631
53	1·1061	21·028	21·611	3	1·0060	1·191	1·224
52	1·1041	20·632	21·203	2	1·0040	0·795	0·816
51	1·1020	20·235	20·796	1	1·0020	0·397	0·408

Concluding Remarks. The hydrochloric acid of commerce is now chiefly obtained from the manufacturers of carbonate of soda, who procure it as a secondary product. For chemical and pharmaceutical purposes, this can only be used after purification. When hydrochloric acid is directly prepared from sea-salt, an iron or stoneware boiler, set in brickwork over an open fire, furnished with a stone-ware head, and connected with a series of capacious double-necked stone-ware bottles, usually constitutes the distillatory and condensing apparatus. The arrangement resembles that employed in the preparation of liquor of ammonia (see *page* 61). For this, and similar operations, on the *small scale*, the little apparatus, figured in the *engraving*, and which is recommended by Mr. Fownes, will be found to answer admirably.



The simple wash-bottle (*e*) there shown will be found an exceedingly useful contrivance in a great number of chemical operations. It serves in the present, and in many similar cases, to retain any liquid or solid matter mechanically carried over with the gas, and it may be always employed when gas of any kind is to be passed through water or a chemical solution. The open tube (*d*) dipping into the liquid prevents the possibility of absorption, by which a partial vacuum would be occasioned, and the liquid of the second vessel lost by being driven into the first. The formula of the Ph. L. 1836 is defective in ordering too little acid, by which means the product becomes contaminated with a portion of sulphuric acid, and the residuum of the process is rendered so hard and insoluble as to prevent its removal from the retort by ordinary means. It is, therefore, better to use a larger quantity of acid than is there ordered. The products of the other formulæ are pure liquid hydrochloric acid, provided the materials employed are quite free from foreign admixture. The *commercial acid* may be *purified* by diluting it with an equal weight of *water*, gently heating it in a retort, connected with a Liebig's condenser, and receiving the evolved gas into a fresh quantity of pure water. *Iodine* and *arsenic* may be removed by agitating it for a few minutes with some small pieces of bright copper foil, previously to rectification. *Nitrous, nitric, sulphurous,* and *sulphuric acid,* may be removed by a like agitation with a few grains of peroxide of manganese or red lead, in fine powder, and redistilling it as before; observing to reject the first portions that come over, as long as they discolour a weak solution of sulphate of indigo. Ordinary commercial hydrochloric acid may now be bought for less than 0¾*d.* per *lb.*, in quantity.

HYDROCHLORIC ACID (Dilute). Syn. *Acidum Hydrochloricum Dilutum, A. Muriaticum D.,*—Lat. *Prep.* 1. (Ph. L.) *Hydrochloric acid* (Ph. L.), 5 fl. oz. (or, 1 vol.); *distilled water,* 15 fl. oz. (or, 3 vol.); mix. Sp. gr. 1·043. "1 fl. oz. is saturated by 168 gr. of the crystals of carbonate of soda."

2. (Ph. E.) 1 measure of *acid* (Ph. E.) to 3 of *water.* Sp. gr. 1·050.

3. (Ph. D.) 4 measures of *acid* (Ph. D.) to 13 of *water.*

4. (*Henry's.*) Sp. gr. 1·074.

Obs. The first three of the above are used in dispensing. *Dose.* 30 to 60 drops in simple infusion of roses or water. The last is used in assaying mineral waters, &c.

HYDROCHLORIC ETHER. See *Ethers.*

HYDROCOBALTOCYANIC ACID. *Prep.* Pass *sulphuretted hydrogen* through a solution of *cobaltocyanide of lead,* separate the lead by filtration, and evaporate the solution so that crystals may form.

Prop., &c. White, fibrous, acidulous, deliquescent crystals, soluble in water. With the metals it forms compounds termed *cobaltocyanides.* The *cobaltocyanide of potassium* is made by dissolving, by a gentle heat, the pure carbonate or protoxide of cobalt, in a solution of caustic potassa which has been treated with an excess of hydrocyanic acid, and evaporating the solution. It forms soluble, reddish-yellow crystals which are rendered colourless, or only slightly yellow, by recrystallization. The *cobaltocyanide of lead* is made by treating a solution of acetate of lead with cobaltocyanide of potassium, and adding ammonia, when a white granular precipitate of the salt is formed. *Cobalto cyanide of silver* is prepared by mixing a solution of nitrate of silver with another of cobaltocyanide of potassium; a white granular precipitate subsides. In a similar way several other *cobaltocyanides* may be formed. See *Cobaltocyanogen.*

HYDROCYANATE. Syn. *Hydrocyanas,*—Lat. See *Hydrocyanic Acid.*

HYDROCYANIC ACID. Syn. *Cyanide of Hydrogen, Prussic Acid; Acidum Hydrocyanicum, A. Prussicum, A. Borussicum,*—Lat. This remarkable compound was discovered by Scheele, in 1782; but it was not until 1815 that Gay-Lussac obtained it in a pure anhydrous form, and demonstrated its composition.

Prep. 1. (Gay-Lussac.) *Bicyanide of mercury* (in powder), 3 parts; and *fuming hydrochloric acid,* 2 parts; are mixed in a small tubulated retort, to which is adapted a long tube bent to a right angle at one of its extremities, and containing in its horizontal part some fragments of *carbonate of lime,* succeeded by others of *chloride of calcium;* the free end of the tube is then introduced into a long narrow phial, or, what is better, a test tube, surrounded with *ice-and-salt,* and a gentle heat is applied; the liquid which collects in the receiver is poured into a bottle furnished with a good stopper, which is then covered with black or purple paper, and kept in the *dark,* inverted.

2. (Liebig.) *Pure crystallized ferrocyanide of potassium,* 15 parts; *water* and *sulphuric acid,* of each, 9 parts; are distilled in a glass retort connected with a *well-cooled* receiver containing *chloride of calcium* (in coarse fragments), 5 parts; and the process is stopped as soon as the chloride in the receiver is *perfectly covered* by the distilled fluid; the acid is then decanted into a well-stoppered bottle, as before.

3. (Vauquelin.) *Sulphuretted hydrogen* rendered *perfectly dry* in the usual manner, is passed over *cyanide* or *bicyanide* of *mercury,* in powder, contained in a horizontal glass tube, gently heated, and afterwards over *carbonate of lead* and *fragments of chloride of calcium,* arranged in the manner described above. (See No. 1.) The process should be stopped before *quite* the whole of the bicyanide is decomposed. The *products* of the above formulæ are *pure anhydrous hydrocyanic acid,* provided the instructions are carefully carried out.

Prop., &c. A thin, colourless, and exceedingly volatile liquid, possessing a very powerful odour greatly resembling that of peach kernels or oil of bitter almonds; it boils at 79°, and solidifies 0° Fahr.; sp. gr., 0·7058 at 45°. It possesses a feeble acid reaction, and mixes with water and alcohol in all proportions without suffering decomposition. Mixed with strong hydrochloric acid, the whole solidifies to a crystalline paste of *sal ammoniac* and *hydrated formic acid.* The other strong mineral acids operate a like change. In its anhydrous form this acid can seldom be preserved many days; light facilitates this change. It gradually darkens, and eventually deposits a black substance, and the residual liquor is found to have lost all the characteristic properties of prussic acid.

Pure anhydrous prussic acid is one of the most deadly poisons known. Whether swallowed, or applied to the surface of the body, it produces death so rapidly as to preclude the possibility of antidotes being administered. Even its vapour has a like effect. (See *below.*)

HYDROCYANIC ACID. (Dilute). Syn. *Medicinal Hydrocyanic Acid, M. Prussic do.; Acidum Hydrocyanicum Dilutum,*—Ph. L. & D. *A. Hydrocyanicum,*—Ph. E. *A. Prussicum,*—Ph. D. 1826. *Prep.* 1. (Ph. L.) *Sulphuric acid,* 7 fl. dr.; *water,* 4 fl. oz.; mix, pour the liquid into a retort, and when it has become cold, add of *ferrocyanide of potassium,* 2 oz., previously dissolved in *water,* ½ pint; next adapt the retort to a well-cooled receiver containing *distilled water,* 8 fl. oz.; then apply a gentle heat by means of a sand-bath, and let 6 fl. oz. of acid distil over into the water in the receiver; lastly, add of *distilled water,* 6 fl. oz. more, or q. s., so that 12·59 gr. of nitrate of silver dissolved in distilled water, may be *accurately* saturated by 100 gr. of the newly-prepared acid. It contains 2% of real hydrocyanic acid.

2. (Ph. E.) *Ferrocyanide of potassium,* 3 oz.; dissolved in *distilled water,* 11 fl. oz.; *sulphuric acid,* 2 fl. oz.; diluted with *water,* 5 fl. oz., and allowed to cool; distil over 14 fl. oz., by the heat of a sand-bath or naked gas-flame, and dilute the product with *water,* q. s. to make it exactly measure 16 fl. oz. It contains 3·3% of real acid (Christison;—3·98%,—Pereira.)

3. (Ph. D.) *Ferrocyanide of potassium,* 2 *oz.; oil of vitriol,* 1 fl. oz.; *water,*

12 fl. oz.; proceed as last, and let 8 *fl. oz.* distil over; lastly, add to the liquor in the receiver, *distilled water,* 8 fl. oz., or q. s. to make it up to exactly 16 *fl. oz.* Sp. gr., 0·997. It contains 2½% of real acid.

4. (Apothecaries' Hall.) *Bicyanide of mercury,* 1 part; *hydrochloric acid,* (sp. gr., 1·15), 1 part; diluted with *water,* 6 parts; the mixture is submitted to distillation until 6 parts have passed over, which are reduced to the standard strength (Ph. L.) with *distilled water.*

5. (Dr. Clark.) *Tartaric acid,* 1 part; *water,* 40 parts; dissolve, add of *pure cyanide of potassium,* 2⅔ parts; agitate, and after repose decant the clear portion. Contains 3% of pure acid and a little bitartrate.

6. (Everitt.) *Cyanide of silver,* 40 gr.; *distilled water,* 7 fl. dr. and 20 minims; *dilute hydrochloric acid* (sp. gr., 1·129), 40 minims; agitate together, and decant the clear into another phial. Contains 2% of pure acid. An ounce of pure medicinal acid (Ph. L.) may be thus obtained for less than a shilling. (Everitt.)

7. (Laming.) *Cyanide of potassium,* 22 gr.; *water,* 6 fl. dr.; dissolve, add of *crystallized tartaric acid,* 50 gr., dissolved in *rectified spirit,* 3 fl. dr.; shake well together, and decant the clear. Each fl. dr. contains 1 gr. of the *pure acid,* or barely 2%. An excellent process when pure cyanide of potassium is at hand.

8. (Magendie.) *Pure anhydrous acid,* 1 fl. oz.; *water,* 6 fl. oz.; (or 1 to 8½ by weight.) Contains 12% of pure acid. It is 6 times as strong as that of the Ph. L.

9. (Scheele.) *Prussian blue* (pure and in fine powder), 10 parts; *red oxide of mercury,* 5 parts; *water,* 30 parts; boil the mixture in a glass vessel until the blue colour has disappeared or turned green, then decant or filter, and wash the solid residuum with *hot water,* 10 parts; to the mixed liquors, add of *iron filings,* 3 parts; *strongest oil of vitriol,* 1 part; agitate well together, and decant the clear liquid from the quicksilver which separates and collects at the bottom of the vessel; lastly, pour the liquid into a retort, and distil over 1-4th part of it for use. The *strength* of the *product* is uncertain, and varies from 3 to 5%. An acid of 4% is now generally sold under the name of "*Hydrocyanic Acid, Scheele's strength.*"

10. (Dr. R. D. Thomson.) *Dilute sulphuric acid* (Ph. L.), 2 fl. dr.; *distilled water,* 6 fl. dr.; mix, and add of *pure cyanide of lead,* 43½ gr.; agitate well, and decant the clear. Contains 2% of pure acid.

11. (Winckler.) *Ferrocyanide of potassium* (pure cryst., in powder), 120 gr.; *solution of pure phosphoric acid* (sp. gr. 1·25), 240 gr.; *alcohol* of 80%, 480 gr.; mix in a retort connected with a receiver containing of rectified spirit, 120 gr.; infuse for 24 hours, with occasional agitation, and then distil over the liquid portion, adding to the distillate, *alcohol,* q. s. to make it up to exactly 1½ oz. Contains 2% of pure acid.

12. (*Foreign Ph.*) Ph. Austr., Baden, Boruss., Hamb., and U. S., as the Ph. L. (nearly); P. Cod., resembles Magendie's, or from 10½ to 12%.

Prop. Medicinal hydrocyanic acid is a colourless, transparent liquid, tasting and smelling of peach kernels or bitter almonds. It is powerfully poisonous, although less intensely so, and less rapid in its action than the stronger acid. Its salts are the *hydrocyanates* and *metallic cyanides.*

Pur. It is "free from colour; by heat it (entirely) escapes in vapour, exhaling a peculiar odour. It turns litmus of a *slight fugitive* red colour. It does not redden on the addition of the iodocyanide of potassium and mercury. Sulphuretted hydrogen does not discolour it. Chloride of barium being added to it, nothing is thrown down." (Ph. L.) "The precipitate" (produced by nitrate of silver) "*entirely* disappears in boiling nitric acid." (Ph. E.)

Tests.—1. It is distinguished by a strong odour of bitter almonds.—2. Neutralized by potassa, and tested with a solution of sulphate or tincture of sesquichloride of iron, it gives a blue precipitate, or one turning blue on the addition of dilute sulphuric or hydrochloric acid. This test may be most successfully applied as follows:—Spread a single drop of solution of potassa over the bottom of a white saucer or porcelain capsule, and invert it over another vessel of the same size containing the matter under examination. After 2 to 5 minutes remove the upper capsule, and add to the potassa on it, a single drop of a solution of sulphate or tincture of iron, and expose it to the air for a few seconds. Next add one or two drops of dilute sulphuric acid, when a blue colour will be developed if hydrocyanic acid is present.—3. Nitrate of silver gives a white clotty precipitate soluble in boiling nitric acid, and which when dried, and heated in a small glass tube, evolves fumes known to be cyanogen, by burning with a violet, or bluish-coloured flame. A watch-glass moistened with this test, and inverted over hydrocyanic acid, as in No. 3, speedily becomes opaque and white from the formation of cyanide of silver.—4. A drop or two of *yellow* hydrosulphuret of ammonia is spread on the concave surface of a watch-glass or porcelain capsule, which is then inverted over the vessel containing the suspected matter, as in No. 1; after a few minutes the capsule is removed, and any undecomposed hydrosulphuret evaporated by the application of a *very gentle* heat; a glass rod dipped in a solution of a persalt or sesquisalt of iron is now drawn over the glass, when blood-red streaks of sulphocyanide of iron are formed, if the smallest quantity of hydrocyanic acid has been present; or, if the quantity is considerable, a blood red solution is obtained by placing a drop or two of the iron solution on the glass. If the addition of the iron produces a black colour, the evaporation has been carried hardly far enough. This test originated with Liebig, and is the most delicate yet discovered.—5. Supersaturated with potassa, it gives a greenish blue precipitate with sulphate of copper, which is turned white by the cautious addition of hydrochloric acid.—6. Tincture of guaiacum gives a white precipitate, and when a few drops of a solution of sulphate of copper are added, a blue colour is produced, which is heightened by adding alcohol. (Pagenstecher.)—7. An excess of potassa being added, and, subsequently, red oxide of mercury, the latter dissolves as readily as it would in free hydrocyanic acid, if this acid is present. This is regarded as a test of a most conclusive character.

The above tests apply equally to liquids containing free hydrocyanic acid and the *alkaline cyanides;* but they fail to detect the presence of cyanogen in *cyanide of mercury.* For this purpose the solution is mixed with a little hydrochloric acid and clean iron filings or wire, when metallic mercury separates, and hydrocyanic acid and chloride of iron remain in solution; potassa being now added, and subsequently hydrochloric acid in excess, Prussian blue, recognized by its colour, is at once formed. Or, the solution of cyanide of mercury may be decomposed by sulphuretted hydrogen, and then tested as liquid hydrocyanic acid. Or, like the cyanide of silver, it may be recognized by the colour of its flame. (See No. 3.) Most of the *cyanides of the heavy metals* are decomposed by sulphuretted hydrogen, and by dilute hydrochloric acid, a solution of hydrocyanic acid being formed, which may then be tested in the way already indicated. In cases of poisoning, in which the above tests cannot be applied, the contents of the stomach, or other organic mixture, may be introduced along with a little *sulphuric* or *hydrochloric acid* into a retort, and distilled, and the reagents applied to the distilled liquor.

Estim. The following are the most convenient and reliable of the *cyanogen-metrical processes* now in use:—

1. The liquid acid, diluted with water, if concentrated, is treated with a solution of nitrate of silver as long as a precipitate forms; the latter (*cyanide of silver*) is carefully collected, washed, dried, and weighed. This weight divided by 5, gives the *per centage* of *pure hydrocyanic acid* present, provided 100 gr. have been examined, and the sample is free from hydrochloric acid. The absence of the latter is determined by digesting the weighed precipitate in a concentrated solution of nitrate of silver, or in boiling nitric acid. It should *wholly* dissolve. If any portion remains undissolved, it must be carefully collected, washed, dried, and weighed. In this case the loss in weight gives the quantity of cyanide of silver, which must be divided by 5, as before. The result is the true richness of the sample in pure hydrocyanic acid.

2. (MM. Fordos & Gélis.) This process is founded upon the reaction of iodine upon the cyanides, which consists in the absorption of iodine up to the point of saturation, beyond which the presence of *free iodine* becomes apparent. A *test solution of iodine* (3 gr. to 1 fl. oz.) is gradually added from a pourette to a weighed sample of the *dilute acid,* until a permanent yellow tinge becomes visible, when the *quantity of test liquor consumed,* indicates the strength of the acid examined, (equiv. for equiv.)

3. (Liebig.) *Fused nitrate of silver,* 63 gr., are dissolved in *distilled water,* 5937 gr.; by which a test liquor of 6000 grains is obtained, of which every 300 gr. correspond to 1 gr. of *hydrocyanic acid.* The weight of the bottle containing this silver solution is then accurately taken and noted. A weighed portion of the medicinal hydrocyanic acid under examination is next diluted with three or four times its bulk of *water,* and then mixed with a *solution of caustic potassa* and a few drops of a *solution of common salt.* To this mixture the *silver test solution* is gradually added until a visible turbidity is produced, which does *not* disappear on agitation. The test solution is then again weighed. The loss in weight, divided by 300, gives the quantity of pure hydrocyanic present, per cent., when 100 gr. have been examined. Suppose 60 gr. of medicinal acid are found to require 360 gr. of the silver solution, then the proportion of anhydrous hydrocyanic acid

present in the medicinal acid will be 1·20 gr., or 2%. In testing by this method an error of a grain or two in the quantity of silver solution used is not likely to occur, but even this would not make a difference of more than 1-100th or 1-50th of a grain in the amount of hydrocyanic acid. This test answers equally well "with cherry-laurel and bitter almond water, and solutions of the alkaline cyanides, provided proper care is taken.

4. (Ure.) To 100 gr., or any other convenient quantity of the *acid* contained in a small phial, small quantities of the *red peroxide of mercury*, in fine powder, are added in succession, until it ceases to be dissolved on agitation. The weight of the *oxide* taken up, being divided by 4, gives a quotient representing the quantity of *real hydrocyanic acid* present. By weighing out beforehand, on a piece of paper or a watch-glass, 40 or 50 gr. of the *peroxide*, the residual weight of it shows at once the quantity expended. The operation may be always completed in five minutes, for the red precipitate dissolves as rapidly in dilute prussic acid, with the aid of slight agitation, as sugar dissolves in water. Should the presence of hydrochloric acid be suspected, then the difference in the volatility of hydrocyanate and hydrochlorate of ammonia may be had recourse to with advantage; the former volatilizing at a very gentle heat, whilst the latter requires a subliming temperature of about 300° Fahr. After adding ammonia in slight excess to the acid, if we evaporate to dryness at a heat of 212°, we may infer from the residuary sal ammoniac the quantity of hydrochloric acid present. Every gr. of sal ammoniac corresponds to 0·6822 gr. of hydrochloric acid.

Uses, &c. Medicinal hydrocyanic acid has been administered with apparent advantage in chronic coughs, phthisis, spasmodic asthma, hooping cough, hysteria, the vomiting in cholera and pregnancy, the diarrhœa frequently accompanying pulmonary consumption, &c. It has also been successfully employed as an anodyne in numerous painful affections; as cancer, neuralgia, rheumatism, &c. Also *externally*, in prurigo, and some other skin affections. In gastrodynia and those nameless stomach, nervous, and hysterical affections, in both sexes, arising chiefly from excessive irritability or excitement, over-anxiety, study, &c., in which there appears no well-defined organic ailment, small doses of hydrocyanic acid or the alkaline cyanides are invaluable, and never fail to afford considerable relief, if they do not altogether remove the disease. In some cases the effects appear almost magical. A life of absolute wretchedness—sleepless nights, days of intolerable excitement and irritability—is often changed in a few hours to one of quiet and susceptibility of enjoyment. *Dose.* Of the Ph. L., 1 to 6 drops, 3 or 4 times a day, made into a mixture with water flavoured with gum or syrup. *Externally*, as a lotion, 1 fl. dr. of the dilute acid (Ph. L.) to 3 or 4 fl. oz. of distilled water. A weak lotion of prussic acid, employed both before and after shaving, is very soothing to an irritable face. (Dr. Elliotson.) An eye cup or glass containing a *single drop* of the dilute acid and held against the eye for a few seconds, so that the latter may be exposed to the fumes, is a cosmetic application adopted by certain fashionable ladies and actresses to increase the clearness and brilliancy of their eyes.

Pois., &c. The usual *symptoms* after swallowing prussic acid in *poisonous doses*, are—a bitter, hot taste, faintness, giddiness, unsteady gait, difficult respiration, salivation, tetanic convulsions, and insensibility; the latter continues, followed by profound coma, great muscular relaxation, complete loss of the power of motion, convulsive respiration, severe tetanic spasms, and death. The pupils are generally dilated, but, sometimes, contracted. When the quantity taken has been *very large*, tumultuous palpitation, followed by a few hurried inspirations, and convulsive plunges, an almost imperceptible pulse, insensibility, and profound coma, are the only symptoms that usually precede death. Sometimes convulsions do not occur. When recovery takes place, it is usually very rapid, and in most cases occurs within half an hour after the poison has been taken. In most cases death occurs in about 15 to 20 minutes, but sometimes not for nearly half an hour. Of 7 epileptic patients killed by hydrocyanic acid in one of the hospitals in Paris, some did not die in less than ¾ of an hour. The most characteristic post-mortem appearances are extreme glistening brightness, and staring expression of the eyes; and the venous system is usually gorged with blood, whilst the arteries are empty. The odour of the poison is also generally perceptible. The largest quantity of prussic acid ever swallowed, as far as our knowledge extends, was that of a thirsty carman, who seized a half-gallon jug containing it, which was standing on the laboratory counter, and swallowed between 6 and 7 ounces of it at a gulp, in mistake for cold water.

Ant., &c.—1. *Chlorine water*, or *solution* *of chloride of lime* or of *soda*, in doses of 2 or 3 spoonfuls diluted with water, frequently; also applied externally.—2. Inspirations slightly impregnated with the *condensed chloro-vinegar* of M. Mialhe. This is prepared by spreading a thin layer of dry chloride of lime upon a towel, folding this into the form of a cravat, and moistening it with vinegar, which disengages the chlorine by degrees, and allows it to be inspired through the mouth and nostrils.—3. Small quantities of *ammonia water* diluted with 10 or 12 parts of water; also the fumes inhaled. A case is reported of a gentleman who swallowed 2 dr. of the acid (Ph. D.) and in whom insensibility and convulsions had set in, who was cured by this treatment.—4. The joint administration of *carbonate of potassa* and *sulphate of iron*. This has been lately very strongly recommended.—5. *Cold affusion* should be adopted in all cases, and is almost of itself a certain cure, if employed before the convulsive stage is over; and it is often successful even during the stage of insensibility and paralysis. (Herbst.) In all cases, where an emetic can be got down, it should be administered as early as possible, and vomiting promoted by tickling the fauces with the finger or a feather. At a later period a purgative clyster may be administered. Artificial respiration should also be attempted. Unfortunately the poisonous action of prussic acid is so rapid that life is usually extinct before assistance arrives and antidotes can be applied.

Concluding Remarks.—Prussic acid, even when dilute, is very liable to spontaneous decomposition, and this occurs the more speedily under the influence of light and warmth. To *promote* its *preservation*, it is usual to surround the bottles containing it with thick paper (purple on both sides), and to keep them inverted in an obscure situation. The addition of a *very small* quantity of hydrochloric acid renders it much less liable to change, and is now generally made by manufacturers for that purpose; but in testing the strength of such acid by nitrate of silver, it is necessary to deduct the weight of the chloride of silver from that of the mixed precipitate. (See *above.*) The acid prepared by decomposing ferrocyanide of potassium by sulphuric acid, is less liable to change than that prepared by any other process; probably, from a minute quantity of sulphuric acid passing over during the distillation. According to Dr. Christison, it will keep for years. Some of it continued "unchanged for two years and a half, although it was exposed to daylight."

HYDROFERRIC ACID. Same as *Ferric acid.*

HYDROFERRIDCYANIC ACID. Syn. *Hydroferricyanic Acid, Ferridcyanic do., Ferridcyanide of Hydrogen, Ferrosesquicyanic Acid.* A compound of ferridcyanogen and hydrogen.

Prep. Recently precipitated *ferridcyanide of lead* is decomposed by *sulphuretted hydrogen*, or by *dilute sulphuric acid* carefully added. A yellow solution is thus obtained, which yields a deep brown powder when evaporated by heat, or yellow crystals by spontaneous evaporation.

Prop., &c. With the oxides of the metals this compound forms *ferridcyanides.* These may be made by adding a solution of ferridcyanide of potassium to another of a soluble salt of the base. *Ferridcyanide of potassium* is the salt commonly known as red prussiate of potash. Turnbull's blue is a *ferridcyanide of iron.* See *Ferridcyanogen, Potassium,* and *Iron.*

HYDROFERROCYANIC ACID. Syn. *Ferrocyanic Acid, Ferrocyanide of Hydrogen; Acidum Hydroferrocyanicum, A. Ferrocyanicum,*—Lat. *Ferrochyazic Acid, Ferruretted do. do., Ferroprussic do.,*—Obs. A peculiar compound of cyanogen, hydrogen, and iron, discovered by M. Porret, and by him named ferrochyazic acid.

Prep. 1. (Berzelius.) *Ferrocyanide of lead* or *copper* (recently precipitated), is diffused through water, and decomposed by passing a *stream* of *sulphuretted hydrogen* through the liquid; the latter is then filtered, and evaporated in vacuo, over sulphuric acid, and the crystals collected, pressed between bibulous paper, and dried. Or, the acid may be obtained from the solution by adding ether as noticed below.

2. (M. Porrett.) *Ferrocyanide of potassium* is dissolved in *water*, and a *solution of sulphuret of barium* added as long as a precipitate falls; this is collected, washed with *cold water*, dried, and dissolved in *cold water*, 100 parts; this solution is then decomposed by adding of *concentrated sulphuric acid*, 30 parts, and the filtered liquid is treated as before.

3. (M. Posselt.) A *concentrated aqueous solution of ferrocyanic acid* (obtained as above) is agitated with a *little ether;* the acid separates immediately, and may be obtained by filtration. If the solution is moderately concentrated, the whole forms a thick mass, and after some time the ferrocyanic acid suspended in the ether separates from the water saturated with ether, and swims on the surface. The water is to be removed by a pipette; the thick mass is to

be put on a filter and washed repeatedly with a *mixture* of *alcohol and ether*, containing a considerable portion of the latter; it is then pressed between the folds of absorbent paper to remove the moisture, and afterwards perfectly dried over sulphuric acid in vacuo.

4. A *concentrated solution of ferrocyanide of potassium*, prepared with *boiled water*, is cooled out of contact with the air, and *hydrochloric acid* added in excess; the mixture is then agitated with *ether* as before; the separated acid is next dissolved in *alcohol* to which a *little* sulphuric acid has been added, the solution filtered if not clear, and agitated with *ether;* the separated acid is lastly collected and dried.

Prop., &c. Crystals or crystalline laminæ, of a yellowish white, or white colour, when pure; soluble in water and alcohol; the aqueous solution has an acid taste and reaction, and decomposes the alkaline carbonates with effervescence; permanent in dry air; but decomposed when heat and moisture are present. With the metallic oxides it forms compounds termed *ferrocyanides, ferrocyanates, hydroferrocyanates*, or *prussiates*. The INSOLUBLE FERROCYANIDES, may all be formed by the mixture of a soluble salt of the metal with a solution of ferrocyanide of potassium. The latter salt is the compound commonly called *yellow prussiate of potash*. See *Ferrocyanogen, Potassium, Iron, &c.*

HYDROFLUORIC ACID. Syn. *Fluoric Acid; Acidum Fluoricum, A. Hydrofluoricum,*—Lat. *Stygian Water, Aqua Stygis,*—Obs. An acid compound of hydrogen and fluorine. It was discovered by Scheele, but was first procured in a pure state by Gay-Lussac and Thénard, in 1810.

Prep. Pour *concentrated sulphuric acid* on half its weight of *fluor spar*, carefully separated from silicious earth, and reduced to fine powder. The mixture must be made in a capacious *leaden* retort, and a gentle heat only applied, and the evolved gas must be collected in a *leaden* receiver, surrounded by ice.

Prop., &c. A colourless fluid below 59° Fahr., which speedily evaporates in dense white fumes when exposed to the air. Its affinity for water exceeds that of sulphuric acid, and its combination with that fluid is accompanied with a hissing noise, and a considerable increase of its sp. gr. up to a certain point. It readily dissolves glass and silica, forming *fluosilicic acid*, for which reason it cannot be preserved in glass vessels. Bottles of lead, silver, platinum, or pure gutta percha, are used to keep it in. It is highly corrosive, instantaneously destroying the skin on contact, and producing deep and serious ulcerations; its vapour is pungent, irritating, irrespirable, and *poisonous*. With the metals it unites to form *hydrofluorates, fluorates*, or *metallic fluorides*. *Hydrofluorate of ammonia* (fluoride of ammonium) is obtained by heating together, in a platinum crucible, over a lamp, 1 part of *dry sal ammoniac*, with a little more than 2 parts of *fluoride of sodium*. The lid of the crucible should be turned upwards, and filled with cold water. The hydrofluorate sublimes and adheres to the lid, forming a mass of small prismatic crystals. It readily acts on glass. The *hydrofluorates* or *fluorides* of the *alkalies, earths*, and *metals*, may most of them be prepared by saturating hydrofluoric acid with the *recently* precipitated oxide, or carbonate of the base.

In the *arts*, hydrofluoric acid is used for etching on glass. (See *page* 397.)

HYDROFLUOSILICIC ACID. *Prep.* From *powdered fluor spar*, and *silicious sand* or *powdered glass*, of each, 1 part; *concentrated sulphuric acid*, 2 parts; mix in a glass retort, apply a gentle heat, and collect the evolved gas over mercury.

Prop., &c. A colourless, incombustible gas, highly corrosive, and poisonous; it does not act on glass vessels, when they are quite dry; water absorbs 365 times its volume of this gas (Dr. Davy); but decomposition ensues, *pure hydrated silicic acid* being deposited in a gelatinous state, and *silicated fluoric acid*, or *silico-hydrofluoric acid*, remaining in solution, By the action of water of ammonia fluosilicic acid gas is completely decomposed. In this way Dr. Davy obtained $\frac{614}{1000}$ of its weight of pure silica.

HYDROGEN. Syn. *Hydrogenium,*—Lat. *Inflammable Air,*—Obs. A chemical element, first correctly described by Cavendish, in 1766, having previously been confounded with other gases, and by some called *phlogiston*, from being supposed to be the matter of heat. It is a substance which, in its combined state, is not perceptible to the senses, and its existence can only be experimentally demonstrated by its pursuit whilst it passes out of one combination into another. It cannot be arrested and exhibited in its passage, but when it presents itself as the component of a new compound, it is immediately recognized by chemical means. It is the lightest of all ponderable matter whose examination belongs to chemistry. According to M. Dumas, it is a metal. "It is a *gaseous metal*, even as *mercury* is a *liquid metal.* If we suppose that it is impossible to liquefy the vapour of mercury—that it is colourless, inodorous, and transparent as hydrogen—we shall have a correct idea of the views I wish to establish. The *ensemble* of its properties approaches, in fact, to mercury and potassium." (Echo du Monde Savant, Nov. 20, 1842.)

Prep. Hydrogen is always obtained for experimental purposes by the deoxidation of water, by one or other of the following methods:—

1. A tube of iron or porcelain (a *gun barrel,* for instance) containing a quantity of *iron turnings* or *scraps of iron,* is fixed across a furnace, so that its middle portion may be made red-hot; to the one end is attached a retort or other vessel containing water, and to the other, a bent tube connected with a pneumatic trough or gasometer. The tube being now heated to redness, and the water in the retort brought into a state of brisk ebullition, the evolved steam suffers decomposition; the oxygen being absorbed by the iron, and the hydrogen escaping into the gas receiver.

2. *Oil of vitriol,* 1 part, diluted with *water,* 5 parts, is poured on *iron* or *zinc wire* or *filings,* placed in a retort or gas bottle; hydrogen is evolved and is collected, as before. This is the more convenient method of the two, and the one usually adopted in the laboratory.

To ensure the gas being quite pure, *distilled zinc* is employed, and, in both the above cases, the gas is passed, first through *alcohol,* then through a *concentrated solution of pure potassa,* and, lastly, through a *solution of nitrate of silver.* When heat is employed the gas is allowed to cool before proceeding to purify it.

Prop. Gaseous; colourless; tasteless; odourless (when pure); combustible; sp. gr. 0·06935; being 16 times lighter than oxygen gas, and nearly 14½ times lighter than atmospheric air. 100 cubic inches, at 60° Fahr. and 30 inches of the barometer, weigh 2·1371 (say 2·14) gr.; mixed with atmospheric air or oxygen it explodes with extreme violence on the approach of flame, or sudden compression, (Biot.) Brought into contact with spongy platinum, the latter instantly becomes red hot, and the gas is kindled. One measure of *hydrogen,* and 5 or 6 of *atmospheric air;* and 2 of *hydrogen,* and 1 of *oxygen,* are the proportions that explode with the greatest violence. (Doebereiner.) A mixture of 1 volume of *hydrogen,* and 9 volumes of *air,* explodes feebly; and one of 4 volumes of *hydrogen,* and 1 volume of *air,* does not explode at all. (Cavendish.) The electric spark, spongy platinum, the black powder of platinum (Garden), clean platinum foil (Faraday), and some other substances, produce combination, and generally explosion, of the mixed gases. Its slow combustion produces much heat, but little light. A *jet of hydrogen,* burnt in *oxygen gas,* or a jet of these gases (mixed) burnt in the air, with proper precautions, produces the most intense heat known. Water absorbs about 2% by volume of hydrogen. When hydrogen is prepared from crude zinc it has a slight smell; and, when from iron, its odour is often strong and disagreeable.

Tests. It is recognized by—its combustibility;—the pale colour of its flame;—producing water only when burnt in air or oxygen;—extinguishing the flame of other bodies; and—exploding when mixed with half its weight of oxygen and fired. See *Organic Substances.*

Uses, &c. Pure and uncombined hydrogen is not employed in the arts. *Inhalations* of this gas have, however, been occasionally used in medicine. Dr. Beddoes recommended them in phthisis. *Hydrogen water* has been employed in diabetes. In combination, the uses of hydrogen are almost numberless. Combined with oxygen it forms *water;* with chlorine, *hydrochloric acid;* with iodine, *hydriodic acid;* with bromine, *hydrobromic acid;* with fluorine, *hydrofluoric acid;* with cyanogen, *prussic acid;* with carbon, numerous *hydrocarburets* or *hydrocarbons;* with nitrogen, *ammonia;* with phosphorus, *phosphoretted hydrogen;* with sulphur, *sulphuretted hydrogen;* and with arsenic, tellurium, and potassium, *arseniuretted, telluretted,* and *potassiuretted hydrogens.* It enters into the composition of *all compounds* containing *water* (hydrates, &c.), a multitude of *acids* and *salts,* and into all the various *proximate organic principles* of both the *animal* and *vegetable kingdoms.* It forms one of the ingredients of *coal gas,* and of *all bodies* that *possess the power of burning with flame.* From its extreme lightness it has been used to fill *balloons,* and its *carburet* (coal-gas) is now commonly employed for this purpose. On its property of inflaming in contact with spongy platinum is arranged the popular little instrument for the production of *instantaneous light,* sold by the philosophical instrument makers. The chemist avails himself of the great heat developed by its combustion in oxygen in the formation of the *oxyhydrogen blowpipe.* Indeed, the position occupied and the offices performed by hydrogen in the material world, as far as our perceptions permit us to judge, appear all but infinite.

1 *oz.* of *zinc*, with 1½ *oz.* of *oil of vitriol* diluted with 5 or 6 times its weight of *water*, produces considerably above 600 cubic inches of hydrogen gas.

HYDROGEN (Amidide of). See *Ammonia.*

HYDROGEN (Aurochloride of). See *Auro-terchlorides.*

HYDROGEN (Binoxide of). Syn. *Deutoxide of Hydrogen, Peroxide of do., Oxygenated Water; Hydrogenii Binoxydum, H. Deutoxydum,*—Lat. This singular fluid was discovered by M. Thénard in 1818.

Prep. 1. *Deutoxide of barium* is mixed with about *twice its weight of water*, and *sulphuric acid* is gradually added until all the deutoxide is converted into sulphate of baryta, observing to avoid excess of acid; the clear liquid is then decanted.

2. (M. Thénard.) *Water*, 6 or 7 fl. oz.; *deutoxide of barium*, 230 gr.; mix, and add gradually as much *pure concentrated hydrochloric acid* as is required to render the deutoxide soluble; then place the containing vessel, which should be of glass, in a *freezing mixture*, or a *vessel of ice*, and add *gradually* and *cautiously* of *deutoxide of barium* (in powder), 185 gr., stirring the liquid with a glass rod, after each addition; as soon as the whole is dissolved, add *sulphuric acid*, q. s. to entirely precipitate the *baryta;* next add a *second portion* of 185 gr. of *deutoxide of barium*, as before; again add *sulphuric acid*, q. s. to precipitate the whole of the baryta, and decant or filter the solution; repeat the same process with *fresh deutoxide of barium*, until about 3 oz. have been employed; lastly, separate the hydrochloric acid by means of *sulphate of silver*, cautiously added, and the sulphuric acid by *pure solid baryta.*

Prop., &c. The liquid prepared by the last formula contains 25 to 30 times its volume of oxygen, and also much simple water, to remove which it must be placed over sulphuric acid, in vacuo, until the sp. gr. reaches 1·452; beyond which it cannot be concentrated, as at this point it begins to volatilize slowly. In this state it is colourless; limpid; tastes metallic; is stable at *low* temperatures; resolved into oxygen and water, at 59° Fahr. It mixes freely with water, and becomes more permanent by the dilution. It bleaches organic substances; is decomposed by all the metals, except iron, tin, antimony, and tellurium, with more or less facility, and by many of the metallic oxides. The peroxides of lead, mercury, gold, platinum, manganese, and cobalt, effect this change instantaneously, and accompanied with extreme violence, during which the glass tube holding the liquid becomes red hot. Its action on oxide of silver is also exceedingly violent. Every drop of the liquid let fall on the dry oxide produces a real explosion, and light and heat is evolved. Gold in powder acts in a similar manner on *pure* oxygenated water; but has no action on this liquid if a little sulphuric acid is first added. Fibrin, and other organic matter, also deoxidize it.

The only use to which *binoxide of hydrogen* has been applied in the arts, is to restore the blackened lights of paintings which have become darkened by sulphuretted hydrogen. It has been proposed by M. de Sondala, as a means of supplying oxygen to the *confined air* of *diving bells* and other limited places; the carbonic acid formed by the lungs being at the same time absorbed by passing the air through hydrate of lime; but for this purpose *ferric acid* is more convenient and effective.

HYDROGEN (Borofluoride of). See *Fluoboric Acid, &c.*

HYDROGEN (Carbides of). See *Carburetted Hydrogen.*

HYDROGEN (Chloramidide of). See *Hydrochlorate of Ammonia.*

HYDROGEN (Oxides of). See *Binoxide of Hydrogen* and *Water.*

HYDROGEN (Sulphides of). See *Sulphuretted Hydrogen.*

HYDROGEN (Antimoniuretted). Syn. *Antimonetted Hydrogen, Antimonide of do.; Hydrogenium Antimoniatum,* — Lat. A gaseous compound of antimony and hydrogen formed under analogous conditions to those under which arseniuretted hydrogen is generated. It burns with a greenish flame, giving rise to dense fumes of teroxide of antimony, and when conducted through a red-hot tube, or the flame is thrown on a cold surface, as a porcelain plate, metallic antimony is deposited. See *Arsenious Acid.*

HYDROGEN (Arseniuretted). Syn. *Hydrogenium Arseniuratum,*—Lat. See *Arsenious Acid, &c.*

HYDROGEN (Carburetted). Syn. *Carbonetted Hydrogen, Carbide of do.; Hydrogenii Carburetum,*—Lat. Besides the hydrocarbons already noticed, two gaseous compounds, of carbon and hydrogen, possess peculiar interest. These are—

1. *Light Carburetted Hydrogen, Heavy Inflammable Air, Subcarburetted do., Dicarburet of do., Fire-damp, Marsh-gas, Gas*

of the Acetates. This is often abundantly disengaged in coal mines, and its combustion occasions those fearful explosions which are so destructive to human life. The mud at the bottom of stagnant pools, on being stirred, suffers bubbles of gas to escape, which, when collected and examined, are found to be a mixture of light carburetted hydrogen and carbonic acid. The latter is easily removed by passing the gas through a *solution of caustic potassa* or *milk of lime.* When a mixture of *acetate of soda* (cryst.) and *hydrate of potassa* (dry), of each, 2 parts, and *quicklime* (in powder), 3 parts, is strongly heated in a flask or retort, this gas, in a state of absolute purity, is disengaged in great abundance, and may be collected over water. (Dumas.) It is colourless; neutral; nearly inodorous; burns with a yellow flame, producing pure water and carbonic acid; explodes when kindled in contact with air or oxygen; and when mixed with atmospheric air may be respired for some time without apparent injury.

2. *Heavy Carburetted Hydrogen, Bicarburetted do.* See *Olefiant Gas.*

3. *Coal Gas, Oil Gas, Rosin Gas.* These are mixtures of the last two in uncertain proportions, obtained respectively from *gas, oil,* and *rosin,* by the action of heat, and used for the purposes of illumination. *Coal gas* purified by passing it through *water,* then agitating it with *moist carbonate of lead,* and again washing it with *water,* has been recommended by Dr. Clanny, and others, as a palliative in pulmonary consumption. It is diluted with its own volume, or twice its volume of common air, and inspired 3 or 4 times daily, in doses of 12 to 15 inches of the mixed gases, gradually increased to 20 or 30 cubic inches.

HYDROGEN (Phosphuretted). Syn. *Phosphoretted Hydrogen, Phosphide of do.; Hydrogenium Phosphoratum,*—Lat. *Prep.* 1. *Hydrated phosphorous acid* is gently heated in a small retort, and the gas collected over water in the pneumatic trough. Pure.

2. From *phosphorus* (in small lumps) boiled in a *solution of caustic potassa* or *milk of lime,* contained in a small retort, as before. When newly prepared by this process, the gas spontaneously inflames on contact with air, owing to the presence of a small quantity of a *liquid phosphide of hydrogen.* (M. Paul Thénard.)

3. As the last, but using *water strongly acidulated with hydrochloric* for the retort.

Prop., &c. Colourless; very fetid; slightly soluble in water; burns with a white flame; decomposed by light, heat, and strong acids; as commonly prepared, inflames on contact with air, at ordinary temperatures, but when pure, only at the heat of boiling water. Sp. gr. 1·24. It is rendered quite dry by standing over fused chloride of calcium.

HYDROGEN (Seleniuretted). Syn. *Seleniętted Hydrogen, Hydroselenic Acid.* This substance is obtained by the action of *dilute sulphuric acid* on the *seleniuret of iron, manganese,* or *potassium.* It is a colourless gas, freely absorbed by water, and in its action on metallic solutions greatly resembles sulphuretted hydrogen. Its most remarkable property is its power of irritating the nose, exciting catarrhal symptoms, and destroying the sense of smell. This has led to the suggestion by Dr. Prout, that the evolution of this substance by volcanoes, and its diffusion through the atmosphere, may be the cause of certain forms of the epidemic disorder called influenza.

HYDROGEN (Sulphuretted). Syn. *Hydrosulphuric Acid, Sulphohydric do., Hydrothionic do., Sulphide of Hydrogen, Hydrothion, Hepatic Air; Hydrogenium Sulphuratum, Acidum Hydrosulphurium, Aer Hepaticus,*—Lat. A compound of hydrogen and sulphur, noticed by Mayer and Ruellius, but first chemically examined by Scheele, in 1777.

Prep. 1. *Tersulphuret of antimony* (in fine powder), 1 part; *strong hydrochloric acid,* 5 parts; mix in a small glass retort, or in a flask furnished with a bent tube, apply the heat of a spirit lamp, and collect the evolved gas either over mercury or water, in the pneumatic trough, or in bottles, as noticed under *chlorine.* Pure.

2. From *protosulphuret of iron* and *oil of vitriol diluted with* 4 *or* 5 *parts of water.* This is the plan commonly adopted in the laboratory.

3. From *sulphuret of calcium* or *sulphuret of potassium,* as the last.

Prop. Gaseous; colourless; very fetid; odour resembling that of rotten eggs; reddens moistened litmus paper; burns with a blue flame; liquefies under a pressure of 17 atmospheres, at 50° Fahr.; freezes into a white crystalline mass at — 122° Fahr.; cold water absorbs about its own volume of this gas, forming *liquid sulphuretted hydrogen* or *sulphuretted hydrogen water;* sp. gr., 1·171; 100 cubic inches weigh 36·33 gr. Its compounds are called *hydrosulphates, hydrosulphurets, sulphurets,* or *sulphides.* It is powerfully poisonous. An atmosphere containing 1-1500th of this gas instantly killed a small bird; 1-1000th killed a large dog, and 1-250th a horse. (Dupuytren and Thénard.)

Tests. Sulphuretted hydrogen is readily recognized—1. By its odour.—2. By instantly blackening moist carbonate of lead. —3. By tarnishing polished silver.—4. By giving a *yellow* precipitate with arsenious acid.—5. By giving an *orange-red* precipitate with tartar emetic.—6. By giving a *black* precipitate with the salts of lead. Air containing 1-20,000th part of pure hydrogen will sensibly blacken a piece of white paper, moistened with a solution of acetate of lead.

Uses, &c. Sulphuretted hydrogen is chiefly employed as a test in chemical analysis. For this purpose, the best way is to keep a miniature apparatus for generating the gas always at hand. A small bottle or flask, furnished with a closely fitting cork, through which a small bent-tube passes, and containing a *little sulphuret of iron* and *water*, is all that is necessary in this way. When the gas is required for testing, the addition of a *drop* or *two* of *oil of vitriol* will cause it to be at once evolved. Air slightly scented with this gas has been proposed as a sedative, in chronic irritability and inflammation of the lungs during phthisis; but its administration requires the greatest caution. In the form of vapour baths, it has been occasionally employed in obstinate gouty, rheumatic, and cutaneous affections. Under the form of *sulphuretted mineral waters*, it is a common remedy as an alterative and resolvent. *Externally*, sulphuretted hydrogen water has been used as a wash or lotion. Being denser than air, this gas may be poured from its generating bottle into cavities; a scheme successfully employed by M. Thénard to destroy rats and other vermin in their holes. *Hahnemann's test liquor* for detecting lead in wine, is formed of *sulphuretted hydrogen water*, 4 fl. oz., acidulated with *tartaric acid*, 1 dr.

Pois., &c. Sulphuretted hydrogen is one of the most energetic poisons known, especially when it is respired; it is less poisonous when introduced into the stomach or the venous system; it is absorbed without decomposition, and causes great prostration with a change in the texture of organs, and especially of the nervous system.—*Treat.* The first thing is to expose the patient to a free current of air, to loosen the clothing, to use smart and rough friction over the body, and to dash it with *cold vinegar-and-water.* We ought next to make him inspire the condensed chloro-vinegar, noticed under *hydrocyanic acid* (see *page* 579); due care being taken to avoid irritating the lungs. If liquids containing sulphuretted hydrogen or hydrosulphuret of ammonia have been swallowed, a *strong emetic* should be given. Threatened congestion must be met by bleeding. Nervous derangement, spasms, and convulsions, may often be calmed by antispasmodics and the cold bath. If the asphyxia or syncope continues, *mustard* poultices may be applied to the feet and calves of the legs.

HYDROGEN (Sulphuretted,—Solution of). Syn. *Sulphuretted Hydrogen Water, Liquid Sulphuretted Hydrogen, Liquid Hydrosulphuric Acid; Aqua Hydrogenii Sulphureti, A. Acidi Hydrosulphurici, A. Hydrosulphurata, Acidum Hydrosulphuricum aquâ Solutum,*—Lat. var. A solution of sulphuretted hydrogen prepared by passing the gas into cold water. *Used* as a test. (See *above.*)

HYDROGEN (Persulphuretted). Syn. *Persulphide of Hydrogen, Persulphuret of do.* This is prepared by boiling together equal weights of *fresh-slaked lime* and *flowers of sulphur*, in about 6 times their weight of *water*, for 30 or 40 minutes; the resulting deep orange-coloured solution is filtered, and slowly added to an excess of *dilute sulphuric acid*, with constant agitation; a white precipitate of separated sulphur and sulphate of lime makes its appearance, together with a quantity of yellow oily-looking matter, which collects at the bottom of the vessel; this is *persulphide of hydrogen.* It has a very powerful odour; the sp. gr., 1·769; and is a very unstable compound.

HYDROGEN (Telluretted). Syn. *Hydrotelluric Acid.* A peculiar gaseous body discovered by Davy in 1809, and formed in a similar manner to hydrogen, by digesting *hydrochloric acid* on an *alloy of tellurium with zinc* or *iron.* It possesses feeble acid properties, and precipitates *tellurets* from metallic solutions. It is absorbed by water and then forms *liquid hydrotelluric acid,* or *telluretted hydrogen.*

HYDROGURETS. The old name for compounds of hydrogen with a simple inflammable body or a metal.

HYDROKINONE. Two compounds under this name have been obtained by Wöhler from kinone:—

1. (*Colourless Hydrokinone.*) Obtained by the addition of *hydriodic acid, sulphurous acid,* or *telluretted hydrogen* to a *solution of kinone.* Colourless crystals; neutral; odourless; tasteless; soluble both in

water and alcohol; fusible; and volatile by heat.

2. (*Green Hydrokinone.*) This may be obtained by the action of *sesquichloride of iron, chlorine,* or *chromic acid* on *colourless hydrokinone;* or, by mixing together *solutions* of *kinone* and *colourless hydrokinone.* It forms slender green crystals of great brilliancy and beauty, which are fusible, and soluble in boiling water.

HYDROLATS. Syn. *Hydrolata.* Medicated waters.

HYDROLEIC ACID. A peculiar fluid compound, discovered by Frémy, and obtained by evaporating the *alcohol used in the preparation of hydromargaritic acid.*

HYDROMARGARIC ACID. A solid, crystallizable compound, formed by melting together one equivalent each of *metamargaric* and *hydromargaritic acids,* and crystallizing the mass from *alcohol.*

HYDROMARGARITIC ACID. Obtained by boiling the *mother-liquor of metamargaric* and *metoleic acids,* when a mixture of *hydromargaritic* and *hydroleic acids* rises to the surface, which, after being washed with *cold alcohol,* leaves the former pure. By heat it is converted into metamargaric acid and water. It is solid and crystallizable, and dissolves in both alcohol and ether. The above three acids, along with *metamargaric, metoleic, sulphomargaric,* and *sulpholeic acids,* were discovered by M. Frémy, during his researches on the action of sulphuric acid on olive oil.

HYDROMEL. *Prep.* (P. Cod.) *Honey,* 2 oz.; *boiling water.* 32 oz.; dissolve, and strain. A refreshing and slightly laxative drink; in fevers, hoarseness, sore throats, &c.

HYDROMELLONIC ACID. Prepared by dissolving *mellonide of potassium* in *boiling water,* adding *hydrochloric, sulphuric,* or *nitric acid,* and collecting, and drying the precipitate. A yellow powder, soluble in water. It forms *mellonides* with the metallic oxides.

HYDROMETER. Syn. *Areometer, Gravimeter.* An instrument for ascertaining the specific gravities of liquids, and hence their strength; the latter being either in inverse or direct proportion to their specific gravities. *Spirituous liquors* and *ammonia water* are examples of the one; and *malt wort,* and *syrups,* of the other. The following are those best known:—

Baumé's Hydrometer or *Areometer,* which is now very generally employed on the continent, generally consists of two distinct instruments. The *one* for liquids *heavier* than water; the *other,* for liquids *lighter* than that fluid. The *first* floats at the 0, or zero of the scale, in distilled water, at the temperature of 58° Fahr., and each degree, marked downwards, indicates a density corresponding to one per cent. of common salt. The *hydrometer* for *liquids lighter than water,* is poised, so that the 0 of the scale is at the bottom of the stem, when it is floating in a solution of 1 oz. of *common salt* in 9 oz. of *water,* and the depth to which it sinks in distilled water shows 10°; the space between these fixed points being equally divided, and the graduation continued upwards to the top of the scale.

The *temperature* at which these instruments were *originally* adjusted by Baumé, was 12·5° Centigrade (54·5° Fahr.) They are now commonly adjusted in this country at 58 or 60° Fahr. Hence arise the discrepancies observable in the published tables of the "correspondence between degrees of Baumé and real specific gravities."

Cartier's Hydrometer which is much used in France for light liquids, has the same point for the zero of its scale as Baumé's, but its degrees are rather smaller; 30° *Baumé* being equal to 32° *Cartier.*

Dicas's Hydrometer closely resembles *Sikes's,* and was formerly very generally adopted in this country for testing the strength of spirit.

Fahrenheit's Hydrometer consists of a hollow ball, with a counterpoise below, and a very slender stem above, terminating in a small dish. The middle, or half-length of the stem, is distinguised by a fine line across it. In this instrument every division of the stem is rejected, and it is immersed in all experiments to the middle of the stem, by placing proper weights in the little dish above. Then, as the part immersed is constantly of the same magnitude, and the whole weight of the hydrometer is known, this last weight, added to the weights in the dish, will be equal to the weight of fluid displaced by the instrument, as all writers on hydrostatics prove. And accordingly, the sp. gravities for the common form of the tables will be had by the proportion—

As the *whole weight of the hydrometer and its load, when adjusted in distilled water,* is to the *number* 1000, so is the *whole weight when adjusted in any other fluid,* to the *number expressing its specific gravity.*

Gay-Lussac's Areometer and *Alcoholmeter,* at once indicated on their stems the strength of the liquid examined, which merely requires correction for temperature.

Guyton-Morveau's Hydrometer resembles *Fahrenheit's*.

Nicholson's Hydrometer is constructed on the same principle as *Fahrenheit's*. It is chiefly intended for taking the sp. gr. of minerals.

Richter's Hydrometer resembles, for the most part, *Gay-Lussac's*.

Sikes's Hydrometer is that adopted by the Revenue authorities in England for ascertaining the strength of spirits, and has been already fully noticed.

Tralles's Hydrometer resembles *Gay-Lussac's* (nearly).

Twaddell's Hydrometer is much used in the bleaching establishments of Scotland, and in some parts of England. According to this scale, 0 is equal to 1000 or the sp. gr. of *distilled water*, and each degree is equal to ·005; so that by multiplying this number by the number of degrees marked on the scale, and adding 1· the real specific gravity is obtained.

Zanetti's Hydrometers exhibit degrees on their scales, which when multiplied by 10, correspond to real specific gravities.

Obs. Hydrometers, unless manufactured with great care and skill, merely afford approximate results, but which are nevertheless sufficiently correct for all ordinary purposes. They also require several ounces of liquid to float them, and hence cannot be used for very small quantities. Those of Fahrenheit, Nicholson, and Sikes, are the most accurate both in principle and application. They are all employed with a long glass tube, termed a *sample*, *test*, or *hydrometer glass*, in the way already noticed, at page 33; but the thermometer for ascertaining the temperature must be covered with a glass case, or arranged with a folding scale to allow of its immersion in corrosive liquids.

Alcoholmeters, *Elæometers*, *Saccharometers*, *Urinometers*, *&c.*, are simply hydrometers so weighed and graduated, as to adapt them for testing *spirits*, *syrups*, *urine*, *&c.* See *Alcoholmetry* and *Specific Gravity*.

HYDROPATHY. Syn. *Water Cure.* A mode of curing diseases by the copious use of *pure cold water*, both *internally* and *externally*, together with *dry sweating*, and the due regulation of diet, exercise, and clothing. This "treatment of diseases undoubtedly includes powerful therapeutic agents, which in the hands of the educated and honorable practitioner, might be most beneficially resorted to as remedial agents." (Pereira.)

HYDROPERSULPHOCYANIC ACID. A reddish yellow crystalline mass, obtained by fusing *sulphocyanide of potassium* in a *stream of dry hydrochloric acid gas*, in a vessel connected with a suitable receiver. It is purified by solution in *hot alcohol*, from which it is deposited on cooling in a semi-crystalline form.

HYDROPHOBIA. Syn. *Canine Madness; Rabies Canina*,—Lat. A disease which is generally considered as the result of a morbid poison being introduced into the system by the bite of a rabid animal. A clear case of idiopathic or spontaneous hydrophobia has never yet been known to occur in the human subject. Prof. Dick, of Edinburgh, denies the existence of this disease in the lower animals. "What commonly goes by that name is simply an *inflammation of the brain;* and, as the lower animals are not subject to this disease, it is clear that they cannot communicate it to others." "The disease in the case of human beings, is caused by an over-excited imagination, worked upon by the popular delusion, out of doors, of the effects of the bite of a rabid animal." Few persons will, we think, agree with the sweeping assertions of the above writer; although it is generally admitted that the imagination may render parties more susceptible to the accession of the disease.

The common *symptoms of hydrophobia*, are great excitability and horror at the sight of water or the attempt to drink, fever, vomiting, excessive thirst, spitting of viscid saliva, difficult respiration, irregular pulse, convulsions, syncope, delirium, and death.

The whole materia medica has been, unfortunately, unsuccessfully sought without the discovery of a single remedy for this disease, or even a palliative of its severer symptoms. At the London Hospital *hydrocyanic* acid has been repeatedly tried without success. In one case, reported in another quarter, the hydrophobic symptoms gave way under the plentiful administration of the acid; but typhus fever immediately followed, and carried off the patient. (*Lancet*, 1839.) This disease is now justly considered as one of the opprobria of medical science.

The *treatment of the recent bites* of venomous animals has been fully explained at page 134, and need not be repeated here. To prevent secondary or constitutional effects arising, the use of *lemon juice*, or *arsenical solution*, has long been popular. (Graham, and others.) Dr. Buchan remarks that "*vinegar* is of considerable use, and should be taken *freely*."

"At Udina, in Friule, a poor man lying under the frightful tortures of hydrophobia was cured with some *draughts of vinegar*, given him by mistake, instead of another potion. A physician at Padua got intelligence of this event at Udina, and tried the same remedy upon a patient in the hospital, administering to him a *pound of vinegar* in the morning, *another* at noon, and a *third* at sunset, and the man was speedily and perfectly cured." (*The Times.*)

The Rev. A. S. Atcheson, who in consequence of his neighbour, Lord Harborough, having been bitten by a rabid spaniel, was led to pay considerable attention to this subject, also reports favorably as to the use of vinegar in hydrophobia. He has kindly handed us the following morceau, which certainly deserves attention. The appearance of pustules under the tongue preceding an attack of this disease, is a symptom that has not been noticed by previous writers.

"The following *treatment* of *hydrophobia* was originally published by Dr. Muller, late of Vienna, and now of Paris, and was received by him from M. Marochetti, a Russian surgeon, who cured 13 out of 14 patients during his residence in the Ukrane, in 1813. It consists in administering about 1½ pint of a *strong decoction of yellow broom*, daily. The under part of the tongue is to be examined twice a day, and any little pimples or pustules discovered there, are to be opened, and cauterized with a red-hot needle; after which the *decoction* is to be gargled, and a portion swallowed. This treatment is to be continued for 6 weeks or more. The 15th person, treated in the ordinary way, by Marochetti, died.

"In 1818 Marochetti had 26 patients bitten by a rabid dog. In 19 of them, pimples under the tongue followed, and were removed at from the 3d to the 9th day *after the bite.* Marochetti conceives that the hydrophobic poison fixes itself under the tongue, at the orifices of the ducts of the submaxillary gland, situated upon the frænum. If these are not opened within 24 hours after their *first* appearance, the patient is lost."

An aged correspondent of one of the American journals asserts that "it has lately been discovered that a strong decoction made of the *bark of the roots of the white ash*, when drunk as medicine, will cure the bite of a mad dog, and the poison of the rattlesnake. The latter can be made more easily to crawl over live fire-coals than over white ash-leaves; and they are never found in the forest where the white ash grows."

Mr. Blaine, the celebrated veterinarian, recommends the following preparation:—*Fresh leaves of the tree box* and *rue*, of each, 2 *oz.*, *sage*, ½ *oz.*, chop them fine, and boil them in *water*, 1 pint, until reduced to one-half; strain, and press out the liquid; next mash the herbs, and boil them in *new milk*, 1 pint, to one-half; then press, strain, and mix the liquors. *Dose.* One third, every other morning fasting, for a man; make double the quantity for 3 doses for a *horse* or *cow;* one-half or two thirds that for a man suffices for a *middle-sized dog*, and a third, for *smaller dogs.* It produces extreme nausea and distress, and must be given with care.

Mr. Youatt recommends for dogs:—*Leaves of the scutellaria lateriflora*, 40 gr.; *belladonna*, 2½ gr.; both in powder; to be given night and morning for 6 weeks, gradually increasing the dose. The scutellaria laterifolia (*Linn.*) is a labiate plant, common in many parts of North America, where it is highly extolled as both a preventive and remedy for hydrophobia, but, apparently, without any sufficient reason. An infusion is made of 1 dr. or 2 teaspoonfuls of the *powder* in a quart of *hot water*, and half-a-pint is taken for a dose night and morning, with an occasional purgative.

HYDROPHTHORIC ACID. Fluorine. (Ampère.)

HYDROSALICYLIC ACID. See *Salicylous Acid.*

HYDROSELENIC ACID. See *Seleniuretted Hydrogen.*

HYDROSTATIC BALANCE. See *Specific Gravity.*

HYDROSULPHATE. Syn. *Hydrosulphas*,—Lat. See *Hydrogen* (Sulphuretted).

HYDROSULPHOCYANIC ACID. Syn. *Sulphocyanic Acid*, *Sulphuro-prussic do.*, *Sulphuretted Chyazic do.*, *Sulphide of Cyanogen.* A peculiar acid occurring in the seeds and blossoms of the cruciferæ, and in the saliva of man and sheep. It is also produced artificially.

Prep. 1. By decomposing *sulphocyanide of lead* by *dilute sulphuric acid*, avoiding excess, and throwing down the last portion of lead by *sulphuretted hydrogen.*

2. By decomposing a mixture of 1 part of *sulphocyanide of silver* and 100 parts of *water*, by *sulphuretted hydrogen.*

Prop., *&c.* It forms a colourless fluid, readily undergoing decomposition by the action of air and heat. With the bases it forms compounds termed *sulphocyanides.*

HYDROSULPHURET. Syn. *Hydro-*

sulphuretum,—Lat. See *Sulphuretted Hydrogen.*

HYDROSULPHURIC ACID. Sulphuretted hydrogen.

HYDROTELLURIC ACID. See *Telluretted Hydrogen.*

HYDROTHIONIC ACID. Sulphuretted Hydrogen.

HYDROTHORAX. Dropsy of the chest. The common *symptoms* are, difficulty of breathing when in a recumbent posture, paleness, cough, thirst, swelling of the legs and feet, quick, irregular, or intermittent pulse, a scarcity of urine, and a fluctuation of water in the chest. The *treatment* is the same as that for anasarca or general dropsy, observing to avoid the use of emetics. See *Dropsy.*

HYDROUS. Hydrated; applied to substances containing combined water; just as *anhydrous* is applied to those which are dry or destitute of water. The prefix *hydro-*, is sometimes incorrectly used for *hydrous* or *hydrated;* but is properly confined to compounds of hydrogen, as *hydrochloric acid, hydrobromic acid*, acids formed of chlorine, bromine, and hydrogen. See *Hydrate.*

HYDROXANTHIC ACID. The name originally given by Zeise to xanthic acid.

HYDRURET. Syn. *Hydride, Hydroguret; Hydridum, Hydruretum*,—Lat. A compound of hydrogen with a metal, or a base.

HYGIENE. Syn. *Hygieine, Hygieina.* Health; its preservation, promotion, and restoration. That department of medicine and civil government which relates to health. Pressure of other matter on our columns compels us to omit an article we had prepared on this all-important subject. We must, therefore, content ourselves with referring the reader to the various sub-articles—*Air, Bathing, Exercise, Flannel, Food, Nutrition, Sleep, Ventilation, Warmth, &c.*

HYGRUSINE. A name given by Bizio to the éleoptène of Berzelius, or the liquid and more volatile portion of essential oils.

HYOCHOLALIC ACID. See *Hyocholic Acid.*

HYOCHOLIC ACID. Syn. *Glycohyocholalic Acid.* A compound peculiar to the gall of pigs, discovered by Strecker and Gundelach.

Prep. The *fresh gall of pigs* is mixed with a *solution of sulphate of soda;* the precipitate is dissolved in *absolute alcohol*, and decolorized by *animal charcoal.* From this solution *ether* throws down *hyocholate of soda*, which, on the addition of *sulphuric acid*, yields *hyocholic acid* as a resinous mass, which is dissolved in *alcohol*, re-precipitated by *water*, and dried. When heated with alkaline solutions, *glycocine* and a new crystalline acid (*hyocholalic acid*) are formed. When boiled with acids it yields *glycocine* and *hyodyslysine.*

HYOSCYAMIA. Syn. *Hyoscyamine, Hyoscyamina, Daturine, Daturia.* An alkaloid discovered by Brandes in common henbane (*hyoscyamus niger*), and since found in *datura stramonium.* It is powerfully narcotic. Chevallier, Brault, and Poggiale, eminent and skilful chemists, have failed to procure it. (Jour. de Pharm.) It may, however, be obtained in prisms. With the acids it forms salts. See *Daturine.*

HYPEROXYMURIATES. See *Chloates.*

HYPNOTICS. Syn. *Hypnotica.* Agents or medicines which induce sleep; as *opium, morphia, henbane, Indian hemp, lactucarium, &c.* Agents which prevent sleep are called *agrypnotics* (agrypnotica) or *anthynotics* (anthypnotica). Of the latter, *tea, coffee, digitalis, lemon-juice*, and *vinegar*, are the best known. See *Anodynes* and *Sleep.*

HYPOCHLORIC ACID. Syn. *Peroxide of Chlorine; Acidum Hypochloricum*,—Lat. *Prep.* Powdered *chlorate of potassa* is made into a paste with *concentrated sulphuric acid*, and cooled; this is introduced into a small glass retort, and very cautiously heated by *warm water;* a deep yellow gas is evolved, which is the acid, which can only be collected by displacement, like chlorine, since mercury decomposes, and water absorbs it.

Prop. Hypochloric acid has a powerful odour, quite different from that of chlorine itself. It is exceedingly explosive, being resolved with violence into its elements by a temperature short of the boiling-point of water. Its preparation is, therefore, always attended by danger, and should be performed only on a small scale. It may be liquefied by cold. The aqueous solution (*liquid hypochloric acid*) possesses powerful bleaching properties. Salts of this acid have not yet been obtained.

HYPOCHLORITES. See *Hypochlorous Acid.*

HYPOCHLOROUS ACID. Syn. *Protoxide of Chlorine, Euchlorine.* A gaseous compound discovered by Davy in 1811.

Prep. 1. (Davy.) By agitating together a *mixture* of *peroxide of mercury*, 1 part; and *water*, 2 parts; contained in a bottle filled with *chlorine gas.* The filtered liquid is *fluid hypochlorous acid.* It may be purified by distillation at a terperature considerably below 212° Fahr., as at that heat it suffers rapid decomposition.

2. (M. Pelouze.) *Red oxide of mercury* (prepared by precipitation, and dried by exposure to a strong heat), is introduced into a cold glass tube, and *well-washed, dry chlorine gas* is slowly passed over it, and the gas collected by displacement. When the flask or bottle in which the gas is received is exposed to artificial cold by the aid of a mixture of ice and salt, the hypochlorous acid condenses to a deep red liquid, slowly soluble in water, and very subject to explosion.

Prop., &c. It bleaches powerfully, and is readily decomposed by light and contact with various substances, especially powdered glass and other angular bodies. The compounds popularly called *chlorides of lime, soda,* and *potash* are genenerally supposed to be *hypochlorites*, but the point is not definitely determined.

HYPOCHONDRIASIS. Syn. *Hypochondriacism.* The hip or hyp, the vapours, depression of spirits, blue devils. This disease chiefly affects persons of the melancholic temperament, and is commonly induced by hard study, irregular habits of life, want of proper social intercourse, living in close apartments, and insufficient out-of-door exercise. The *treatment* may, in most cases, be similar to that recommended for *dyspepsia* and *gastrodynia;* observing, however, that success depends more on amusing and engaging the mind, and in gradually weaning it from old conceits, than in the mere administration of medicine. When the patient is tormented with a visionary or exaggerated sense of pain, or of some concealed disease, or a whimsical dislike of certain persons, places, or things, or groundless apprehensions of personal danger or poverty, or the conviction of having experienced some dreadful accident or misfortune, the better way is to avoid any direct attempts to alter his opinions, but to endeavour to inspire confidence in some method of relief. Greding mentions the case of a medical man who conceived that his *stomach was full of frogs*, which had been successively spawning, ever since he had bathed when a boy, in a pool in which he had perceived some tadpoles; and he had spent his life in endeavouring to get them removed. One patient, perhaps, fancies himself a *giant;* another, as *heavy as lead;* a third, a *feather*, in continual danger of being blown away by the wind; and a fourth a *piece of glass*, and is hourly fearful of being broken. Marcellus Dentatus mentions a baker of Ferrara, who thought himself a *lump of butter*, and durst not sit in the sun, or come near the fire, for fear of being melted. The writer of this article once knew a man who always put on his coat the wrong side in front, because he conceived his face looked behind him. In such cases it is useless to argue with the patient, as it only causes irritation, and increases the malady. The restoration of the bodily health, and a sudden surprise or change of scene will often effect a cure.

HYPONITRIC ACID. See *Nitrous Acid.*

HYPONITROUS ACID. Syn. *Nitrous Acid* (of some writers); *Acidum Hyponitrosum*,—Lat. A highly volatile liquid, gaseous at common temperatures, first obtained by Gay-Lussac, by confining a mixture of binoxide of nitrogen in excess, and *oxygen gas*, in a glass tube over a concentrated solution of pure potassa in the mercurial pneumatic trough.

Prep. 1. *Binoxide of nitrogen*, 4 parts; *oxygen*, 1 part; (both quite dry) are mixed together, and the resulting orange-coloured fumes are exposed to intense cold, which condenses them into a green liquid.

2. (Liebig.) *Nitric acid* (sp. gr., 1·3), 10 parts; is poured on *starch* or *potato farina*, 1 part, contained in a spacious retort, and a gentle heat applied by means of a water-bath, when "pure hyponitrous acid is disengaged," and may either be employed in the state of gas or condensed by cold, as before. This is the method adopted in the preparation of nitrous or hyponitrous ether.

Prop., &c. This acid contains 14 parts (1 equiv.) of nitrogen, and 24 parts (3 eq.) of oxygen. At 0° Fahr. it is a colourless liquid, but is green at higher temperatures, whilst liquid, and rapidly volatilizes in orange-coloured fumes. It is decomposed by contact with water and the bases, and does not unite directly with the metallic oxides. The *earthy* and *alkaline hyponitrates* may, however, be indirectly formed by exposing the corresponding nitrates to a gentle red heat.

HYPOPHOSPHORIC ACID. A name erroneously given by M. Dulong to a mixture of the phosphoric and phosphorous acids.

HYPOPHOSPHOROUS ACID. A peculiar viscid liquid discovered by Dulong, in 1816, and obtained by treating *phosphuret of barium* with *water*, and as soon as the phosphuretted hydrogen has escaped, filtering, throwing down the baryta with *dilute sulphuric acid* and again filtering and evaporating. It is a powerful deoxidizing agent, and forms salts with the bases called *hypophosphites*. The *hypophosphites of the* *alkalies* may be prepared by precipitating an earthy hypophosphite with an alkaline carbonate; or by directly neutralizing the acid with those carbonates. The *earthy hypophosphites* may be formed by boiling the earth in a caustic state along with water and a few fragments of phosphorus, filtering, and evaporating. All the hypophosphites are soluble in water, and those of the alkalies, both in alcohol and water; they are all decomposed by heat.

HYPOSULPHATE. Syn. *Hyposulphas*,—Lat. A salt of hyposulphuric acid.

HYPOSULPHITE. Syn. *Hyposulphis*,—Lat. A salt of hyposulphurous acid.

HYPOSULPHOBENZIC ACID. Syn. *Hyposulphobenzidic Acid.* A sour liquid or crystals obtained by decomposing *hyposulphobenzidate of copper* by *sulphuretted hydrogen.* It forms salts with the bases termed *hyposulphobenzidates. Hyposulphobenzidate of baryta* may be formed by saturating fuming oil of vitriol with benzole, adding water, filtering, to separate the *sulphobenzide*, neutralizing the filtered liquid with carbonate of baryta, again filtering, evaporating, and crystallizing. *Hyposulphobenzidate of copper* may be obtained by precipitating the last salt with sulphate of copper, filtering, evaporating, and crystallizing.

HYPOSULPHOBENZOIC ACID. Syn. *Sulphobenzoic Acid. Prep.* Accurately precipitate a *solution of acid hyposulphobenzoate of baryta* with *sulphuric acid*, filter, evaporate first over the open fire, and then *in vacuo* over sulphuric acid. Crystalline, deliquescent, sour; forming salts called *sulphobenzoates* or *hyposulphobenzoates*, with the bases. *Sulphobenzoate of baryta* may be made by conducting the vapour of anhydrous sulphuric acid into a dry receiver, containing crystals of benzoic acid, and placed in a freezing mixture. As soon as a translucent mass is formed, dissolve it in water, decant the clear, neutralize with carbonate of baryta, evaporate, and add some hydrochloric acid, when crystals will form as the solution cools. It may be decoloured by animal charcoal, and purified from hydrochloric acid by repeatedly redissolving and crystallizing it.

HYPOSULPHOINDIGOIC ACID. A name given by Berzelius to one of the acids obtained by precipitating *sulphate of indigo* with *carbonate of potassa.*

HYPOSULPHURIC ACID. Syn. *Dithionic Acid; Acidum Hyposulphuricum*,—Lat. An acid compound of sulphur and oxygen, discovered by Welter and Gay-Lussac. It is prepared by passing *sulphurous acid gas* through *water* holding in suspension *black oxide of manganese*, in fine powder. The manganese is subsequently precipitated with *baryta*, added in excess, and a current of *carbonic acid gas* is passed through the liquid, which is next filtered, and evaporated, when crystals of *hyposulphate of baryta* are obtained. These, when dissolved, and carefully neutralized with *sulphuric acid*, yield a *solution of hyposulphuric acid.* It may be concentrated until its sp. gr. is 1·35. Hyposulphuric acid neutralizes the alkalies and earths forming salts called *hyposulphates*, which are soluble. See *Hyposulphate of Soda*, *Trithionic Acid*, *&c.*

HYPOSULPHUROUS ACID. This compound has never been isolated. The *hyposulphites*, or salts formed by its union with the bases, may either be obtained by digesting *sulphur* in *solutions of the sulphites*, or by passing *sulphurous acid gas* into *alkaline solutions.* The *hyposulphites of potassa* and *soda* possess the remarkable property of dissolving a large quantity of chloride of silver, and some other metallic compounds; hence their use in the art of photography. See *Hyposulphite of Soda*, *&c.*

HYRACEUM. A substance produced by the Cape badger (*hyrax capensis*), and proposed as a substitute for castoreum. "I believe it to be inert and useless." (Dr. Pereira.)

HYSTERICS. Syn. *Hysteria*,—Lat. The *treatment* of this disease varies with the causes and the symptoms. Bleeding, cupping, and depletives, are generally had recourse to, in robust and plethoric habits; and stimulants and tonics, in those of a weakly or relaxed constitution. Affusion of cold water, and nasal stimulants will frequently remove the fit, in mild cases. Exercise, proper amusements, and regular hours and diet, are the best preventives. See *Antihysteric Draught*, *Hydrocyanic do.*, *&c.*

ICE. Syn. *Glacies*,—Lat. Water, under ordinary conditions, crystallizes or freezes, at 32° Fahr. During this transition it expands with irresistible violence, and separates from all soluble matter previously combined with it. The density of ice is found to be only 0·950; that of water being 1·000. Coloured water and salt water by freezing produce colourless and fresh ice, and clean solid ice, when thawed, furnishes water equal in purity to that which has been distilled. To effect this purification perfectly, the whole mass of water must be slowly and completely frozen, so as to prevent the accumulation of blebs or air-bubbles, and the entanglement of any uncongealed or ejected matter in its pores.

The *use of ice* in the preparation of *ice-creams, iced-liquors, &c.*, is noticed elsewhere. The confectioner collects his ice as early as possible during the winter, and stores it in a *well-drained* well or excavation, somewhat of the form of an inverted sugar-loaf, contained in a small shed or building called an *ice-house.* This building should always be situated on a dry sandy soil, and, if possible, on an eminence. The door should be on the north side, and the roof should be conical and thickly thatched with straw.

In *medicine*, ice is frequently employed *externally* in inflammation of the brain, to resolve inflammation, to stop hemorrhage, to constringe relaxed parts, and as an anodyne, to deaden pain. For these purposes it is pounded small, in a cloth, and placed in a bladder or bag of gauze (*ice-cap, ice-poultice*) before applying it. *Internally*, ice or ice-cold water has been given with advantage in heartburn, typhus, inflammation and spasms of the stomach, to check the vomiting in cholera, and to arrest hemorrhage, whether bronchial, gastric, nasal, or uterine. Small lumps of ice, or a small glassful of pounded ice-and-water will often temporarily restore the tone of the stomach and nervous system during hot weather, when all other means fail. *Ice-creams*, taken in moderation, act in the same way.

In the warmer climates of Europe an *ice-house* or an *ice-safe* (a *refrigerator*) is a necessary appendage to every respectable dwelling, not merely for the purpose of pleasing the palate with iced beverages, but to enable the residents to preserve their provisions (fish, meat, game, milk, butter, &c.) in a wholesome state from day to day.

ICES. Syn. *Ice-creams.* These are commonly composed of cream or sweetened water, variously flavoured, and congealed by ice or a freezing mixture. Sometimes, instead of cream, the materials of a custard are used. The mixed ingredients are placed in a tin furnished with a handle at top, called a "*freezer*," or "*freezing-pot*," which is then plunged into a bucket containing *salt-and-ice*, (*ice* broken small, and mixed with about half its weight of *common salt*), and is kept in rapid motion, backwards and forwards, until its contents are frozen. As the cream congeals and adheres to the sides, it is broken down with the "*ice-spoon*," so that the whole may be equally exposed to the cold. As the salt and ice in the tub melt, more is added, until the process is finished. The "*ice-pot*" with the cream in it, is next placed in a leaden "*ice-stand*," is at once surrounded with a mixture of ice and salt, and closely covered over. In this state it is carried into the shop. The glasses are filled as required for immediate use, and should have been previously made as cold as possible.

Plain ice-cream or *cream for icing*, is commonly made by one or other of the following formulæ:—

1. *New milk*, 2 pints; *yelks of* 6 *eggs; white sugar*, 4 *oz.;* mix, strain, heat gently, and cool gradually.

2. *Cream*, 1 pint; *sugar*, 4 *oz.;* mix, as above.

3. *Cream* and *milk*, of each, 1 pint; *white sugar*, ½ *lb.*

Flavoured "*ice-creams*" are made by mixing "*cream for icing*" with half its weight of *mashed* or *preserved fruit*, previously rubbed through a clean hair sieve; or, when the flavour depends on the *juice of fruit* or on *essential oil*, by adding a sufficient quantity of such substances. *Raspberry* and *strawberry-ices* are made according to the former method; *lemon, orange, noyeau*, and *almond ices*, by the latter method. In the same way any other article besides cream may be frozen.

Chocolate for Icing is made by rubbing 1 *oz.* of *chocolate* to a paste with a tablespoonful of *hot milk*, and then adding "*cream for icing*," 1 pint.

Coffee for Icing is made of *cream for icing*, 1 quart, to which a small tea-cupful of the *strongest possible clarified coffee* has been added, together with 2 *oz.* of *sugar*, and the *yelks* of 3 or 4 *eggs*.

ICHTHYOSIS. See *Fish-skin Disease.*

ICING (for Cakes). Syn. *Sugar Ice.* The covering of concreted sugar with which the confectioners adorn their cakes. *Prep.* Beat the *white of eggs* to a full froth, with a little rose or orange-flower water; then add, gradually, as much *finely-powdered sugar* as will make it thick enough, beating it well all the time. For *use*, dust the cakes over with flour, then gently rub it off, lay on the icing with a flat knife, stick on the ornaments while it is wet, and place it in the oven for a few minutes to harden, but not long enough to discolour it. It may be tinged of various shades by the addition of the proper "*stains*."

IDRIALINE. A fusible, inflammable substance, found by Dumas, associated with the native cinnabar of the mines of Idria, in Carniola. It is extracted from the *ore* by means of *oil of turpentine.* It is only slightly soluble in alcohol and ether. When pure it is white and crystalline.

IDRYLE. A hydrocarbon generally found associated with idrialine.

IGASURIC ACID. Syn. *Strychnic Acid; Acidum Igasuricum,*—Lat. An acid discovered by Pelletier and Caventou, associated with strychnine in St. Ignatius' bean and nux vomica. It may be obtained by digesting the *rasped* or *ground beans* first in *ether*, and then in *boiling alcohol*, evaporating the latter decoction to dryness, diffusing the residuum through *water*, adding a little *carbonate of magnesia*, again boiling for some minutes, filtering, washing the powder with *cold water*, and digesting it in *alcohol*, and filtering. The *igasurate of magnesia* thus obtained is dissolved in *boiling water*, the solution decomposed by *acetate of lead*, and the precipitate (*igasurate of lead*), after being washed and diffused through *distilled water*, is decomposed by *sulphuretted hydrogen*. The solution thus obtained yields crystals (*igasuric acid*) on being evaporated. It is soluble in both water and alcohol.

IGASURINE. A peculiar yellow colouring matter found in the seeds and bark of nux vomica. It is reddened by nitric acid and chlorine. According to M. Desnoix, it is a very energetic base, and is more easily reddened by nitric acid than even brucine itself.

IGNITION. In the *laboratory* this term is commonly applied to the state or act of heating or being heated to redness or luminousness. See *Calcination.*

IGREUSINE. The fluid part of volatile oils.

ILLICINE. Syn. *Illicina.* An unexamined substance obtained from the leaves of the common holly (*ilex aquifolium,*—Linn.)

Prep. The *filtered decoction* is boiled for about 30 minutes with *fresh-burnt prepared animal charcoal*, after which the whole is set aside to cool; when cold the liquid portion is poured off from the charcoal, which is then collected on a filter, drained, washed with a little ice-cold water, and dried; it is next digested for some time in *boiling alcohol*, and the filtered tincture is gently evaporated to dryness. *Dose.* 6 to 18 gr.; in intermittents, gout, &c.

ILLUMINATION. Flame is gas or vapour in a state of combustion. When pure, the light emitted by it is exceedingly feeble. The luminosity of flame depends on the precipitation and ignition of solid carbon within it, a matter which depends both on the nature of the burning material and on the supply of atmospheric oxygen being duly regulated. The flame of substances destitute of carbon, or in which this development of solid matter does not take place, is pale or only feebly luminous. On the other hand, the quantity of heat evolved by the flame of any substance, presuming the combustion is complete, is constantly in inverse ratio to that of the light emitted by it. Pure hydrogen burns with a pale, smokeless flame, but with the production of considerable heat; whilst wax and light gas develope less heat during combustion, but burn with considerable brilliancy. "The light of a flame may be increased by diminishing its heat, or the intensity of its combustion; and conversely, the heat of a flame, may be increased by diminishing its light." To give the greatest degree of luminosity to flame, the supply of air must be proportioned to the character of the burning substance, and be insufficient for the instantaneous combustion of the evolved gases; in which case, the hydrogen takes all the oxygen, and the larger portion of the carbon is precipitated, and burnt in the solid form, at some little distance within the outer surface of the flame. When the supply of air is sufficient for the immediate and complete combustion of the *whole* of the combustible matter, no such precipitation takes place, and the flame is neither white nor brilliant. The richest coal gas mixed with sufficient air to convert all its hydrogen and carbon into water and carbonic acid, explodes with a pale blue flash; yet the same gas, when consumed in the ordinary way, burns with a rich white flame. When the supply of air is insufficient to cause the combustion of the newly-formed solid carbon at the instant of its development, and whilst it is in an incandescent state, the flame becomes red and smoky, and unburnt sooty particles are thrown off. The same occurs when the temperature of any portion of the hydrogen is reduced below that intensity required for the combustion of the newly separated charcoal. Solid bodies, as tallow, oils, and fats, which burn with flame, are converted into the state of gas by the heat required to kindle them, and it is this gaseous matter which suffers combustion, and not the substance which produces it. The existence of these facts may be easily demonstrated by means of a common candle or gas-burner. See *Light* (Artificial), *&c.*

ILLUTATION. See *Mud Bath.*

IMAGINATION. The influence of the imagination both in the production and cure of disease, has been long admitted by medical practitioners. It is probably the most powerful therapeutic agent known. "Extraordinary cures have been ascribed to inert and useless means, when, in fact, they were referable to the influence of the imagination." (Dr. Pereira.)

IMPERATORINE. A neutral, fusible, and acrid-tasted substance, extracted by means of ether from the roots of imperatoria ostruthium. It is insoluble in water.

IMPERIAL. Syn. *Potus Imperialis, Ptisana I.*,—Lat. *Prep.* 1. *Cream of tartar*, $\frac{1}{4}$ *oz.;* 1 *lemon*, sliced; *lump sugar*, 2 *oz.; boiling water*, 1 quart; infuse, with occasional stirring until cold, then pour off the clear portion for use.

2. A *lemon*, sliced; *sugar*, 1 *oz.; boiling water*, 1 pint.

3. *Yellow rind* and *juice of lemon; citric acid*, 1 *dr.; sugar*, $2\frac{1}{2}$ *oz.; hot water* (which has been boiled), 1 quart; as No. 1. Refrigerant and slightly diuretic. *Used* as a common drink in fevers, dropsy, &c.; and as a summer beverage.

IMPERMEABLE. A term recently applied to waterproof textile fabrics. See *Waterproofing.*

IMPETIGO. See *Eruptions* and *Tetters.*

IMPLEMENTS (Agricultural). "Almost all the operations of agriculture may be performed by the plough, the harrow, the scythe, and the flail; and these are the sole implements in the primitive agriculture of all countries. With the progress of improvement, many other implements (and machines) have been introduced; the more remarkable of which are the *drill plough*, the *horse hoe*, the *winnowing machine*, the *threshing machine*, the *hay-making machine*, and the *reaping machine*. The object of all these implements and machines is to abridge human labour, and to perform the different operations to which they are applied, with a greater degree of rapidity, and in a more perfect manner than before." (Loudon.) On the *perfection* of *agricultural implements* and *machines* depends much of the improvement of which this art is susceptible. See *Agriculture, &c.*

IMPROVING. The trade name for "doctoring," "adulterating," or "lowering" the quality of any substance with the view of cheapening it, or increasing its bulk. See *Wines, &c.*

INCENSE. *Prep.* 1. *Olibanum*, 2 or 3 parts; *gum benzoin*, 1 part.

2. *Olibanum*, 7 parts; *gum benzoin*, 2 parts; *cascarilla*, 1 part. Placed on a hot plate or burned, it exhales an agreeable perfume. *Used* in some of the rituals of the Roman catholic church.

INCINERATION. The reduction of organic substances to ashes by combustion. See *Calcination.*

INCOMBUSTIBILITY. The quality of being incapable of being kindled, or of being consumed by fire. Substances possessing this property are said to be "*incombustible*" or "*fire-proof.*"

INCOMBUSTIBLE CLOTH. Cloth made of the fibres of asbestos by weaving, will bear a considerable heat without injury. *Cotton* and *linen fabrics* prepared with a *solution* of *borax*, *phosphate of soda*, *phosphate of ammonia*, or *sal ammoniac*, may be placed in contact with ignited bodies without their suffering active combustion, or bursting into flame. These substances act by forming a species of glaze on the surface of the fibres, which excludes them from the air. They do not, however, prevent carbonization taking place, when the temperature is sufficiently high. *Solutions* of *alum, sea salt, &c.*, have also been used for the same purpose. It is by a knowledge of this property of culinary salt, that *jugglers* are enabled to perform the common trick of burning a thread of cotton whilst supporting a ring or a small key, without the latter falling to the ground. The cotton is reduced to a cinder, but from the action of the salt, its fibres still retain sufficient tenacity to support a light weight.

The addition of about 1 *oz.* of *alum* or *sal ammoniac* to the last water used to rinse a *lady's dress*, or a set of *bed furniture*, or a less quantity added to the starch used to stiffen them, renders them uninflammable, or at least so little combustible that they will not *readily* take fire; and if kindled, are *slowly* consumed *without flame.* Had this precaution been adopted, the late lamentable accident to a talented young actress at one of our national theatres might have been avoided.

Paper, wood, &c., may be rendered comparatively incombustible by soaking them in any of the above solutions. See *Asbestos, Fires, &c.*

INCOMBUSTIBLE STUCCO. *Prep.* From *moist gravelly earth* (or *sand*), previously washed, and sifted to the required degree of fineness, made into *stucco* with the following composition:—*pearl-ashes*, 2 parts; (dissolved in) *water*, 5 parts; *common clay*, 1 part. This is said to cost about 1*s.* 6*d.* per hundred square feet, and to have been tried on a large scale and found to answer well. It is used for wood, &c.

INCOMPATIBLES. Substances which exert a chemical action on each other, and cannot therefore, with propriety, be prescribed together in the same formula or prescription. The principles on which we should act to avoid falling into the last-named source of error, are briefly developed under the heads "*Affinity*" and "*Decomposition.*" To this we may add, that if a substance is endowed with well marked therapeutical or poisonous properties, independent of those which may exert a chemical effect upon the tissues, its mode of action will neither be changed nor destroyed by the combinations which it forms; provided always that the new compounds are not *insoluble* in water.

"It is not necessary to give two incompatible medicines at the same time, in order to produce decomposition; it is sufficient if they are given within a very short interval of each other. Thus a sick person, who has been treated with *lead* externally, or even internally, will present a discoloration of the skin, if he takes a sulphur bath four or five days after the lead treatment has been discontinued. If a person is rubbed with *iodide of potassium* shortly after having applied *Vigo's plaster* (plaster of ammoniacum with mercury), or the *Neapolitan ointment* (mercurial ointment), iodide of mercury and caustic potash will be formed, which will cause vesication. So also vomiting occurs if *lemonade* made with *tartaric acid* is taken five or six days after the administration of *white oxide of antimony.*" (Trousseau & Reveil.)

Lists of Incompatibles are published in many pharmaceutical and medical works, but are in reality of little use beyond illustrating rules and principles which are familiar to every chemist, and which every prescriber should also be intimately acquainted with.

INCRUSTATION (of Steam Boilers). Many methods have at various times been proposed to prevent the formation of deposits in steam boilers. When water abounding in *earthy carbonates* (as Thames water) is used, the plan recommended by Dr. Ritterband, will, we believe, be found one of the best and least expensive. It consists in simply throwing a little *sal ammoniac* into the boiler, by which carbonate of ammonia is formed, which passes off with the steam, and *chloride of calcium* (muriate of lime), which remains in solution. When the water is permanently hard (*i. e.*, contains sulphate of lime) this method is inapplicable. The *common plan* adopted by working engineers to prevent incrustations from either variety of water, is, on each occasion of cleaning out the boiler, to introduce some substance, which by its mechanical action shall prevent the precipitated earthy matter caking together, or adhering to the boiler plates. Some *common tar*, *bitumen*, or *pitch*, appears to answer well under most circumstances. Mr. Ira Hill recommends the use of 3 or 4 shovelfuls of *coarse sawdust.* He states, that after adopting the use of this article, he never had any difficulty from lime, although using water strongly impregnated with it, and has always found the inside of his boilers as smooth as if just oiled. We have worked a powerful boiler daily for 6 months without opening the "*man-hole,*" after throwing a few pounds of potatoes into it. In all cases, when the earthy matter can be kept in a state of solution, or precipitated in a pulverulent form, it is easily removed from the boiler by what engineers term "priming," which is allowing the hot water to be blown over with the steam, so that, after a sufficient time, the whole original contents of the boiler are removed, and replaced by fresh water. Before doing so, however, it is of consequence to cut off the communication with the cylinders, and to open the waste-steam cock.

INCUBATION (Artificial). This has been practised by the Egyptians from a very remote period. M. Bonnemain has the honour of having introduced this art to Western Europe, in 1775, and having been the first to pursue it successfully on the commercial scale. The source of heat employed by him was a circulatory hot water apparatus, and the temperature maintained by it, 100° Fahr. His plan was to introduce, daily, 1-20th only of the eggs, the apparatus was capable of receiving, so that on the 21st day the first chickens were hatched, and a like number every day afterwards as long as the supply of eggs was kept up. Among the trays containing the eggs, he placed saucers of water, to compensate for the absence of moisture derived in natural incubation by transpiration from the body of the hen. The chickens, as soon hatched, were transfered to a "nursery" or "chick-room," also artificially heated, and were fed with crushed millet seed. Several attempts have been made of late years to introduce artificial incubation into this country, with variable success. Those interested in the subject should pay a visit to Mr. Cantelo's Egg-hatching Exhibition in Leicester Square.

INCUBUS. See *Nightmare.*

INDIAN RUBBER. See *Caoutchouc.*

INDIGESTION. Syn. *Dyspepsy; Dyspepsia,*— Lat. This complaint pervades every rank of society, and is, perhaps, of all others, the most general. Few indeed are there, who wholly escape it, in one or other of its forms. The *common* symptoms of dyspepsia, are—want of appetite, sudden and transient distensions of the stomach, frequent eructations, heartburn, stomachic pains, occasional vomiting, and, frequently, costiveness or diarrhœa. Sometimes the head is affected, and dimness of sight, double vision, muscæ volitantes, and slight vertigo, are experienced, along with a multitude of other symptoms, depending on a derangement of the functions of the *nervous system.*

The *causes* of *dyspepsia* are numerous. In the *higher ranks of society* it is a common consequence of over indulgence in the luxuries of the table, of late hours, or of the want of proper exercise, both of body and mind. In the *studious*, and *those who lead a sedentary life*, it is usually caused by excessive mental exertion or anxiety, or by the fatigues of business, and the want of sufficient bodily exertion, and of pure air. In the *lower orders of society*, it generally results from inebriety, or a deficiency of proper food and clothing, bad ventilation, &c.; and is not unfrequently occasioned by the physical powers being over-taxed, especially soon after meals.

The *treatment* of *dyspepsia* depends less on medicine than on the adoption of regular habits of life. Moderation in eating, drinking, and the indulgence of the passions; early rising, due exercise, and retiring to rest at an early hour, will do much to restore the tone both of the stomach and nerves. Excessive study and mental exertion should be avoided, and recourse should frequently be had to society, and amusements of a lively and interesting character. If the bowels are confined, *mild aperients* should be taken, and if diarrhœa is present, *antacids* and *absorbents* may be had recourse to with advantage. The stomach may be strengthened by the use of *mild bitters, tonics*, and *stimulants*, and *sea bathing*, or the *shower* or *tepid bath* may be taken, when convenient, to strengthen the nervous system. When *dyspepsia* is a *secondary* or *symptomatic disease*, the cause should be sought out, and the treatment varied accordingly. *Among* the *aperient medicines* most suitable to dyspepsia, may be mentioned—*Epsom salts, phosphate of soda*, and *Seidlitz powders*, each of which should be taken largely diluted with water. An occasional dose of the "*Abernethy Medicines*" (see *page* 1) has also been recommended. Among *antacids*, are the *bicarbonates* and *carbonates of potassa* and *soda*, either of which may be taken in doses of half a teaspoonful dissolved in water; or if the spirits are depressed, one or two tea-spoonfuls of spirits of *sal volatile* will be more appropriate; and in cases *accompanied* by *diarrhœa*, a little *prepared chalk.* As *bitters*, the *compound infusion of orange peel*, or of *gentian*, are excellent. As *tonics*, small doses of *bark*, or of *disulphate of quinine*, to which *chalybeates* may be added, if there is pallor of countenance, or a low pulse, with no disposition to fever or headache.

When *dyspepsia* is complicated with *hysteria, hypochondriasis*, or *chlorosis*, the treatment noticed under those heads may be conjoined to that above recommended. When it depends on *constipation*, or a *deficiency of bile*, the mildest and most effective of all remedies will be found supplied in *inspissated ox-gall.* "In all cases of incipient constipation, ox-gall is a remedy of undoubted efficacy; and even in protracted cases, when hope has almost fled—but where evidences of strangulation are not unequivocally manifested, it should never be omitted by the practitioner. In *habitual* or *chronic constipation*, accompanied by *indigestion, clay-coloured stools*, and a *feeling of oppression after food has been taken*, it acts with almost specific certainty. When, however, the liver begins to assume its healthy action, its employment should be discontinued, as it will then produce all the symptoms of regurgitation of bile into the stomach. This state will be readily recognized as a favorable omen of returning power." (Dr. Allnatt, *Lancet*, 1845.) See *Draughts, Mixtures, Pills, &c.*

INDIGO. Syn. *Indicum, Pigmentum Indicum,*—Lat. An insoluble blue substance obtained from the leaves and young shoots of several species of *indigofera, isatis*, and *nerium.* These are soaked either in *cold water*, or, still better, in *water kept at about* 100° Fahr., until the liquor becomes deep green; the latter is then drawn off, and beaten or churned till blue flakes appear; *lime-water* is next added, and after a time, the yellow liquor is drawn off; the blue sediment is, lastly, dried, and formed into small lumps.

Prop. Tasteless; scentless; of a dark blue colour passing into purple; when rubbed with a smooth hard body, it assumes a coppery hue; insoluble in water, cold alcohol, ether, alkalies, hydrochloric acid, dilute sulphuric acid, and the cold fixed and volatile oils; slightly soluble in boiling alcohol and oils; freely soluble in concentrated sulphuric acid, and, when decoloured or reduced by contact with deoxidizing substances, in alkaline lyes; soluble in creasote; its colour is destroyed by chromic acid, nitric acid, and chlorine; when suddenly heated it gives off rich purple fumes, which condense into brilliant copper-coloured needles.

Pur. The best indigo ("*fine blue*") is that which has the deepest purple colour, and assumes the brightest coppery-hue when rubbed with the nail: its fracture is homogeneous, compact, fine-grained, and coppery; its powder is of an intensely deep blue tint, and light enough to swim on water; and it leaves only a fine streak when rubbed upon a piece of white paper. In general, when indigo is in hard, dry lumps of a dark colour, it is considered of bad or inferior quality. Indigo, when in hard or brittle lumps, or in dust or small bits, is often adulterated with sand, pulverized slate, and other earthy substances. The most certain test of its value as a dye-stuff, is an assay for its *indigotine.* (See *below.*)

Assay 1. Take 20 gr. of the *sample of indigo* for examination; 40 gr. of *pure quicklime* (made by burning white marble); and 1000 grains-measure of *distilled water;* with part of the water slake the lime; rub the indigo to an impalpable powder in a clean wedgewood-ware mortar, and gradually add to it a little of the water, so as to form a thin paste; then add the slaked lime, and triturate the mixture for some time, gradually adding more water; next introduce the triturated mass into a large flask, taking great care not to spill or waste anything, and wash out the mortar with the remaining portion of the measured water, and pour the washings into the flask; the latter, with its contents, are then to be exposed for several hours at a temperature ranging from 180° to 190° Fahr., by keeping it immersed in a water-bath heated to near the boiling-point; next add a little (say 30 or 35 gr.) of *protosulphate of iron* (in fine powder), and agitate the little until it is dissolved; then cork up the flask closely, and again place it in the water-bath, and allow it gradually to cool there, occasionally shaking it to assist the reaction of the ingredients on each other; when it has cooled, decant the clear green liquor from the sediment into an open *graduated alkalimeter* up to a certain point, which is then noted; to promote the oxidization of the colouring matter, and to keep the lime and other foreign bodies in solution, a *little hydrochloric acid* should be added; as soon as the liquor has cleared, throw the whole on a *weighed filter*, and collect the precipitate, which is *pure indigo*, wash it, dry it by the heat of boiling water, and then weigh it. The per centage of pure indigo is then ascertained as follows:—Suppose, for example, that 40 divisions (400 grains-measure) have been poured into the alkalimeter, and by oxidation have yielded 3 gr. of indigo, the sample under examination contained 37½ per cent. of *pure indigo.* For

400 gr. : 3 gr. : : 1000 gr. : 7½ gr.

which, being multiplied by 5 (20 gr. only being examined) is equal to 37½ gr.

2. (M. Dana's Process.) This consists in boiling a weighed sample in *water* along with *carbonate of soda*, adding *protochloride of tin* from time to time, and precipitating the clear solution with a *solution* of *bichromate of potassa;* the whole is then thrown on a filter, and the precipitate after being washed, first with *dilute hydrochloric acid*, and next with *pure water*, is dried, and weighed; it is then incinerated; the *weight of the ashes*, deducted from the *original weight of the dried precipitate*, indicates the proportion of *pure indigo.*

3. (*Fritsche's Process.*) 25 gr. each of *indigo*, and *grape sugar*, are put into a bottle capable of containing 1000 gr. of liquor; the bottle is half filled with *boiling alcohol*, and the other half with *alcohol* previously mixed with 37½ gr. of a very concentrated *solution of caustic soda;* the whole is then strongly agitated, and after being left at rest for some time, and becoming bright, is decanted into another bottle; whilst protected from contact with the air, this liquor is of a yellowish-red colour, and so dark that it appears transparent only when held before the light, but as soon as it is exposed to the influence of atmospheric oxygen it becomes purple, and quickly passes through the different shades of red, violet, and blue, until the whole of the *indigotine* is deposited. This appears under the form of minute scales, or of a very fine, light, crystalline powder. This is collected on a filter and washed first with a little *rectified* spirit and then *thoroughly* with *water*, after which it is dried by the heat of *boiling water*, and weighed.

Commercial indigo seldom contains so much as 50% of *indigotine* or *pure indigo blue.*

Uses, &c. Indigo is one of our most valuable blue pigments and dye-stuffs. In medicine it has been employed in various affections of a spasmodic character, as chorea, convulsions, epilepsy, hysteria, &c. In large quantities it often induces giddiness, vomiting, and diarrhœa; and when continued for some time, muscular twitchings, resembling those arising from strychnine. *Dose.* Beginning at about 15 gr., and gradually increased to 1, 2, or even 3 dr., at which it should be continued for 3 or 4 months; made into an electuary with honey or sugar, to which some aromatic may be added.

Obs. Indigo, though apparently a very simple substance, is composed of several distinct principles, and by the action of acids, alkalies, oxygen, chlorine, &c., yields several other substances possessing considerable interest. The following are the chief of these compounds of which the word indigo constitutes a portion of the name:—

INDIGO (Sulphate of). Syn. *Sulphate of Indigotine, Sulphindylic Acid, Sulphindigotic Acid.* This is prepared by gradually adding *indigo* (in fine powder), 1 part, to *smoking Sulphuric acid*, 5 parts, or *oil of vitriol*, 8 parts, contained in a stone-ware vessel placed in a tub of *very cold water*, to prevent the mixture heating; the ingredients are stirred together with a glass rod at short intervals until the solution is complete, after which the whole is allowed to repose for about 48 hours, by which time it becomes a homogeneous pasty mass of an intense blue colour, which in a dull light appears nearly black. In this state it forms "*Barth's blue*," or the "*chemic blue*" or "*indigo composition*" of the dyer. Diluted with about twice its weight of soft water, it is converted into the "*Saxon blue*" or "*liquid blue*" of the shops, also used for dyeing. If during the addition of the powdered indigo to the acid the mixture becomes heated, a part of the indigo blue is decomposed, sulphurous acid and "*indigo green*" being produced.

Obs. When sulphate of indigo is diffused through a large quantity of water, nearly boiling, and *wool* is macerated in it for some time, the latter absorbs the whole of the indigo-sulphate and is dyed blue, whilst the liquor assumes a greenish-blue colour. Wool so prepared, when well rinsed in water, and boiled for some minutes in a large quantity of that liquid containing 1$^0_0$ or 2$^0_0$ of *carbonate of potassa*, or a quantity equal to about 1-3rd that of the indigo originally employed, gives up its blue colour, but retains the indigo-red in its fibres. The liquid is now a rich blue-coloured solution of "*ceruleo-sulphate of potassa*," from which the salt may be obtained by cautious evaporation. This compound is prepared on the *large scale*, by diluting *sulphate of indigo* with about 12 times its weight of *soft water*, and imperfectly saturating the solution with *carbonate of potassa;* the ceruleo-sulphate falls down as a dark-blue coppery-looking powder, soluble in 140 parts of cold water, and in about 90 parts of boiling water. This substance is kept both in the *moist* and *dry state*, and is known in commerce under the respective names of "*distilled indigo*," "*precipitated do.*," "*soluble do.*," "*indigo paste*," "*blue carmine*," "*distilled blue*," "*soluble blue*," *&c.* It is extensively used in *dyeing;* and when mixed with *starch*, whilst in the moist state, and made into cakes or knobs, it constitutes the finest variety of the "*blue*" used by laundresses for tinging linen. "*Ceruleo-sulphate of ammonia*" and "*ceruleo-sulphate of soda*" may be prepared in the same way as the potash-salt, by substituting the *carbonates of those bases* for carbonate of potassa. The ammonia salt is very soluble. The "*ceruleo-sulphates of lime*" and "*alumina*" are also soluble in water.

INDIGO BLUE. See *Indigotine.*

INDIGO BROWN. Obtained from *powdered indigo* by treating it first with *dilute sulphuric acid*, and then with a hot *strong caustic lye*, which must afterwards be neutralized with *acetic acid*, evaporated to dryness, and digested in *alcohol*, to dissolve out acetate of potassa. A dark-brown substance resembling humic acid.

INDIGO DYES. There are two methods of preparing solutions of indigo for dyeing. —1. By *deoxidizing it* and then *dissolving it in alkaline menstrua.*—2. By *dissolving* it in *sulphuric acid.* The former constitutes the ordinary *indigo vat* of the dyers.

1.—*a.* (*Cold vat.*) Take of *indigo*, in fine powder, 1 *lb.; green copperas* (clean cryst.), 2½ to 3 *lb.; newly slaked lime*, 3½ to 4 *lb.;* triturate the powdered indigo with a *little water* or an *alkaline lye*, then mix it with some *hot water*, add the *lime*, and again well mix, after which stir in the solution of copperas, and agitate the whole thoroughly at intervals for 24 hours. A little *potash* or *soda* is frequently added, and a corresponding portion of lime omitted. For *use*, a portion of this *preparation vat* is ladled into the "*dyeing vat*," as wanted. After being employed for some time the vat must be refreshed with a little more *copperas* and *fresh-slaked lime*, when the sediment must be well stirred up, and the whole thoroughly mixed together. This is the common "blue vat" of this country.

b. (*Potash vat.*) Take *indigo*, in fine powder, 12 *lb.; madder*, 8 *lb.; bran*, 9 *lb.; potash*, 24 *lb.; water* at 125° Fahr., 120 cubic feet; mix well; at the end of about 36 hours add 14 *lb.* more *potash*, and after 10 or 12 hours longer, further add 10 *lb.* of *potash*, and rouse the whole up well; as soon as the fermentation and reduction of the indigo are well developed, which generally takes place in about 72 hours, add a little fresh-slaked lime. This vat dyes very quickly, and the goods lose less of their colour in alkaline and soapy solutions than when dyed in the common vat.

c. (*Pastel Vat.*) As the last, but employing *woad* instead of madder; the vat is set at 160° Fahr., and kept at that temperature until the deoxidizement and solution of the indigo has commenced. The last two are also called the "warm vat."

Obs. Wool, silk, linen, and cotton, may each be dyed blue in the indigo vat. The goods, after being passed through a weak *alkaline solution*, are subjected to the action of the vat for about fifteen minutes; they are then freely exposed to the air; the immersion in the vat and the exposure are repeated until the colour becomes sufficiently deep. Woad and madder improves the richness of the dye. Other deoxidizing substances, beside those above mentioned, may be used to effect the solution of the indigo; thus a mixture of *caustic soda*, *grape sugar*, *indigo*, and *water*, is often employed on the Continent for this purpose; and *orpiment*, *lime*, and *pearlash* are also occasionally used. When properly prepared, the indigo vat may be kept in action for several months by the addition of one or other of its constituents, as required. An excess of either copperas or lime should be avoided.

2. The *sulphatic solution of indigo*, noticed at *pages* 146, 597, &c., is added to *water*, as required, and the goods, previously boiled with *alum*, are then immersed in it, and the boiling and immersion are repeated until the wool becomes sufficiently dyed.

Obs. With the above dye every shade of blue may be dyed, but it is most commonly employed to give a ground to logwood blues. A solution of *soluble indigo* (see *above*), in *water very slightly acid with sulphuric acid*, imparts a very fine blue to cloth, superior in tint to that given by the simple sulphate.

INDIGO GREEN. See *Sulphate of Indigo.*

INDIGO PURPLE. Syn. *Phœnicine.* The name given by Mr. Crum to the purple precipitate obtained by filtration from a *solution of indigo in fuming sulphuric acid*, when largely diluted with *water.*

INDIGO RED. Syn. *Indigo Resin*, *Red Resin of Indigo.* This is prepared by boiling *alcohol* (sp. gr., 0·830), on *powdered indigo* previously exhausted by digestion in *dilute acids* and in a *strong alkaline solution.* When heated it is converted into a white sublimate (*deoxidized indigo-red*), but recovers its red colour by the action of nitric acid.

INDIGO WHITE. See *Indigogene.*

INDIGOGENE. Syn. *Indicyle*, *Indigo White*, *Reduced Indigo*, *Hydrogenized do.* A name given by Brugnatelli to reduced or deoxidized indigo-blue. It must not be confounded with *aniline* or *crystalline* which has been recently occasionally called indigogene, as the two substances are quite distinct compounds.

Prep. The *yellow alkaline solution* obtained by one or other of the processes noticed under *indigotine* is carefully protected from the air, both before and after precipitation with *hydrochloric acid;* and the precipitate, after being rapidly washed with *recently boiled distilled water*, or with *very dilute sulphurous acid*, is drained on a filter, dried *in vacuo*, and then at once transferred to a well-stoppered bottle.

Prop., &c. A grayish-white mass of minute crystals, generally light-blue on the surface, and rapidly turning blue on exposure to the air; soluble in alkalies, alcohol, and ether, to which it imparts a yellow colour. These solutions deposit indigo blue on exposure to the air. A solution of this substance constitutes the indigo vat of the dyer.

INDIGOIC ACID. See *Anilic Acid.*

INDIGOTINE. Syn. *Ceruline*, *Indigo Blue.* This is the pure blue principle of indigo. It appears to be the *oxide* of the same organic radical of which indigo-white is probably the *hydrate.*

Prep. 1. *Indigo* (in fine powder) is digested successively in *dilute hydrochloric acid*, *solution of potassa*, and *alcohol;* the dried residuum is *crude indigotine.*

2. *Indigo* (in fine powder), 1 part; *green sulphate of iron*, 2 parts; *hydrate of lime*, 3 parts; *water*, 15 parts; mix, agitate occasionally until the colour is destroyed, then decant the clear portion, precipitate with *dilute hydrochloric acid*, and wash the powder, *first* with *water*, and then with *boiling alcohol*, until the latter ceases to acquire a yellow colour.

3. *Caustic soda* and *grape sugar*, of each,

1 part; *water*, 20 parts; *powdered indigo*, 5 parts; mix, and proceed as last. The above are essentially the same as the indigo vat., but on the small scale.

4. (Fritsche.) This process has been already explained. (See *page* 596.) It is not only a good process for obtaining indigotine, but the easiest and most correct means of testing the commercial value of indigo, and is well calculated, from its simplicity, for the use of the practical dyer. The product from all the above exceeds 50% of the indigo operated on.

5. (Mr. Thos. Taylor.) *Powdered indigo*, 2 parts; *plaster of Paris*, 1 part; *water*, q. s. to reduce the mixture to a thin paste; spread the mass evenly upon an oblong iron plate to the depth of about ¼ inch, and dry it by a gentle heat. It must then be held over the flame of a spirit lamp, when a disgusting odour will be evolved, the mass will begin to smoke, and in a few minutes will be covered with a heavy purple vapour, which will condense into brilliant flattened prisms or plates of an intense copper colour, forming a thick velvety coating over the surface immediately exposed to the heat. Should the mass catch fire, it may be instantly extinguished by a drop of water let fall upon it. *Prod.* 15 to 18%. See *Indigo*, *&c.*

INDINE. A peculiar substance produced when *bisulphisathyde* is treated with a cold *aqueous solution of pure potassa.* This substance is isomeric with indigo-white, but is in other respects dissimilar.

INDINIC ACID. Formed by the action of a *boiling solution of potassa* on *indine.* It forms crystalline salts. *Indinate of potassa* forms small black needles.

INDURATION. An increase in the consistence of any portion of the body, usually resulting from chronic inflammation, pressure, or friction. *Corns* and *galls* are of this kind.

INFANCY. "The domestic treatment of infants and children is comprised in the application of the laws of health to the mother as well as to the child. The position of parent is one of serious responsibility, both morally and physically, and the edict has gone forth that 'the sins of the parent shall be visited on the children.' If we could ensure good mothers, we could vastly improve the race of men. The nursing mother of a sick infant must, by following faithfully the rules of health in respect of the four great hygienic principles—*food*, *clothing*, *exercise*, and *ablution*, give health with her milk to her offspring; she must also pay close attention to her mind, avoid all sources of irritation and anxiety, and remember that an angry mother sours her milk, and produces a fractious, and often a diseased infant. I am quite of opinion, that if mothers were sound in constitution, and bestowed the requisite care upon the maintenance of their health, we should hear little of *diseases of children.* In children, as well as in parent, the rules of health must be carried out," and their neglect cannot fail to bring with it a heavy retribution. (Eras. Wilson; *slightly abridged.*) See *Exercise*, *Nursing*, *&c.*

INFANT'S PRESERVATIVE (Atkinson's). *Carbonate of magnesia*, 6 dr.; *white sugar*, 2½ *oz.*; *oil of aniseed*, 20 drops; *compound spirit of ammonia* and *rectified spirit*, of each, 2½ fl. dr.; *laudanum*, 1 fl. dr.; *syrup of saffron*, 1 oz.; *caraway water*, q. s. to make the whole measure 1 pint. Antacid, anodyne, and hypnotic.

INFECTION. Syn. *Contagion.* The communication of disease either by *personal contact* with the sick, or by means of *effluvia* arising from their bodies. Attempts have been made to restrict the term *contagion* to the former, and *infection* to the latter, but this distinction is now discarded by the majority of respectable writers. Indeed, many persons deny the existence of either. The following are the principal diseases which are commonly regarded as contagious:—*chicken-pox*, *cholera*, *cow-pox*, *dysentery*, *erysipelas*, *glanders*, *gonorrhœa*, *hooping-cough*, *hydrophobia*, *itch*, *measles*, *mumps*, *ophthalmia* (purulent), *plague*, *scald-head*, *scarlet fever*, *small-pox*, *syphilis*, *typhus*, *yaws.* See *Chlorides*, *Disinfectants*, *&c.*

INFLAMMABLE AIR. See *Hydrogen.*

INFLAMMATION. Syn. *Inflammatio*,—Lat. The common *symptoms* of inflammation, are *pain*, *swelling*, *heat*, and *redness*, attended with fever and general constitutional derangement when severe. In all cases, the vascular action of the part is excited or augmented; and if the attack does not subside or terminate without an exacerbation of the symptoms, *adhesion*, *suppuration*, *ulceration*, and *obstruction of parts*, follow each other in regular succession. In *external inflammations*, and in those which attack the outer covering of the viscera, these symptoms are the most highly developed and observable; whilst in *inflammations of internal membranes* and deep-seated parts, little pain is often experienced.

The *treatment* of inflammations, whether trifling or serious, is essentially the same in principle, and only differs in degree. This consists in the adoption of the usual means for lowering the force of the circulation and the frequency of the pulse; of which *bleeding*, *purging*, a *low diet*, and the use of *refrigerant drinks* and *lotions*, form the most important part. The constitutional derangement or symptomatic inflammatory fever, and inflammatory condition of the blood, which always accompany local inflammation, and progress with its intensity, are usually combated by *copious bleeding* from the arm, repeated a second, and even a third time, until some obvious advantage is gained. In inflammations of a more purely local character, *cupping* or *leeching* the part immediately affected, or the parts adjacent to it, is in general more appropriate and successful. In these cases the application of *refrigerant* or *sedative lotions*, *baths*, *&c.*, generally proves of much advantage. In cases in which there is induration or dryness of the part, the use of *warm embrocations* is indicated.

Inflammation often arises from apparently very trifling causes, particularly in persons of a full or bad habit of body, or who indulge in the free use of malt liquors. In some persons, a very trifling local injury, as a slight abrasion, cut, prick, or sprain, produces a considerable amount of tumefaction, attended with severe constitutional excitement. We were once acquainted with a very amiable and beautiful young lady who lost her life from accidentally paring one of her toe nails too close. Had she, on the first occurrence of the irritation and redness which followed, reduced her diet, and taken a dose of aperient medicine, it is probable that she would not have furnished a case in illustration of the danger of neglecting apparently trifling symptoms. Punctured wounds, sprains, and dislocations, commonly furnish the most serious cases of inflammation that depend on mere external injury. See *Abscess*, *Fever*, *Tumours*, *&c.*

INFLAMMATION (of the Bowels). The *common causes* are incautious exposure to cold, the use of improper food, and the presence of acrid substances or hardened fæces in the bowels. The more constant *symptoms*, are pain over the abdomen, thirst, heat, and excessive restlessness and anxiety; sickness, obstinate constipation, and a hard small quick pulse. In the later stages the pain and tenderness of the abdomen especially around the navel, become excessive, and there is difficult micturition. In some cases, the pain suddenly ceases, the belly becomes tumid, the pulse scarcely perceptible, the countenance ghastly, and the patient dies in a few hours. The *treatment* consists in very copious bleeding, leeches to the abdomen, hot bath and fomentations, aperient clysters, and mercurial purges; with effervescing draughts and opium to allay sickness, followed by diaphoretic salines, and gentle aperients. See *Stomach*, *&c.*

INFLAMMATORY FEVER. See *Fever* and *Inflammation.*

INFLUENZA. See *Catarrh.*

INFUSION. Syn. *Infusum*, *Infusio*,—Lat. A liquid medicine prepared by macerating vegetable or animal substances in water, at any temperature below that of ebullition.

The mode of *preparing* infusions, is, with most substances, precisely similar to that pursued for making the almost universal beverage—*tea*. The ingredients are commonly placed in a stoneware pot or vessel (an *infusion pot*) previously made hot; *boiling water* is then poured over them, and the cover being placed on, the whole is allowed to digest together, at first, for a short time, in a warm situation, as on the hob or the fender, and afterwards (the vessel being removed from the heat) until the whole becomes cold. The liquid is then poured from the ingredients, and the latter, being slightly pressed, if necessary, the infusion is strained through a piece of clean linen or a hair sieve for use. During the digestion, the ingredients should be *occasionally stirred*, an important matter often neglected, and not even referred to by most pharmaceutical writers.

The *substances* employed for making infusions receive the same *preliminary treatment* as those intended for making *decoctions*. *Shavings*, *leaves*, and *flowers*, require no previous preparation beyond being pulled asunder; but *roots*, *woods*, and other *solid substances*, must be bruised or sliced, if in the green or recent state, or bruised, or coarsely pulverized, if dry, for the purpose of exposing as large a surface as possible to the action of the menstruum.

The substances extracted by water from vegetables by infusion are chiefly gum, mucus, extractive, tannin, certain vegetable acids, the bitter and narcotic principles, gum-resin, essential oil, and alkaloids. Some of these substances are only sparingly soluble in water at ordinary temperatures; but more readily so in *hot* water, and freely soluble in *boiling water*. The temperature of the water should be therefore proportioned to the nature of the vegetable matter operated on. For mere demulcent infusions, in which fecula and gum are the chief substances sought to be dissolved out, and when the active principle is scarcely soluble in water, unless at nearly the boiling temperature, *boiling water* alone should be employed; but when the medicinal virtues of vegetables are soluble in water at lower temperatures, it is better to employ *hot water* (165° to 175° Fahr.), and to allow a little longer period for the digestion. In many cases *temperate water* (from 60° to 70°), or *tepid water* (from 80° to 90° Fahr.) may be used with advantage, especially in the preparation of *aromatic bitter infusions*, and in most cases, where it is wished that the product should contain as little inert matter as possible; but when water at low temperatures is employed, the period of the maceration must be proportionately increased. By adopting the method of *maceration in vacuo*, or in an atmosphere of carbonic acid, the menstruum may be allowed to lay in contact with the vegetable matter for an unlimited period, without decomposition taking place.

Infusions, like decoctions, are liable to undergo *spontaneous decomposition* by keeping, especially in warm weather, when a few hours are often sufficient for their passage into a state of active fermentation; they should therefore, when possible, be prepared for use daily, as beyond 24 hours they cannot be depended on. The London College directs a pint only to be made at a time, thus very properly regarding them as extemporaneous preparations.

Concentrated Infusions, now so common in the shops, and unfortunately, so generally used in dispensing, are either made by taking 8 times the quantity of the ingredients ordered in the pharmacopœia, and then proceeding in the usual manner, or by the method of displacement; *or*, by carefully and rapidly *concentrating the simple infusions*, by evaporation in a steam or salt water bath, until reduced to about 1-7th of the original quantity. In either case, the liquid is put into a *strong* bottle, without being filtered, and 10 to 12$\frac{0}{0}$ of *rectified spirit* added to it, whilst still hot. The cork is then put in and secured down, and the whole agitated for some minutes, after which it is set aside for a week, when the clear portion is carefully decanted from the sediment for sale. *Another method* which answers well with the aromatic bitter vegetables, is to take 8 *times* the *usual quantity of the ingredients*, and to exhaust them with a mixture of *rectified spirit*, 1 part; and *distilled water*, 3 parts; by digestion, or, better still, by percolation. Concentrated infusions made in this way keep well, and deposit scarcely any sediment. Many houses that are remarkable for the "brilliancy" and beauty of these preparations, employ $\frac{1}{3}$ *spirit of wine* and $\frac{2}{3}$ *water* as the menstruum. It may, however, be taken as a general rule, that for vegetable substances that abound in woody fibre, and contain little extractive matter soluble in water (as *quassia*, for instance), $\frac{1}{6}$ to $\frac{1}{5}$ part of *spirit* is sufficient for their preservation; whilst for those abounding in mucilage or fecula, or that readily soften and become pulpy and glutinous in *weak* spirit (as *rhubarb*) $\frac{1}{5}$ to $\frac{1}{3}$ is required.

By adopting the method originally suggested by Mr. Alsop, infusions may be preserved, uninjured, for a year or longer, without the addition of spirit or any other substance. The only precaution necessary is, to keep them in bottles *perfectly filled*, and *hermetically sealed.* (Pharm. Journ. i. 57.) Our own plan is to put a few bruised *cloves* or *seeds of black mustard* into the bottles, which must be only 2-3rds filled, then completely fill them with a condensed atmosphere of carbonic acid gas; and, lastly, to stopper them and seal them over, so as to perfectly exclude the air. A pint of decoction of sarsaparilla, and $\frac{1}{2}$ pint of infusion of calumba treated in this way, kept good for fully 9 years. By simply macerating in the infusion as much *bruised mustard seed* as can be added without flavouring the liquor, along with a little *bruised cloves*, we find that most vegetable infusions may be preserved in bottles which are occasionally uncorked, without either *fermenting or becoming mouldy*, by the use of very little spirit ($\frac{1}{9}$ or $\frac{1}{10}$).

Before adding the spirit to infusions made with *cold* water, or with water which is only *tepid*, it is advisable to heat the liquid to about 185° Fahr., in a water-bath, and after keeping it at that temperature for a few minutes, and allowing it again to become cold, to separate it from the precipitated matter, either by filtration or decantation.

It is often very difficult to render vegetable infusions and decoctions perfectly transparent, a quality always expected in the *concentrated preparations.* Defecation by repose is always better than filtration, owing to the more or less viscidity of the suspended matter. When this is not sufficient, they may be clarified with *white of egg* (2 or 3 to the gall.) previously beaten up with 5 or 6 fl. oz. of water. Most of the vegetable infusions and decoctions will readily pass the filter, after a *very small* quantity of *acetic*, *nitric*, or *sulphuric acid* has been added to them. The most obstinate may be rendered "*brilliant*," or "*candle bright*," as the "cellarmen" call it, by shaking them up, first with about a drachm of *dilute sulphuric acid*, and afterwards with the *whites of* 3 *or* 4 *eggs*, previously mixed with a few ounces of water, for each gallon of the liquid. This plan is, however, objectionable, for many medicinal preparations.

As many infusions which are occasionally employed in medicine, must necessarily escape being separately noticed in this work, it may be as well to remark, that the *infusions* of all vegetables that do not exert a *very powerful* action on the human frame, as ordinary herbs and roots, may be made by pouring 1 pint of *boiling water* on 1 *oz.* of the *vegetable matter*, and allowing it to macerate for ½ an hour to an hour. The *decoctions* of the same vegetables may be made by simply boiling the above ingredients, in the same proportions, for 10 or 15 minutes, instead of operating by mere infusion. With substances of somewhat greater activity, only half the above quantity should be taken; whilst, with the *narcotic plants*, and those possessing great activity, 1 to 2 dr. to *water*, 1 pint, will be the proper quantity. *The ordinary dose* of such infusions and decoctions is ½ to 1 wine-glassful (1 to 2 *fl. oz.*), two, three, or four times a day, as the case may indicate.

Infusion is preferred for all bodies of a delicate texture, which readily yield their active principles to water; and especially when these are either volatile or liable to be injured by the heat of ebullition.

The *simple infusions* are now less frequently made by the druggist than formerly. In most cases he merely furnishes the ingredients, and the infusions are prepared by either the nurse or patient, by whom they are commonly called "*Teas*."

The following list embraces most of the infusions used in prescribing or noticed in books. Where the proportions of the ingredients are not given, 1 *oz.* of the *medicinal substance*, and 1 pint of *boiling water* are to be taken, and the *dose* is that referred to above.

INFUSION (Agrimony). Syn. *Agrimony Tea; Infusum Agrimonii*,—Lat. From the fresh tops before the flowers are formed. Vermifuge. *Dose.* A teacupful 3 or 4 times a day; also used as an astringent gargle and lotion. For internal use, an equal weight of *liquorice root* (sliced) is commonly added.

INFUSION (Alkaline). Syn. *Infusum Alkalinum*,—Lat. *Prep.* (Beasley.) *Hickory ash*, 1 pint; *wood soot*, ¼ pint; *boiling water*, 1 gall.; in 24 hours decant the clear. "A popular remedy in America for dyspepsia with acidity."

INFUSION (Aloes). Syn. *Infusum Aloës*,—Lat. *Prep.* From *hepatic* or *Socotrine aloes* (in powder), 2 dr.; *carbonate of potassa*, 1½ dr.; *boiling water*, 1 pint.

INFUSION (Aloes,—Compound). Syn. *Infusum Aloës Compositum*,—Lat. *Prep.* 1. As the *compound decoction* (Ph. L.), but using only a pint of *boiling water.*

2. (Fothergill.) *Calumba* and *rhubarb*, of each, 1 oz.; *aloes*, 2 dr.; *lime water*, 16 fl. oz.; *spirit of horse-radish*, 1 fl. oz.; macerate in the cold for 12 hours, and strain. The last three, like the *decoction*, are aperient, antacid, stomachic, tonic, and emmenagogue. *Dose.* 1 table-spoonful to a small wine-glassful, in water. The last one is an admirable medicine in dyspepsia, loss of appetite, and troublesome constipation.

INFUSION (American Calumba). Syn. *Infusum Frazeræ*,—Lat. From the *dried root of American calumba* (Frazera Carolinensis,—*Walter.*) A pure, powerful, and excellent bitter, destitute of aroma, and fully equal to gentian. (Lindley.)

INFUSION (American Centaury). Syn. *Infusum Sabatii*,—Lat. From the herb (*sabbatia angularis*). A pure bitter tonic, without astringency or aroma.

INFUSION (American Senna). Syn. *Infusum Cassiæ Marylandicæ*,—Lat. *Prep.* (Martin.) *Leaves of American* or *wild senna* (cassia Marylandica,—*Linn.*), 1½ oz.; *coriander seed*, 1 dr.; *boiling water*, 1 pint. Purgative.

INFUSION (Angelica). Syn. *Infusum Angelicæ*,—Lat. From the *root of garden angelica.* A warm stomachic and diaphoretic; and, in large doses, aperient. It is a popular remedy in dyspepsia, flatulent colic, and heartburn.

INFUSION (Aniseed). Syn. *Aniseed Tea; Infusum Anisi*,—Lat. Carminative; an excellent adjunct to purgatives to prevent griping; given to infants to relieve colic, &c. Dr. Prout recommends the use of water at 120° or 125° Fahr.

INFUSION (Antiscorbutic). Syn. *Infusum Antiscorbuticum, Mistura Antiscorbutica*,—Lat. *Prep.* (Hosp. F.) *Water trefoil* (menyanthis trifoliata,—*Linn.*), 1 oz.; *orange peel*, 2 dr.; *boiling water*, 1 quart; infuse for 8 or 10 hours, strain, and add of *compound spirit of horse-radish*, 5 fl. oz. In scurvy.

INFUSION (Arnica). Syn. *Infusum Arnicæ*,—Lat. From the *flowers* of *mountain arnica* or *German leopard's bane* (arnica montana,—*Linn.*) Cottereau orders 1 oz., Dr. Pereira ½ oz., and Dr. A. T. Thomson, ¼ oz. of the *flowers* to the pint. The first is the usual quantity. The dose of the first is a tablespoonful; of the second, ½ to 1 fl. oz.; of third, ½ to 1 wine-glassful. See *Decoctions.*

INFUSION (Arnica,—Compound). Syn. *Infusum Arnicæ Compositum.*—Lat. *Prep.* (Ph. Copenh.) *Flowers of arnica,* 1 dr.; *peppermint,* 2 dr.; *chamomiles,* ½ oz.; *boiling water,* ½ pint. *Dose.* 1 fl. oz. As the last.

INFUSION (Arnica-root). Syn. *Infusum Arnicæ Radicis,*—Lat. *Prep.* (Ph. Castr. Ruth.) *Arnica root,* 40 gr.; *water,* 1 ℔. *Dose.* 1 fl. oz. As the above.

INFUSION (Astringent). Syn. *Infusum Astringens, Mistura do.,*—Lat. *Prep.* 1. From *oak-bark.*

2. *Infusion of cusparia,* 17 fl. oz.; *tincture of catechu* or *kino,* 1 fl. oz.; *powdered ipecacuanha,* 1 dr.; *powdered opium,* 12 gr.; mix. In diarrhœa, &c. It must be well shaken before pouring out the dose.

INFUSION (Balm). Syn. *Infusum Melissæ,*—Lat. *Prep.* (Plenck.) *Fresh herb,* 5 dr.; *boiling water,* 1 pint; infuse for 15 minutes.

INFUSION (Barberry). Syn. *Infusum Berberis,*—Lat. *Prep.* (Dr. Copland.) From the *bark of the barberry shrub* (berberis vulgaris,—Linn.) In jaundice, biliary fluxes, and other cases where heat and acrimony prevail; either alone or combined with a little carbonate of soda or potassa, and tincture of calumba.

INFUSION (Bark). Syn. *Infusion of Cinchona; Infusum Cinchonæ,*—Ph. L. & E. *Prep.* (Ph. L.) *Yellow cinchona* (bruised), 1 oz.; *boiling distilled water,* 1 pint; macerate for 2 hours in a covered vessel and strain.

2. (Ph. E.) From *any species of cinchona,* as the last; but infusing the bark for 4 hours, and then straining through linen or calico.

Obs. Infusion of bark, is tonic and stomachic, and in very large doses, febrifuge. It is an extremely useful medicine in dyspepsia, debility, and during convalescences, and is often a valuable adjunct to more active remedies. Like the decoction, it is most energetic when strained whilst hot. The addition of 1 fl. dr. of *diluted sulphuric acid* to the water before pouring it on the bark increases its solvent power, and, consequently, the strength of the infusion. *Dose.* 1 to 3 fl. oz.

INFUSION (Bark,—Concentrated). Syn. *Infusum Cinchonæ Concentratum,*—Lat. *Prep.* 1. *Yellow bark* (coarsely powdered), 4 *lb.*; *boiling water,* 8 *lb.*; digest for 12 hours, express the liquid, add *rectified spirit,* 2 *lb.*, and after 24 hours' repose, decant the clear portion.

2. *Yellow bark* (in coarse powder), 4 *lb.*; *cold water,* 8 *lb.*; *rectified spirit,* 2 *lb.*; *dilute sulphuric acid,* 4 fl. oz.; mix the fluids, and either macerate the bark in them for a week in a *closed* vessel, or proceed by the method of displacement. Very superior.

Obs. 1 fl. dr. of either of the above added to 7 fl. dr. of water, produces an extemporaneous infusion of cinchona resembling that of the pharmacopœia. The concentrated preparation of the Ph. L. being more than 8 times the usual strength, is placed amongst *Liquors.*

INFUSION (Pale Bark.) Syn. *Infusum Cinchonæ Pallidæ,*—Ph. L. *Infusum Cinchonæ;* Ph. D., & Ph. L. 1836. *Prep.* 1. (Ph. L.) From *pale bark,* as *infusion of cinchona,* (Ph. L.)

2. (Ph. D.) *Crown* or *pale bark,* 1 *oz.*; *boiling water,* ½ pint; infuse 1 hour in a covered vessel, and strain through paper.

3. (*Inf. Cinch. sine calore,*—Ph. D. 1826.) *Powdered pale bark,* 1 oz.; *cold water,* 12 fl. oz.; triturate the bark with a little of the water, gradually add the remainder, macerate for 24 hours, and decant the clear liquor.

Obs. "This infusion is inferior to the preceding" (inf. of yellow bark) "in activity, and is a very unnecessary one. It is said to oppress the stomach less than that of the other cinchona bark: the reason is obvious,—it is weaker." (Pereira.)

INFUSION (Pale Bark,—Concentrated) Syn. *Infusum Cinchonæ Pallidæ Concentratum,*—Lat. *Prep.* As *concentrated infusion of cinchona,* but using *pale bark.* The concentrated preparation of the Ph. L. will be found under *Liquors.*

INFUSION (Bark,—Compound). Syn. *Infusum Cinchonæ Compositum,* — Lat. *Prep.* 1. (St. B. Hosp.) *Cinchona bark,* 1 oz.; *red-rose leaves,* 3 dr.; *orange peel* (dried), 2 dr.; *boiling water,* 1 pint; macerate 2 hours in a covered vessel, strain, and add of *dilute sulphuric acid,* 1½ fl. dr.

2. (Ph. U. S.) *Powdered bark,* 1 oz.; *aromatic sulphuric acid,* 1 fl. dr.; *water,* 16 fl. oz.; macerate 12 hours, with occasional agitation, and strain.

3. (*Inf. Cinch. cum Aqua Calcis,*—Ph. U. S., 1831.) *Cinchona* (bruised), 1 oz.; *lime water* (cold), 16 fl. oz.; macerate for 12 hours in a covered vessel.

4. (*Inf. Cinch. cum Magnesiæ.*—Ph. U.S. 1831.) *Bruised bark,* 1 oz.; *calcined mag-*

nesia, 1 dr.; *boiling water*, 12 fl. oz.; boil, digest 1 hour and strain. The last two are useless and nearly inert preparations, wisely rejected from the Ph. U. S. 1851.

INFUSION (Bay-leaves). Syn. *Infusum Lauri, Inf. Lauri Nobilis*,—Lat. From the *leaves* or the *berries* of the *sweet bay* (laurus nobilis,—*Linn.*) Aromatic, stimulant, and emmenagogue; in very large doses, emetic and poisonous. It is chiefly given in colic, flatulence, paralysis of the extremities, and obstructed menstruation.

INFUSION (Beef). See *Beef Tea, &c.*

INFUSION (Belladonna). Syn. *Infusum Belladonnæ*, — Lat. *Prep.* 1. (Dr. Paris.) *Leaves of deadly nightshade* (dried), 4 gr.; *boiling water*, 2 fl. oz.; for a dose.

2. (Dr. Saunders.) *Leaves* (dried), ½ dr. *boiling water*, 12 fl. oz.; infuse, strain, and to every 7 fl. oz. of the infusion add of *compound tincture of cardamoms*, 1 fl. oz.

INFUSION (Benne). Syn. *Infusum Sesami*,—Lat. *Prep.* (Dr. Wood). *Fresh leaves of benne* (sesamum Indicum or s. orientale), 4 in no.; *cold water*, 1 pint; infuse until the liquid is sufficiently mucilaginous. *Used* as a demulcent drink in hoarseness, fevers, &c. When the dried leaves are used the water should be warm.

INFUSION (Bistort). Syn. *Infusum Bistortæ*,—Lat. *Prep.* (Radius.) *Bistort* or *snake-weed root* (polygonum bistorta,—*Linn.*), ½ oz.; *boiling water*, 1 pint; infuse 2 hours, and strain. In passive hæmorrhages.

INFUSION (Bitter Purging). See *Compound Gentian Mixture.*

INFUSION (Black Purslane). Syn. *Infusum Euphorbiæ Hypericifoliæ*,—Lat. *Prep.* (Zollickoffer.) *Black purslane* (dried), ½ oz., *boiling water*, 1 pint. *Dose.* In dysentery and diarrhœa, 1 table-spoonful every hour or every other hour; in leucorrhœa and flooding, a wine-glassful thrice daily.

INFUSION (Black Snake-root). Syn. *Infusum Cimicifugæ Racemosæ, I. Acteæ R.*—Lat. In dropsy, rheumatism, and chest complaints.

INFUSION (Blessed Thistle). Syn. *Infusum Centaureæ, Inf. Cardui Benedicti*,—Lat. From the *whole herb.* In small doses it is diaphoretic; in larger ones, tonic, stomachic, and deobstruent; taken warm, it is occasionally given to promote the action of emetics. The properties of carduus benedictus "are such as to lead us to the belief that it has been superseded by other not more efficacious remedies." (Lindley.)

INFUSION (Blood-root). Syn. *Infusum Sanguinariæ*,—Lat. *Prep. Blood-root* (sanguinaria Canadensis,—*Linn.*), ½ oz.; *boiling water*, 1 pint. Stimulant and emetic.

INFUSION (Blue Flag). Syn. *Infusum Iridis Versicoloris*,—Lat. 1. From the *flowers of blue flag* (iris versicolor,—*Linn.*) —2. From the *root* or *rhizomes.* The first is *used* chiefly for its rich colour, as a test, &c.; the second, is diuretic and cathartic, and apt to produce distressing nausea and prostration.

INFUSION (Boneset). Syn. *Infusum Eupatorii*,—Ph. U. S. From the dried *leaves and flowers of boneset* or *thoroughwort* (eupatorium perfoliatum, — Linn.) Diaphoretic, nauseant, and emetic when warm; tonic when cold.

INFUSION (Boneset,—Compound). Syn. *Infusum Eupatorii Compositum*, — Lat. *Prep.* (Ellis.) *Boneset* and *sage*, of each, ½ oz.; *cascarilla*, 1 dr.; *boiling water*, 1½ pint; infuse until cold, and strain. In hectic fever. A wine-glassful of either of the above, given hourly, in these diseases, until perspiration and nausea are induced, has been highly recommended in influenza.

INFUSION (Brazil-wood). Syn. *Infusum Ligni Brasiliensis*,—Lat. From *ground* or *rasped Brazil wood.* When wanted to keep, *rectified spirit*, 3 fl. oz., is added to every pint. *Used* for colouring, and as a test.

INFUSION (Broom). Syn. *Infusum Scoparii*,—Ph. L., 1836. *Prep.* From the *fresh tops of broom* (cytisus scoparius). Diuretic; in dropsy, &c.

INFUSION (Buchu). Syn. *Infusum Buchu*,—Ph. L. & D. *Inf. Bucku*,—Ph. E. *Inf. Diosmæ*,—Ph. L. 1836. Diuretic, sudorific, tonic; in dyspepsia, &c.; but chiefly in chronic affections of the bladder and urethra attended with copious secretion.

INFUSION (Buchu,—Compound). Syn. *Infusum Buchu Compositum, I. iosmæ C.*, —Lat. *Prep.* (Radius.) *Leaves of buchu* and *whortleberry*, of each, ½ oz.; *boiling water*, 8 oz., (say ½ pint); digest for half-an-hour, strain, and add of *syrup of senega*, ½ fl. oz. *Dose.* 1 or 2 table-spoonfuls every hour; in atony of the bladder and mucous discharges.

INFUSION (Buckbean). Syn. *Infusum Menyanthis*,—Lat. From the *herb* or *root of buckbean* or *marsh trefoil* (menyanthes trifoliata,—*Linn.*) Bitter, stomachic, tonic, and diuretic; in *large doses*, purgative, vermifuge, and emetic. It has been recommended in agues, gout, dropsy, scurvy, worms, &c. The chief consumption of this plant is by the brewers; "2 *oz.* being equal to 1 *lb.* of hops." (Gray.)

INFUSION (Burdock). Syn. *Infusum Arctii,*—Lat. From the *root of common burdock* (lappa minor,—D. C.) Aperient, diuretic, diaphoretic, and tonic; in gout, rheumatism, skin diseases, &c. See *Decoctions* and *Extracts.*

INFUSION (Calumba). Syn. *Infusum Calumbæ,*—Ph. L. & E. *Inf. Colombæ,*—Ph. D. *Prep.* 1. (Ph. L.) *Calumba* (sliced), 5 dr.; *boiling water,* 1 pint; digest for 2 hours in a covered vessel, and strain.

2. (Ph. E.) *Calumba* (in coarse powder), ½ oz.; *cold water,* 1 pint; triturate the powder with a little of the water, so as to moisten it thoroughly, then put it into a percolator, and transmit cold water through it, until 16 fl. oz. of infusion are obtained.

3. (Ph. D.) *Calumba* (in coarse powder), 3 *dr.*; *cold water,* 9 fl. oz.; macerate 2 hours, and strain.

Obs. The infusion prepared by the first of the above formulæ soon spoils, especially in hot weather; but that prepared by the others (*inf. calumbæ cum aquâ frigidâ*) may be kept for some days. In either case it should not be allowed to stand upon the dregs. Infusion of calumba is a good tonic and stomachic bitter. *Dose.* 1 to 3 fl. oz., in dyspepsia, &c., and for restraining vomiting and diarrhœa during pregnancy or dentition. It is preferably joined with small doses of the carbonates of soda, potassa, ammonia, or magnesia, when there is acidity; or with chalybeates, when there is paleness and a low pulse; with all of which substances it may be mixed without suffering any sensible alteration.

INFUSION (Calumba,—Concentrated). Syn. *Infusum Calumbæ Concentratum,*—Lat. *Prep.* 1. *Calumba* (in coarse powder), 5½ *oz.; cold distilled water,* 12 fl. oz.; digest, with frequent agitation, for 3 or 4 hours, then express the liquor, and repeat the digestion with 5½ fl. oz. more of tepid *water;* after another hour, express this portion also, using as much force as possible; next mix the liquors, heat them quickly, to the boiling point in a shallow vessel, and pour the infusion, whilst *still hot,* into a strong bottle, and when it has cooled a *little,* add of *rectified spirit,* 4 fl. oz., secure down the stopper or cork, and agitate well for a few minutes; the bottle must now be set aside for a week, after which the clear portion is to be decanted from the dregs. Very superior.

2. (*Wholesale.*) From *calumba* (reduced to coarse powder), 5¼ *lb.; rectified spirit,* 5 pints; (diluted with) *water,* 12 pints; digest for a week, or proceed by displacement. Should there be any difficulty in obtaining it free from cloudiness, the *whites* of 4 or 5 *eggs,* previously mixed with about a ¼ pint of *cold water,* may be added to the infusion, which, after being well agitated for about 10 minutes, must be allowed to repose for 7 or 8 days, and then decanted from the dregs. Should it not be perfectly transparent, it may be filtered through blotting paper. *Product.* 20 *lb.*

Obs. The concentrated infusion produced by the above formulæ is of *very superior quality,* and has acquired an extensive sale in the wholesale trade. 1 fl. dr. added to 7 fl. dr. of water makes a perfectly transparent liquid, possessing exactly similar virtues to the *infusion of calumba,* Ph. L.

INFUSION (Cantharides). Syn. *Infusum Cantharidis, Inf. Lyttæ,*—Lat. *Prep.* (Soubeiran.) *Spanish flies* (powdered), 20 gr.; *boiling water,* q. s. (about 3½ fl. oz.) to yield 3 fl. oz., after expression and filtration.

INFUSION (Capsicum). Syn. *Infusum Capsici,*—Lat. *Prep.* 1. (Pereira.) *Capsicum* (powdered), ½ oz.; *boiling water,* 1 pint. *Dose.* ½ fl. oz.

2. (Stephen's *Pepper Medicine,*—Pereira.) *Red pepper* (capsicum fructescens), 2 table-spoonfuls (or 3 of *cayenne pepper*); *common salt,* 2 tea-spoonfuls; *boiling water,* ½ pint; to the strained liquor when cold, add of *very sharp vinegar,* ½ pint. *Dose.* 1 table-spoonful, slowly swallowed, every half hour, in cholera, malignant sore throat, scarlatina, &c.

INFUSION (Caraway). Syn. *Caraway Tea; Infusum Carui,*—Lat. *Prep.* From *bruised caraway seed,* 3 dr.; *boiling water,* 1 pint. In the flatulent colic of infants, and as an adjunct to aperient medicine.

INFUSION (Carrot Seed). Syn. *Infusum Dauci, Inf. Carotæ,*—Lat. Diuretic; in dropsy and nephritic complaints; ½ to 1 pint being taken daily.

INFUSION (Cascarilla). Syn. *Infusum Cascarillæ,*—Ph. L. E. & D. *Prep.* 1. (Ph. L. & E.) *Cascarilla* (bruised), 1½ oz.; *boiling distilled water,* 1 pint; infuse for 2 hours in a closed vessel, and strain.

2. (Ph. D.) *Cascarilla,* 1 *oz.; boiling water,* ½ pint. A light, aromatic bitter-tonic. *Dose.* 1 to 3 fl. oz., usually combined with carbonate of soda and tincture of cascarilla. It is an excellent medicine in dyspepsia, debility, diarrhœa, &c.

INFUSION (Cascarilla,—Concentrated). Syn. *Infusum Cascarillæ Concentratum,*—Lat. *Prep.* 1. *Cascarilla* (good and fragrant, bruised), 6½ *lb.; rectified spirit of* *wine*, 3 pints; *cold water*, 6 pints; macerate in a close vessel for 14 days, express the liquor, and filter.

2. As the last, but proceeding by the method of displacement.

Obs. If the preceding processes are well managed, the product is 10 *lb.*, and resembles brandy in colour and transparency, and is delightfully fragrant. 1 fl. dr. of *this infusion* mixed with 7 fl. dr. of *water* makes a preparation exactly resembling the *infusion of calumba*, Ph. L.

INFUSION (Cascarilla,—Alkaline). Syn. *Infusum Cascarillæ Alkalisatum*, — Lat. *Prep.* (Ph. Palat.) *Cascarilla*, 3 oz.; *carbonate of potassa*, 2 dr.; *boiling water*, 16 fl. oz. Antacid and tonic. *Dose.* 1 tablespoonful.

INFUSION (Cassia). Syn. *Cassia Tea; Infusum Cassiæ Fistulæ*, — Lat. *Eau de Casse*,—Fr. *Prep.* (Soubeiran.) *Cassia pods* (bruised), 4 oz.; *boiling water*, 1½ pint. Laxative.

INFUSION (Catechu). Syn. *Compound Infusion of Catechu; Infusum Catechu*,—Ph. E. *Inf. Catechu Compositum*,—Ph. L. & D. *Inf. Japonicum*,—Obs. *Prep.* 1. (Ph. L.) *Catechu* (powdered), 6 dr.; *cinnamon* (bruised), 1 dr.; *boiling water*, 1 pint; macerate for an hour in a covered vessel, and strain.

2. (Ph. E.) *Catechu*, 6 dr.; *cinnamon*, 1 dr.; *boiling water*, 17 fl. oz.; infuse for 2 hours, strain, and add of *syrup*, 3 fl. oz.

3. (Ph. D.) As the Ph. L. (nearly). Astringent; in diarrhœa, 3 or 4 times a day, or after every liquid dejection.

INFUSION (Cathartic). See *Mixtures.*

INFUSION (Catmint). Syn. *Infusum Catariæ*,—Lat. From *dried catmint* or *catnep* (nepeta cataria,—*Linn.*) Stimulant, carminative, diaphoretic, and emmenagogue. In doses of a tea-spoonful it has been recommended in the flatulent colic of infants.

INFUSION (Cayenne Pepper). See *Infusion of Capsicum.*

INFUSION (Centaury). Syn. *Infusum Centaurii*,—Lat. From the *flowering tops of common* or *lesser centaury* (gentiana centaurium, — *Linn.*) Bitter, febrifuge, stomachic, and vermifuge. A popular remedy in obstructions, jaundice, debility, dyspepsia, &c.; and *externally*, for the itch, and to destroy pediculi. An *infusion* is also made of the root, which is about one-half more powerful than the tops. The plant is "a valuable native medicine; in the places where it grows, it is carefully collected for use in rustic pharmacy." (Lindley.)

INFUSION (Cephalic). Syn. *Infusum Cephalicum*,—Lat. *Prep.* (Edin. Hosp.) *Valerian root*, 2 oz.; *rosemary tops*, 4 dr.; *boiling water*, 1 quart; infuse 12 hours, strain, and add *aromatic water*, 4 fl. oz. As an antispasmodic, and in various affections of the head.

INFUSION (Chamomile). Syn. *Chamomile Tea; Infusum Anthemidis*,—Ph. L. E. & D. *Inf. Chamæmeli*, — Ph. D. 1826. *Prep.* (Ph. L. & E.) *Chamomiles*, 5 dr.; *boiling water*, 1 pint; macerate 10 minutes (20 minutes,—Ph. E.), and strain.

2. (Ph. D.) *Chamomiles*, ½ *oz.; boiling water*, 12 *fl. oz.* Tonic, bitter, and stomachic. It should be drunk cold, as it is emetic when warm. See *Bitters.*

INFUSION (Chamomile,—Concentrated). Syn. *Infusum Anthemidis Concentratum*,—Lat. *Prep.* From *chamomiles*, 5½ oz.; *water*, 1 pint; boil till the mixture weighs exactly 21 *oz.;* express the liquor by means of a powerful tincture-press, cool, and add of *essential oil of chamomile*, 15 drops, dissolved in *rectified spirit*, 5 fl. oz.; agitate well, let it repose until the next day, then decant the clear, and filter. Strongly bitter and odorous, and beautifully transparent. 8 times as strong as the *infusion*, Ph. L.

INFUSION (Cherry-laurel.) Syn. *Infusum Lauro-cerasi*, — Lat. *Prep.* (Dr. Cheston.) Fresh *leaves* of the *common* or *cherry-laurel* (prunus lauro-cerasus,—*Linn.*), 2½ oz.; *boiling water*, 1 pint; infuse, strain, and add of *clarified honey*, 2½ oz. As a lotion in cancer of the lip, and as a wash for malignant ulcers.

INFUSION (Chiretta). Syn. *Infusum Chirettæ, Inf. Chiraytæ*, — Lat. *Prep.* (Ph. E. & D.) *Chiretta*, 4 dr.; *boiling water*, 1 pint; macerate for 2 hours (1 hour, —Ph. D.), and strain.

Obs. Chiretta is a pure tonic bitter closely allied to gentian, and has been long esteemed in the East Indies as a remedy for acidity, flatulence, and dyspepsia, especially when occurring in gouty or debilitated habits. It is usually given in combination with carbonate of soda or tincture of sesquichloride of iron. The whole of the plant is employed. Dr. Royle recommends the use of water at 180° Fahr., and Mr. Squire recommends *cold water.*

INFUSION (Chiretta, — Concentrated). Syn. *Infusum Chirettæ Concentratum*,—Lat. *Prep.* From *chiretta*, 4 oz., for each pint of the product, prepared as either *infusion of calumba* or *cascarilla.* (See *above.*) 1 fl. dr. added to 7 fl. dr. of *water* makes 1 fl. oz. of the common infusion.

INFUSION (Cinchona). See *Infusion of Bark.*

INFUSION (Cinnamon). Syn. *Cinnamon Tea; Infusum Cinnamoni,*—Lat. In flatulence, dyspepsia, and nervous colics.

INFUSION (Cloves). Syn. *Clove Tea; Infusum Caryophillorum; Inf. Caryophylli,* —Ph. L. E. & D. *Prep.* 1. (Ph. L. & E.) *Cloves* (bruised), 3 dr.; *boiling water,* 1 pint; macerate for 2 hours in a covered vessel, and strain (through calico,—Ph. E.)

2. (Ph. D.) *Cloves,* ¼ *oz.; boiling water,* 9 *fl. oz.;* infuse 1 hour. Aromatic, stimulant, and stomachic, either alone or in combination; in colic, dyspepsia, gout, &c.

INFUSION (Cloves,— Concentrated). Syn. *Infusum Caryophylli Concentratum,*—Lat. *Prep.* 1. *Bruised cloves,* 3 oz.; *boiling water,* 16 fl. oz.; infuse as above and strain; when cold add of *rectified spirit,* ¼ pint, and filter.

2. *Bruised cloves,* 1¾ *lb.*; *rectified spirit,* 1 quart; *cold water,* 3 quarts; macerate for 7 days, and express the liquid; sprinkle the *marc* with *water,* 12 fl. oz., and after the lapse of an hour, again submit it to the press; lastly, filter the mixed liquors. Very fine. The above are 8 times the strength of the *infusion of cloves,* (Ph. L.)

INFUSION (Coffee). Syn. *Infusum Caffei,*—Lat. *Prep.* (Dr. McBride.) *Unroasted coffee berries* (bruised), 30 in no.; *cold water,* 1 quart; macerate 2 or 3 hours. In calculus, &c. *Dose.* ½ pint every morning.

Obs. Sir Jno. Floyer and Sir Jno. Pringle cured asthma with a strong infusion of roasted coffee. M. Bouchardat prescribes a strong infusion made by displacement, and mixed with a little brandy, in poisoning by opium and other like narcotics, after the administration of emetics and ioduretted water. M. Honore also employs very strong made-coffee in albuminuria. Clausen gives it in gout, and Parker employs it as a nervous stimulant in lieu of ammonia and wine, for persons of a highly sensitive and excitable temperament.

INFUSION (Contrayerva). Syn. *Infusum Contrayervæ,*—Lat. *Prep.* (Pereira) *Contrayerva* (in powder), 1 oz.; *boiling water,* 12 fl. oz. Stimulant, tonic, and diaphoretic; in low fevers, &c.

INFUSION (Copalche Bark). Syn. *Infusum Copalchi Corticis,*—Lat. *Prep.* (Dr. Stark.) *Bark of copalche bush* (croton pseudo-china), ½ oz.; *boiling water,* 1 pint; digest 2 hours, and strain. A warm bitter and stomachic.

INFUSION (Corsican Moss). Syn. *Infusum Helminthocorti,*—Lat. *Prep.* (Mr. Farr.) *Corsican moss,* 5 dr.; *boiling water,* 1 pint; macerate for 10 or 12 hours, and strain. Ad libitum, in cancer. See *Decoctions.*

INFUSION (Cusparia). Syn. *Infusion of Angostura Bark; Infusum Cuspariæ,*—Ph. L. & E. *Inf. Angusturæ,*—Ph. D. 1826. *Prep.* (Ph. L. & E) *Cusparia* (bruised), 5 dr.; *boiling distilled water,* 1 pint; macerate 2 hours, and strain. Stimulant and tonic; in typhus fever, bilious diarrhœa, dysentery, &c.

INFUSION (Daffodil). Syn. *Infusum Narcissi Pseudo-narcissi,* — Lat. *Prep.* (Dufresnoy.) *Flowers of daffodil* (narcissus pseudo-narcissus,—*Linn.*), 3 to 16 in no.; *boiling water,* 1 pint. Expectorant, nauseant, and emetic. In hooping-cough.

INFUSION (Dahlia Petals). From the violet or blue varieties. *Used* for its colour, and as a test.

INFUSION (Dandelion). Syn. *Infusum Taraxaci,*—Lat. From the *sliced root.* Stomachic, resolvent, and tonic. See *Decoctions* and *Extracts.*

INFUSION (Dandelion,—Concentrated). Syn. *Infusum Taraxaci Concentratum,*—Lat. *Prep.* From the root (sliced), 1 *lb.;* exposed to a current of warm dry air until crisp, then coarsely pulverized, and digested for a week in a mixture of *rectified spirit,* 12 fl. oz.; *cold water,* 1½ pint. 8 times the usual strength.

INFUSION (Dandelion,—Compound). Syn. *Infusum Taraxaci Compositum,*—Lat. *Prep.* (Meigs.) *Infusion of dandelion,* 4 fl. oz.; *extract of do.,* 2 dr.; *sesquicarbonate of soda,* ½ dr.; *tartrate of potassa,* 3 dr.; *tincture of rhubarb,* 3 fl. dr.; *tincture of henbane,* 20 drops. In dropsical and visceral affections. *Dose.* 1-3rd part, thrice daily.

INFUSION (Digitalis). See *Infusion of Foxglove.*

INFUSION (Diuretic). Syn. *Infusum Diureticum,*—Lat. *Prep.* 1. *Broom tops,* 1 oz.; *boiling water,* 1 pint; infuse 1 hour, strain, cool, and add of *sweet spirits of nitre,* 3 fl. dr. *Dose.* A wine-glassful every other hour.

2. *Infusion of foxglove,* 4 fl. oz.; *tincture of foxglove,* ½ fl. dr.; *acetate of potassa,* 1 dr.; *laudanum,* 10 drops. *Dose.* 1 table-spoonful twice or thrice a day, carefully watching the effects.

3. *Juniper berries,* 2 oz.; *aniseed,* ½ oz.; *boiling water,* 1 pint; infuse 1 hour; strain, and when cold, add of *compound spirit of juniper,* 2 fl. oz.; *tincture of squills,* 1 fl. dr.; *nitre,* 1 dr. *Dose.* ½ a teacupful frequently. All the above are used as diuretics in dropsy.

INFUSION (Dogwood Bark). Syn. *Infusum Cornus Floridæ*,—Lat. From the *bark of American dogwood* (cornus Florida, —*Linn.*) See *Decoctions.*

INFUSION (Round-leaved Dogwood). Syn. *Infusum Cornus Circinatæ*,—Lat. Recommended in diarrhœa.

INFUSION (Elder Flowers). Syn. *Elder-flower Tea; Infusum Sambuci Florum*, —Lat. From the *picked flowers*, ½ *oz.; boiling water*, 1 pint. Pectoral, expectorant, and diaphoretic, either alone or sweetened with honey. See *Decoctions.*

INFUSION (Elecampane). Syn. *Infusum Inulæ*,—Lat. Diaphoretic, expectorant, and tonic.

INFUSION (Elm-bark, — Compound). Syn. *Infusum Ulmi Compositum*,—Lat. *Prep.* (Cadet.) *Elm-bark, bitter-sweet, burdock,* and *fumitory*, of each, 2 dr.; *boiling water*, 1 pint; digest for 4 hours, strain, and add of *syrup of sarsaparilla*, 1 oz. The whole to be taken in 24 hours, in divided doses, in the chronic exanthemata. See *Decoctions.*

INFUSION (Ergot of Rye). Syn. *Infusum Secalis Cornuti; Inf. Ergotæ*,—Ph. D. *Prep.* 1. (Pereira.) *Ergot*, 1 dr.; *boiling water*, 4 fl. oz.; infuse till cold. *Dose.* One third, every half hour, until the whole is taken.

2. (Ph. D.) *Ergot* (in coarse powder), 2 *dr.*; *boiling water*, 9 *fl. oz.;* infuse 1 hour in a covered vessel, and strain. "The *product* should measure about 8 oz." *Dose.* 1-5th or 1-6th, every ½ hour or hour, as a parturifacient.

INFUSION (Ergot,—Concentrated). See *Liquors.*

INFUSION (Fennel). Syn. *Fennel Tea; Infusum Fœniculi*, — Lat. *Prep.* From *sweet fennel-seeds*, ½ oz.; *boiling water*, 1 pint. In griping and windy colic of infants; a few drops to ½ a tea-spoonful for a dose, or a little by way of enema.

INFUSION (Flax-seed). See *Infusion of Linseed.*

INFUSION (Fleabane). Syn. *Infusum Inulæ Dysentericæ*,—Lat. From *common fleabane* (inula dysenterica,—*Linn.*) Tonic. Formerly *used* in diarrhœa. According to Linnæus, it cured the Russian army under General Keith of dysentery.

INFUSION (American Fleabane). Syn. *Infusum Erigeronis Annui*,—Lat. From the *whole plant* (erigeron annuum). Diuretic; a common remedy in America for the dysuria of children.

INFUSION (Canadian Fleabane). Syn. *Infusum Erigeronis Canadensis*,—Lat. From the *whole plant* (erigeron Canadense). Astringent and diuretic; taken freely in dropsies. See *Extracts.*

INFUSION (Foxglove). Syn. *Infusum Digitalis*,—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Stem-leaves of foxglove* (dried), 1 dr.; *boiling water*, 1 pint; macerate in a covered vessel for 4 hours, strain, and add of *spirit of cinnamon*, 1 fl. oz. *Dose.* ½ to 1 fl. oz.

2. (Ph. E.) *Foxglove* (dried), 2 dr.; *boiling water*, 18 fl. oz.; *spirit of cinnamon*, 2 fl. oz.

3. (Ph. D.) *Foxglove* (dried and reduced to a coarse powder), 1 *dr.; boiling water*, 9 *fl. oz.;* infuse 1 hour. The *product* should measure about 8 fl. oz. The last two are of *double* the strength of the infusion, Ph. L., and the *dose* must consequently be only 2 to 4 fl. dr. "I believe this, when properly made, to be the most effectual of the preparations of foxglove." (Pereira.) See *Foxglove.*

INFUSION (Fumitory). Syn. *Infusum Fumariæ*,—Lat. From the *herbaceous portion* of *common fumitory* (fumaria officinalis,—*Linn.*). Aperient and diaphoretic; in obstinate skin diseases and chronic obstructions of the liver.

INFUSION (Galls). Syn. *Infusum Gallæ*,—Lat. From *Aleppo galls*, coarsely powdered. In diarrhœa, hemorrhages, &c.; also *freely*, in cases of poisoning, by the alkaloids; and diluted with 3 or 4 times its volume of water, for injections, embrocations, gargles, &c.

INFUSION (Galls,—Compound). Syn. *Infusum Gallæ Compositum, Mistura Gallæ*,—Lat. *Prep.* (Ellis.) *Infusion of galls*, 4 fl. oz.; *prepared chalk*, ½ oz.; *powdered gum*, 1 dr.; *tincture of opium*, ½ fl. dr. *Dose.* 1 table-spoonful every 2 hours, in diarrhœa, &c.

INFUSION (Garlick). Syn. *Infusum Allii*,—Lat. *Prep.* (White.) *Garlic* (recent), ½ ℔; *water*, 1 ℔; place them in a covered pot, set it in a very slow oven for 3 or 4 hours, and when cold, express the fluid portion. *Dose.* In epilepsy, 2 tea-spoonfuls before and after every meal; in chronic diarrhœa, a tea-spoonful after every motion.

INFUSION (Gentian). Syn, *Infusum Gentianæ*,—Lat. *Prep.* (Beral.) *Gentian* (bruised), 2 dr.; *boiling water*, 1 pint; infuse 5 or 6 hours, and strain. Stomachic.

INFUSION (Gentian,—Compound). Syn. *Infusum Gentianæ*,—Ph. E. *Inf. Gentianæ Compositum*,—Ph. L. & D. *Prep.* 1. (Ph. L.) *Gentian* (sliced) and *orange peel* (dried), of each, 2 dr.; *lemon peel* (fresh), 4 dr.; *boiling distilled water,* 1 pint; macerate for an hour in a covered vessel, and strain. *Dose.* 1 to 2 fl. oz.

2. (Ph. E.) *Sliced gentian root,* ½ oz.; *bitter orange peel* (dried and bruised), and *coriander seeds,* of each, 1 dr.; *proof spirit,* 4 fl. oz.; digest for 3 hours, then add of *cold water,* 16 fl. oz., and in 12 hours more strain.

3. (Ph. D.) *Gentian* and *dried orange peel,* of each, 2 dr.; *boiling water,* ½ pint; macerate 1 hour and strain. *Dose* of the *last two,* ½ to 1 fl. oz.

Obs. The above are agreeable and useful tonics and stomachics. The infusion of the Edinburgh college will keep for some time in a close vessel; but the others soon spoil, especially in hot weather.

INFUSION (Gentian, — Concentrated Compound). Syn. *Infusum Gentianæ Comp. Concentratum,*—Lat. *Prep.* 1. *Gentian root* (bruised), 4½ *lb.; boiling water,* q. s. to cover it; infuse with occasional agitation for 2 hours, express the liquor, wash the *marc* with a little boiling water, and evaporate to 13 quarts; when *cold,* strain through flannel, add of *rectified spirit,* 1 gall., and pour the mixed fluids on *dried orange peel,* 4½ *lb.;* and *fresh lemon peel,* 9 *lb.;* macerate for 1 week, then express the liquor in a powerful press, and filter through paper.

2. *Gentian* and *dried orange peel,* of each, 4½ *lb.; fresh lemon peel,* 9 *lb.; cold distilled water,* 13 quarts; *rectified spirit,* 1 gall.; macerate for 14 or 15 days, with frequent agitation, then express the liquid, add 1 dr. each of the *essential oils of lemon* and *orange,* agitate well, and filter through paper.

3. *Gentian,* 1¼ *lb.; essence of lemon,* 1 dr.; *essence of orange,* ½ dr.; *essence of cedrat,* 15 drops; *rectified spirit,* 1 quart; *cold water,* 3 quarts; digest for 10 days and filter.

Obs. The above formulæ are actually employed at the present time by houses who do largely in concentrated infusion of gentian, and, with proper management, the products possess the brilliancy of brandy, are powerfully bitter, odorous, and aromatic, and keep well; 1 fl. dr., added to 7 fl. dr. of *water,* produces 1 fl. oz. of liquid possessing all the qualities of the *infusion* of the Ph. L. in perfection. The sale of the above preparations is astonishingly large.

INFUSION (Gentian,—with Rhubarb). Syn. *Infusum Gentianæ et Rhei, Mistura Stomachica,*—Lat. *Prep.* From *gentian* and *rhubarb* (bruised), of each, 2 dr.; *boiling water,* 1 pint; digest 1 hour, and strain; to the cold infusion add of *sesquicarbonate of ammonia,* 1 dr. An admirable medicine in dyspepsia, hysteria, loss of appetite, constipation, chronic rheumatism, &c.

INFUSION (Ginger). Syn. *Ginger Tea; Infusum Zingiberis,*—Lat. From the *best unbleached Jamaica ginger,* freshly bruised or grated. In flatulence, colic, and indigestion.

INFUSION (Ginseng). Syn. *Ginseng Tea; Infusum Ginseng, I. Radicis G.,*—Lat. *Prep. Ginseng* (panax quinquefolium,—*Linn.*), ½ oz.; *ginger* (grated), 1 dr.; *boiling water,* 1 pint; macerate 1 hour, then add of *cinnamon* (bruised), ½ dr.; infuse for another hour, and strain. "*Ginseng tea,*" made according to the above formula, has a wonderful reputation in China, as a stimulant, restorative, and aphrodisiac. In Europe, however, it is merely regarded as an aromatic demulcent.

INFUSION (Golden Rod). Syn. *Infusum Solidaginis,*—Lat. From the *herbaceous portion* of *common golden rod* (solidago virgo aurea,—*Linn.*) Expectorant, diuretic, and diaphoretic; chiefly used in fevers.

INFUSION (Goldthread). Syn. *Infusum Coptis,*—Lat. From the *root* of *coptis trifolia* (Linn.). Bitter, stomachic; in dyspepsia, and as a mouth-wash in thrush.

INFUSION (Guaco). Syn. *Infusum Guaco,*—Lat. From the *bruised leaves* and *stems* of *guaco* or *huaco* (mikania guaco). Sudorific and vulnerary; reputed in South America to be a powerful remedy for the bites of venomous serpents and for hydrophobia, but the trials in this country do not show it to be of any value in such cases. Dr. Hancock explains this by asserting that the wrong plant has been employed.

INFUSION (Guaiacum). Syn. *Infusion of the Woods; Infusum Guaiaci Compositum, Aqua Benedicta Composita; Aqua Calcis C.*—Ph. D. 1826. *Prep.* (Ph. D. 1826.) *Guaiacum shavings,* 6 oz.; *bruised liquorice root,* 1 oz.; *sassafras bark,* ½ oz.; *coriander seeds,* 3 dr.; *lime water,* 96 fl. oz. (say 5 pints); infuse for 2 days, and strain. *Dose.* 3 to 4 fl. oz., twice or thrice a day, in scrofula, rheumatism, gout, eruptions, &c.

INFUSION (Gum). Syn. *Infusum Acaciæ,*—Lat. *Prep.* From *gum acacia* and *lump sugar,* of each, 2 *oz.; boiling water,* 1 pint; macerate until dissolved, then cool, and add of *orange-flower water,* ½ fl. oz. A pleasant demulcent in coughs, hoarseness, &c.

INFUSION (Hedge Hyssop). Syn. *Infusum Gratiolæ,*— Lat. *Prep.* (A. T. Thomson.) *Hedge hyssop* (gratiola officinalis,—*Linn.*), dried, 2 dr.; *boiling water*, 8 fl. oz.. Cathartic, diuretic, emetic, and vermifuge. *Dose.* 3 to 6 fl. dr.; in dropsies, gout, jaundice, &c. See *Extracts.*

INFUSION (Hemlock). Syn. *Infusum Conii, Inf. Conii maculati,*—Lat. *Prep.* (Guy's Hosp.) *Dried leaves of hemlock,* and *coriander seeds,* of each, 2 dr.; *boiling water,* 8 oz.; infuse for 2 hours. Combined with acetate of ammonia, tincture of henbane, and syrup of poppies, in pulmonary complaints, &c.

INFUSION (Hemp Agrimony). Syn. *Infusum Eupatorii Cannabini,*—Lat. From the *herb* (eupatorium cannabinum,—*Linn.*). Reputed aperient, diuretic, pectoral, and vulnerary. The *root* of the plant is used in lieu of jalap.

INFUSION (Henbane). Syn. *Infusum Hyoscyami,*—Lat. From *fresh leaves,* ½ oz.; *boiling water,* 1 pint. As a lotion for painful ulcers, swelled face, &c.

INFUSION (Henbane,—Compound). Syn. *Henbane Fomentation; Infusum Hyoscyami Compositum,*—Lat. *Prep.* (Radius.) *Henbane leaves, poppy heads,* and *mallows,* of each, 1 oz.; *boiling water,* 2 quarts. For painful ulcers, and in facial neuralgia, &c.

INFUSION (Hops). Syn. *Hop Tea; Infusum Humuli; Inf. Lupuli,*—Ph. L. *Prep.* (Ph. L.) *Hops,* 6 dr.; *boiling distilled water,* 1 pint; macerate for 4 hours in a covered vessel (press), and strain. Tonic and anodyne. Well-hopped mild ale is a good substitute.

INFUSION (Horehound). Syn. *Horehound Tea; Infusum Marrubii,*— Lat. From the leaves; demulcent, pectoral; a popular remedy in coughs, colds, hoarseness, and chest affections generally, taken freely.

INFUSION (Horse-radish). Syn. *Infusum Armoraciæ,*—Lat. Diuretic and stomachic.

INFUSION (Horse-radish,—Compound). Syn. *Infusum Armoraciæ Compositum,*—Lat. *Prep.* (Ph. L.) *Horse-radish* (sliced), and *mustard seed* (bruised), of each, 1 oz.; *boiling distilled water,* 1 pint; macerate for 2 hours in a covered vessel, strain, and add of *compound spirit of horse-radish,* 1 fl. oz. Stimulant, stomachic, and diuretic; in dropsies, paralysis, scurvy, chronic rheumatism, &c.

INFUSION (Hyssop). Syn. *Hyssop Tea; Infusum Hyssopi,* — Lat. From the *leaves* of *hyssopus officinalis* (Linn.) Stimulant, stomachic, emmenagogue, and expectorant; in dyspepsia, flatulency, hysterical affections, &c.; also used by boxers as a wash for black eyes.

INFUSION (Hyssop,—Compound). Syn. *Infusum Hyssopi Compositum,*—Lat. *Prep.* (Ratier). *Hyssop leaves,* 2½ dr.; *liquorice,* 2 dr.; *boiling water,* 1 quart. As a demulcent drink in catarrhal affections.

INFUSION (Indian Sarsaparilla). Syn. *Infusum Hemidesmi,*—Lat. From *Indian* or *scented sarsaparilla* (hemidesmus Indicus). Dr. Ashburner orders it to be made with *lime water* (cold); but this plan is seldom followed. *Dose* and *uses,* same as those of infusion of sarsaparilla.

INFUSION (Iron,—Bitter). Syn. *Infusum Ferri Amarum,*—Lat. *Prep.* (Dr. R. E. Griffith.) *Iron filings,* 3 oz.; *gentian* and *ginger,* of each, bruised, 1 oz.; *orange peel,* ½ oz.; *strong old cider,* 1 pint; infuse for a month, frequently stirring, and filter. *Dose.* ½ to 1 dr., 3 or 4 times daily, as a chalybeate tonic.

INFUSION (Juniper Berries). Syn. *Infusum Juniperi, I. Baccæ J.,*—Lat. As a stimulant diuretic, in dropsies, &c.

INFUSION (Juniper Berries,—Compound). Syn. *Infusum Juniperi Compositum,*—Lat. *Prep.* 1. (Guy's Hosp.) *Juniper berries,* 2½ oz.; *boiling water,* 1 pint; to the strained solution, when cold, add of *compound spirit of juniper,* 10 fl. dr.; *bitartrate of potassa,* 1 dr.

2. (Parrish.) *Ginger, juniper berries,* and *mustard seed,* of each, bruised, ½ oz.; *horse-radish* and *parsley root,* of each, bruised, 1 oz.; *cider,* 1 quart, infuse, and strain with expression. All the above are used in dropsies.

INFUSION (Justicia). Syn. *Infusum Justiciæ,*—Lat. *Prep.* From the *root of creata* (justicia paniculata), 3 dr.; *boiling water,* 1 pint, Bitter, stomachic, and febrifuge; in dyspepsia, cholera, dysentery, intermittents, &c. See *Drogue Amère.*

INFUSION (Kino). Syn. *Infusum Kino,*—Lat. From *kino,* 5 dr.; *boiling water,* 1 pint. In diarrhœa, and diluted with 4 or 5 times its bulk of water as an *injection* in chronic gonorrhœa.

INFUSION (Lime Flowers). Syn. *Linden-flower Tea; Infusum Tiliæ,*—Lat. From the *flowers* of the *lime* or *linden tree* (tilia intermedia). Antispasmodic, diaphoretic, and cephalic.

INFUSION (Lime Flowers,—Compound). Syn. *Infusum Tiliæ Compositum,* — Lat. *Prep.* (Foy.) *Chamomiles, linden flowers,* and *orange leaves,* of each, 2 dr.; *boiling water,* 1 quart; infuse, strain, and add of *syrup,* 2 fl. oz. In nervous headaches, &c. The above are much used on the Continent.

INFUSION (Linseed). Syn. *Linseed*

Tea, Flaxseed do; Infusum Lini,—Lat. Demulcent and pectoral.

INFUSION (Linseed,—Compound). Syn. *Compound Linseed Tea; Infusum Lini,*—Ph. E. *Inf. Lini Compositum,*—Ph. L.; & Ph. D., 1826. *Prep.* (Ph. L. & E.) *Linseed* (bruised), 6 dr.; *fresh liquorice root* (sliced), 2 dr.; *boiling distilled water,* 1 pint; macerate for 4 hours near the fire, in a covered vessel, and strain. A cheap and useful demulcent in pulmonary and urinary irritation; especially in catarrhs, gonorrhœa, &c.; ad libitum. Dr. Pereira recommends the addition of sliced lemon and sugar-candy, to render it more palatable.

INFUSION (Liquorice). Syn. *Infusum Glycyrrhizæ,*—Lat. From the *fresh root,* sliced. Demulcent and laxative; taken ad libitum.

INFUSION (Litmus). Syn. *Infusum Lacmi,*—Lat. *Used* for its colour, and as a liquid test, and to make test paper.

INFUSION (Lobelia). Syn. *Infusum Lobeliæ, Inf. Lob. Inflatæ.* From *lobelia* or *Indian tobacco.* In asthmas, chiefly. *Dose.* 1 to 2 table-spoonfuls every half-hour, until it occasions nausea.

INFUSION (Logwood). Syn. *Logwood Tea; Infusum Hæmatoxyli,*—Lat. From *logwood chips.* One of the best remedies known for simple diarrhœa arising from weakness; also used as a colour and test.

INFUSION (Maiden-hair). Syn. *Infusum Adianthi,*—Lat. From either *common maiden-hair* (adiantum capillus veneris, —*Linn.*) or *Canadian maiden-hair* (adiantium pedatum, — *Linn.*) They are both slightly bitter, aromatic, and pectoral. The infusion forms an excellent demulcent drink in catarrhs.

INFUSION (Malambo Bark). Syn. *Infusum Corticis Malambo,* — Lat. *Prep.* (Ure.) *Bark,* 2 dr.; *boiling water,* 1 pint. An aromatic tonic and astringent.

INFUSION (Mallow Flowers). Syn. *Infusum Malvæ Florum,*—Lat. Pectoral and laxative. Chiefly used as a test.

INFUSION (Malt). Syn. *Malt Tea; Sweet Wort; Infusum Bynes, Inf. Malti,*—Lat. Prepared with *hot water* (165° to 170° Fahr.) Demulcent and laxative. A useful drink in sore throat, inflammatory fevers, &c. Some persons flavour it with *sliced lemon.*

INFUSION (Marygold). Syn. *Infusum Calendulæ,*—Lat. From the flowers of the *common marygold* (calendula officinalis,—*Linn.*) Carminative, diaphoretic, and emmenagogue. It has been recently recommended in cancerous affections, both internally and as a lotion. Radius adds *syrup of orange-peel* to flavour it.

INFUSION (Matico). Syn. *Infusum Maticonis, I. Maticæ, I. Matico,* — Lat. From the *leaves* of the *matico plant* (artanthe elongata). Aromatic, bitter, stimulant, and reputed hæmostatic; in internal hæmorrhages and mucous discharges. The Indians use it as an aphrodisiac. (Martius.)

INFUSION (Matico,—Compound). Syn. *Infusum Maticonis Compositum,* — Lat. *Prep.* (Watmough.) *Matico* and *senna,* of each, 2 dr.; *boiling water,* 1 pint. In hæmorrhagic and other discharges, piles, &c.; a wine-glassful repeatedly.

INFUSION (May-weed). Syn. *Infusum Cotulæ,*—Lat. From the *dried flowers of may-weed* or *stinking chamomile* (anthemis cotula, — *Linn.*) Bitter, stomachic, and diaphoretic; in large doses, emetic and sudorific; chiefly in hysterical affections, scrofula, &c.

INFUSION (Meadow Rue). Syn. *Infusum Thalictri Flavi,*—Lat. From the herb *meadow rue* (thalictrum flavum,—*Linn.*) In hydrophobia, taken plentifully.

INFUSION (Milfoil). Syn. *Yarrow Tea; Infusum Millefolii,*—Lat. In dropsies, and as a fomentation to bruises. See *Decoctions.*

INFUSION (Mint). Syn. *Mint Tea; Infusum Menthæ Simplex,*—Ph. D. From the *dried leaves of green or spearmint.* Carminative and stomachic; chiefly used as a vehicle for other medicines. A wine-glassful ad libitum.

INFUSION (Mint,—Compound). Syn. *Compound Mint Tea; Infusum Menthæ Compositum,*—Ph. D. 1826. *Prep.* To *mint tea,* 6 fl. oz.; add of *oil of spearmint,* 3 drops, previously triturated with *lump sugar,* 2 dr., and dissolved in *compound tincture of cardamoms,* ½ fl. oz. A useful remedy in colic, flatulence, &c.; as the last.

INFUSION (Mudar). Syn. *Infusum Corticis Mudaris, I. C. M. Giganteæ,*—Lat. From the *root-bark* of *asclepias gigantea,* (Brown.) Resembles infusion of ipecacuanha. *Dose.* 1 to 3 teaspoonfuls, as an alterative; a wine-glassful, as an emetic. In the East Indies it is highly esteemed in epilepsy, hysteria, syphilis, convulsions, and various spasmodic diseases.

INFUSION (Nettle-seed). Syn. *Infusum Urticæ Seminum,*—Lat. *Prep.* (Garde.) *Seed of common nettle* (urtica dioica,—Linn.), 2½ dr.; *boiling water,* 18 fl. oz.; infuse 3 hours, strain, and add of *syrup,* 2 fl. oz. Astringent, diuretic, and pectoral.

INFUSION (Nux Vomica). Syn. *Infusum Nucis Vomicæ*,—Lat. *Prep.* (Hosp. F.) *Nux vomica* (ground or rasped), 1 dr.; *boiling water*, 1 pint; digest 3 hours, and strain. It must be taken with caution, and the effects watched. See *Nux vomica & Strychnine.*

INFUSION (Orange-peel). Syn. *Infusum Aurantii Corticis*,—Lat. Bitter and stomachic.

INFUSION (Orange-peel,—Compound). Syn. *Infusum Aurantii*,—Ph. E. *Inf. Aurantii Compositum*,—Ph. L. & D. *Prep.* 1. (Ph. L. & E.) *Dried bitter-orange peel*, ½ oz.; *fresh lemon peel*, 2 dr.; *cloves* (bruised), 1 dr.; *boiling distilled water*, 1 pint; macerate for 15 minutes in a covered vessel, and strain.

2. (Ph. D.) *Dried orange peel*, 3 *dr.; cloves*, ½ *dr.; boiling water*, ½ pint; macerate half an hour. An agreeable stomachic. It is chiefly employed as a vehicle for other medicines.

INFUSION (Orange-peel,—Concentrated Compound). Syn. *Infusum Aurantii Concentratum, Inf. A. Comp. Conc.*,—Lat. *Prep.* 1. Seville *orange-peel*, (dried), 3¼ *lb.; fresh lemon peel*, 1½ *lb.; bruised cloves*, ⁸⁄₄ *lb.*; *boiling water*, 9 pints; infuse for 20 minutes, press out the liquor, and, when cold, add of *rectified spirit*, 1 quart; and filter.

2. *Dried orange-peel*, 18 *oz.; fresh lemon peel*, ½ *lb.; bruised cloves*, ¼ *lb.; rectified spirit*, 1 pint; *cold water*, 3 pints; macerate for 1 week, press, and filter. Very superior.

Obs. 1 fl. dr. of either of the above added to 7 fl. dr. of *water*, makes a similar (preferable) preparation to the *compound infusion of orange peel*, Ph. L.

INFUSION (Pareira Brava). Syn. *Infusum Pareiræ*,—Ph. E. & D.; & Ph. L. 1836. *Prep.* 1. (Ph. E., & Ph. L. 1836.) *Velvet leaf* or *pareira brava root*, 6 dr.; *boiling water*, 1 pint; macerate for two hours in a lightly covered vessel, and strain.

2. (Ph. D.) *Pareira* (bruised and torn), ½ *oz.; boiling water*, 9 *fl. oz.; macerate* 1 hour, and strain. In irritation and mucous discharges from the urinary organs. The corresponding preparation of the Ph. L. will be found among the "*decoctions.*"

INFUSION (Parsley Root). Syn. *Infusum Petroselini*,—Lat. From the *root of garden parsley*. Aromatic, diuretic, and slightly aperient. It has been highly recommended by Dr. Chapman and others in dropsy, in the strangury arising from blisters, &c.; taken freely, either alone, or combined with a little *sweet spirit of nitre.*

INFUSION (Peach Leaves). Syn. *Infusum Persicæ, I. P. Folii*,—Lat. *Prep.* (Pereira.) *Peach leaves* (dried), ½ oz.; *boiling water*, 1 pint; macerate an hour, and strain. *Dose.* 1 to 2 table-spoonfuls, twice or thrice a day; to allay irritation of the bladder and urethra, and as a vermifuge.

INFUSION (Pectoral). Syn. *Infusum Pectorale*,—Lat. *Prep.* (Hosp. F.) *Linseed* (bruised), ¾ oz.; *coltsfoot leaves*, ½ oz.; *liquorice root* (sliced) and *poppy-heads*, of each, ¼ oz.; *boiling water*, 1 pint; digest two hours, and strain. In coughs, colds, hoarseness, &c., accompanied with a dose of aperient medicine. See *Species, &c.*

INFUSION (Pennyroyal). Syn. *Pennyroyal Tea; Infusum Pulegii, I. Menthæ Pulegii*,—Lat. A popular remedy for nausea, flatulence, colds, hooping-cough, hysterical affections, obstructed menstruation, &c.

INFUSION (Peppermint). Syn. *Peppermint Tea; Infusum Menthæ Piperitæ*,—Lat. In flatulence, colic, griping, &c., and as a vehicle for other medicines.

INFUSION (Periwinkle). Syn. *Infusum Vincæ Minoris*,—Lat. From the *leaves* of *lesser periwinkle* (vinca minor,—*Linn.*) Astringent and tonic; in diarrhœa, dysentery, &c. Mr. Weathers employs it in passive hæmorrhages, and others have recommended it as an external tonic applied to the perinæum, &c., in piles, relaxation of the genitals, &c.

INFUSION (Persimmon). Syn. *Infusum Persimmonis*,—Lat. From the *bark* of *persimmon* or *pishamin* (diospyros Virginiana,—*Linn.*) Astringent; very valuable in diarrhœa, hæmorrhages, agues, &c.; and as a gargle in ulcerated sore throat.

INFUSION (Peruvian Bark). See *Infusion of Bark.*

INFUSION (Pinkroot). Syn. *Pinkroot Tea, Worm do.; Infusum Spigiliæ*,—Lat. From *Indian pinkroot.* Vermifuge; either combined with, or followed by a purge after the third or fourth dose. The dose for a child, 3 to 5 years old, is 1 to 2 table-spoonfuls.

INFUSION (Pinkroot,—Compound). Syn. *Infusum Spigiliæ Compositum, I. S. cum Sennâ*,—Lat. *Prep.* (Elliss.) *Pinkroot*, ½ oz.; *senna*, 2 dr.; *fennel seed*, 3 dr.; *manna*, 1 oz.; *boiling water*, 1 pint. *Dose*, ½ wine-glassful to a child 2 or 3 years old; in worms. See *Decoctions.*

INFUSION (Pleurisy Root.) Syn. *Infusum Asclepiadis Tuberosæ*,—Lat. From the *root* of *butterfly weed* or *pleurisy root* (asclepias tuberosa,—*Linn.*) Expectorant and diuretic; in large doses, purgative; in colds, pleurisy, pneumonia, &c. According to Bigelow it is a valuable mild tonic and stimulant.

INFUSION (Poison-oak). Syn. *Infusum Rhois Toxicodendri,*—Lat. *Prep.* From the *dried leaves of the poison-oak* or *poison ivy* (rhus toxicodendron,—*Linn.*), 3 dr.; *boiling water,* 1 pint. Stimulant and narcotic; chiefly in palsy and mania.

INFUSION (Poppy-heads). Syn. *Poppy Tea; Infusum Papaveris,*—Lat. Soothing, anodyne. Sweetened with honey it is a popular remedy for tickling cough, restlessness, &c.; also used *hot,* as an embrocation, in painful tumours, inflammations, &c.

INFUSION (Red Poppy). *Syn. Red-poppy Tea; Infusum Rhœados*—Lat. From the *petals* of the *red* or *corn poppy.* Anodyne and pectoral. Sweetened with sugar or honey, it is a popular remedy in catarrhal affections; but the use of this as well as of the last preparation should be accompanied by a dose of aperient medicine.

INFUSION (Purging Flax). Syn. *Infusum Lini Cathartici,*—Lat. From the *dried leaves of purging flax* (linum catharticum,—*Linn.*) Cathartic. The *dose* should be repeated at intervals of an hour, or an hour and a half, until it operates.

INFUSION (Quassia). Syn. *Quassia Tea; Infusum Quassiæ,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Quassia* (sliced), 40 gr.; *boiling distilled water,* 1 pint; infuse for 2 hours in a covered vessel, and strain.

2. (Ph. E.) *Quassia,* 1 *dr.*; *boiling water,* 1 pint.

3. (Ph. D.) *Quassia* (rasped), 1 *dr.; boiling water,* 8½ *fl. oz.*

4. (Ph. U. S.) *Quassia,* 2 dr.; *cold water,* 16 fl. oz; macerate for 12 hours, and strain. As a bitter tonic, in loss of appetite, dyspepsia, &c.; either combined with alkaline carbonates or chalybeates. Sweetened with moist sugar or honey, it forms a common *fly-water* or *fly-poison.*

INFUSION (Quassia,—Compound). Syn. *Infusum Quassiæ Compositum,*—Lat. *Prep.* (Ellis.) *Quassia, serpentary,* and *dried orange peel,* of each, ¼ oz.; *boiling water,* 1 pint. A stimulant stomachic.

INFUSION (*Rattle-snake Root.*) Syn. *Seneka Tea; Infusum Senegæ,*—Ph. E. *Inf. Polygalæ,*—Ph. D. *Prep.* 1. (Ph. E.) *Rattle-snake root* (bruised) 10 dr.; *boiling water,* 1 pint; infuse for 4 hours in a covered vessel and strain.

2. (Ph. D.) *Polygala root,* ½ *oz.; boiling water,* 9 fl. oz. Stimulant, expectorant, and diuretic, either alone or combined with ammonia; in catarrhs, &c.

INFUSION (Red Cabbage). *Used* as a colour, and to make test paper. It will not keep without the addition of about 1-10th of its weight of *rectified spirit.*

INFUSION (Rhatany). Syn. *Infusum Rhataniæ; Inf. Krameriæ,*—Ph. L. & D. *Prep.* 1. (Ph. L.) *Rhatany root,* 1 oz.; *boiling distilled water,* 1 pint; macerate for 4 hours in a covered vessel, and strain.

2. (Ph. D.) *Rhatany,* ½ *oz.; boiling water,* 9 *fl. oz.;* macerate 1 hour, and strain. Astringent and tonic; chiefly in chronic diarrhœa.

INFUSION (Rhatany,—Concentrated). Syn. *Infusum Krameriæ Concentratum,*—Lat. From 8 times the *usual quantity of ingredients,* as *infusion of cascarilla.*

INFUSION (Rhododendron). Syn. *Infusum Rhododendri,*—Lat. From the *leaves of yellow rhododendron* (rhododendron chrysanthum), ½ oz.; *boiling water,* ½ pint. Highly recommended by Pallas and Koelpin in gout, chronic rheumatism, and syphilis. A patient lame from sciatica, and deplorably emaciated, was completely cured by persevering in its use. (Pallas.)

INFUSION (Rhubarb). Syn. *Infusum Rhei,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Rhubarb* (sliced), 3 dr.; *boiling distilled water,* 1 pint; macerate for 2 hours in a covered vessel, and strain.

2. (Ph. D.) *Rhubarb,* 2 *dr.; boiling water,* 9 *fl. oz.;* macerate 1 hour.

3. (Ph. E.) *Rhubarb,* (in coarse powder), 1 oz.; *boiling water,* 18 fl. oz.; infuse for 12 hours, add of *spirit of cinnamon,* 2 fl. oz.; and strain through linen or calico. Stomachic and purgative; along with neutral salts or aromatics. The infusion, Ph. E., being fully double as strong as that of the Ph. L. & D., must be taken in proportionate doses.

INFUSION (Rhubarb,—Concentrated). Syn. *Infusum Rhei Concentratum,*—Lat. *Prep.* 1. *Rhubarb* (in coarse powder), 10 *oz.; rectified spirit,* 1 pint; *cold distilled watar,* 1 quart; digest 10 days, with frequent agitation, then express the liquor, and filter it; or proceed by the method of displacement.

2. *Rhubarb,* 3 *lb.* 5 *oz.; cold distilled water,* 11 pints; *rectified spirit,* 5½ pints; as the last.

Obs. 1 fl. dr. of either of the above, added to 7 fl. dr. of *water,* forms 1 fl. oz. of liquid, resembling, and in many points preferable to the infusion of the Ph. L. The above is the only way a fine, rich-coloured, and transparent concentrated preparation can be made, that will keep well. Should it not prove perfectly limpid it may be clarified in the way already mentioned.

INFUSION (Rhubarb,—Alkaline). Syn. *Infusum Rhei Alkalinum, I. R. cum Potassâ.*—Lat. *Prep.* (Copland.) *Rhubarb*, 2 dr.; *carbonate of potassa*, 1 dr.; *boiling water*, ½ pint; macerate for 4 hours, strain, and add of *tincture of cinnamon*, ½ fl. oz. In dyspepsia, acidity, heartburn, &c.

INFUSION (Roses). Syn. *Infusum Rosæ*,—Lat. From the *petals of red roses*. Used as colouring and for a test; mixed with vinegar and sweetened with honey it forms a popular gargle in sore throat.

INFUSION (Roses,—Compound). Syn. *Infusum Rosæ*,—Ph. E. *Inf. Rosæ Compositum*,—Ph. L. *Inf. R. Acidum*,—Ph. D. *Tinctura Rosarum*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Petals of the red* or *damask rose* (dried and pulled asunder), 3 dr.; *boiling water*, 1 pint; mix, and add of *dilute sulphuric acid*, 1½ fl. dr.; macerate for 2 hours, strain off the liquor, and dissolve in it, *white sugar*, 6 dr. The Edinburgh form is nearly similar.

2. (Ph. D.) *Petals*, 2 *dr.; boiling water*, ½ pint; infuse 1 hour, strain, and add of *dilute sulphuric acid*, 1 *fl. dr.*

Obs. A vessel of glass or stone-ware should be used to make the infusion in, as metallic vessels injure the colour of the liquid, and are also attacked by the acid. The best plan is to add the dilute sulphuric acid to the water, before pouring it on the leaves. The infusion may be squeezed out of the leaves with the hands.

Infusion of roses is principally used as a vehicle for sulphate of quinine, saline purgatives, and some other medicines. It is astringent and refrigerant, and, when diluted with water, forms a pleasant drink in febrile disorders, phthisical sweats, hæmorrhages, diarrhœa, &c. It also makes a very useful astringent gargle. *Dose.* 1 to 4 fl. oz.; either alone or diluted with water. It is incompatible with the alkalies and earths, and their carbonates and bicarbonates.

INFUSION (Roses, — Concentrated). Syn. *Infusum Rosæ Concentratum*,—Lat. *Prep.* 1. *Rose petals* or *leaves*, 10 *oz.; boiling distilled water*, 3 pints; infuse for 2 hours, with frequent agitation, express the liquid, strain through a clean hair sieve, and add of *dilute sulphuric acid*, 4½ fl. oz.; after agitation for 5 or 6 minutes, and repose for 2 or 3 hours, decant the clear portion, and filter through paper supported on calico; next, dissolve in the liquid 1¼ *lb.* of the *finest white sugar*, broken up into small lumps, but perfectly free from dust and dirt; lastly, pour the infusion into clean stoppered green-glass bottles, and as much as possible keep them from the light, and in a cool place.

2. *Rose petals* or *leaves*, 3¼ *lb.; boiling water*, 2 gall.; *diluted sulphuric acid*, 24 fl. oz.; *finest white sugar*, 6½ *lb.;* as the last.

3. The same quantity of *dilute sulphuric acid* and *cold water*, as before; mix, and infuse the *rose leaves* in the liquid for 48 hours, then express, filter, and add the *sugar*. Product very fine, and keeps well without becoming gelatinous.

Obs. The above infusion is 8 times as strong as that of the Ph. L. Great care should be taken that the utensils are *perfectly clean*, especially the press, if one is employed; and earthenware *glazed with lead* should be *avoided*. The "*pressing*" should also be conducted as rapidly as possible, to avoid the colour being injured by the iron. *Clean wrought iron* does not readily injure the colour of infusion of roses *before* the addition of the acid. When the 3d formulæ is adopted, strong pressure of the leaves with the hands can alone be safely had recourse to. If the infusion does not filter *quite clear* through paper, it should be set aside for a few days, when, in general, it will be found to filter more readily and satisfactorily. Should it be wanted for immediate sale, the addition of the whites of 2 or 3 eggs, diluted with 2 or 3 ounces of water, followed by violent agitation of the liquid for a few minutes, and repose for an hour or two, will usually render it "fine," when it may be either decanted, or filtered should it require it. It will now pass rapidly through ordinary filtering paper, and at once run "clear."

INFUSION (Rue). Syn. *Rue Tea; Infusum Rutæ*,—Lat. Carminative, antispasmodic, emmenagogue, and vermifuge. It is a popular and useful remedy in flatulent colic, infantile convulsions, epilepsy, hysteria, suppressed menstruation, &c.

INFUSION (Rupture-wort). Syn. *Infusum Herniariæ*,—Lat. From the *herb* (herniaria glabra,—*Linn.*) Astringent, diuretic, and saline; formerly supposed to be useful in ruptures.

INFUSION (Sage). Syn. *Sage Tea; Infusum Salviæ*,—Lat. From the *leaves of common garden sage*. Carminative and stomachic. In flatulence and dyspepsia, and diluted with water as a drink, to lessen the night sweats in phthisis and fever, and to stop the secretion of milk after weaning. *Dill tea* (Infusion of dill; Infusum anethi), which is reputed to promote the secretion of milk, is made in a similar manner.

INFUSION (Sage,—Compound). Syn. *Infusum Salviæ Compositum,*—Lat. *Prep.* (Ellis.) *Sage* and *boneset,* of each, ½ oz.; *cascarilla,* 1 dr.; *boiling water,* 1½ pint; infuse until cold. A wine-glassful every 3 or 4 hours in hectic fever.

INFUSION (Sarsaparilla). Syn. *Infusum Sarzæ; Inf. Sarsaparillæ,*—Ph. U. S. From the *bruised root.* Dr. Hancock adds, ½ fl. dr. of *hydrochloric acid* to each pint of the *water* employed, as the menstruum, by which, he says, the efficacy of the infusion is greatly increased. At St. George's Hospital, a little *liquorice root* and *liquor of potassa* is added for the same purpose.

INFUSION (Sarsaparilla,—Compound). Syn. *Infusum Sarsaparillæ Compositum,*—Lat. *Prep.* (Ph. D., 1826.) *Sarsaparilla root* (washed clean with a little cold water, and sliced), 1 oz.; *lime water* (cold), 16 fl. oz.; macerate for 12 hours, and strain. Inferior to the simple infusion, since both earths and alkalies lessen the solvent action of water on sarsaparilla. *Use* of both the above, similar to that of the decoction.

INFUSION (Sassafras). Syn. *Sassafras Tea; Infusum Sassafras,*—Lat. From *sassafras chips.* Alterative, stimulant, and sudorific; a popular remedy in various cutaneous, rheumatic, scrofulous, and syphilitical affections. Hufeland recommends the addition of a little *liquorice root.*

INFUSION (Savine). Syn. *Savine Tea; Infusum Sabinæ,*—Lat. *Prep.* (Pereira.) *Fresh savine leaves* or *herb,* 1 dr.; *boiling water,* 8 fl. oz.; infuse in a covered vessel. Stimulant, emmenagogue, and vermifuge; in chlorosis, and suppressed menstruation depending on a torpid action of the uterine vessels; in chronic rheumatism, worms, &c. *Dose.* 1 to 2 table-spoonfuls, cautiously administered.

INFUSION (Saxifrage). Syn. *Saxifrage Tea; Infusum Pimpinellæ,*—Lat. From the *root of burnet saxifrage* (pimpinella saxifraga,—*Linn.*) Astringent; in diarrhœa, and *externally* as a wash to remove freckles.

INFUSION (Scutellaria). Syn. *Infusum Scutellariæ,*—Lat. *Prep.* (Dr. Spalding.) *Dried herb* of *scutellaria lateriflora* (Linn), in powder, 1½ tea-spoonful; *boiling water,* 1 pint. By teacupfuls, thrice daily to prevent hydrophobia. (See p. 587.)

INFUSION (Senna). Syn. *Senna Tea; Infusum Sennæ,*—Ph. E. *Inf. Sennæ Compositum,*—Ph. L. & D. *Inf. S. Simplex,*—Ph. L., 1788. *Inf. S. Commune,*—Ph. L., 1746. *Prep.* 1. (Ph. L.) *Senna,* 15 dr.; *ginger* (bruised), 4 scruples; *boiling water,* 1 pint; macerate for an hour in a covered vessel, and strain.

2. (Ph. E.) *Senna,* 1½ oz.; *ginger,* 4 scrup.; *boiling water,* 1 pint.

3. (Ph. D.) *Senna, ½ oz.; ginger, ½ dr.; boiling water,* ½ pint. Purgative. *Dose.* 1 to 2 wine-glassfuls. It is usually given in doses of 1 to 1½ fl. oz., combined with 3 to 6 dr. of Epsom salts, or other saline purgative, under the name of "*black draught.*"

This infusion is very apt to spoil in warm weather, to prevent which "Mr. Squire recommends the addition of 1 gr. of *nitrate of potassa* to each ounce." (Pereira, Elem. Mat. Med. iii, p. 1872.) See *Mixtures.*

INFUSION (Senna, — Concentrated). Syn. *Infusum Sennæ Concentratum,*—Lat. *Prep.* 1. *Senna,* 2 *lb.* 1 *oz.; tepid water,* 1 quart; macerate for 12 hours, frequently stirring with a stick, and express the liquor; to the *marc,* add of *tepid water,* 1¼ pint, repeat the maceration for 3 hours, and again express the liquor with powerful pressure; mix the infusions, and after 2 hours' repose, decant the clear portion, and evaporate it as rapidly as possible, by steam or a chloride of sodium bath, until it measures 1½ pint; pour this into a strong bottle, and when nearly cold, add of *rectified spirit,* ½ pint; *bruised ginger,* 3½ *oz.;* macerate a week with frequent agitation, and after repose for a few days, decant the clear portion, and add *dilute spirit* (1 to 4), q. s. to make the whole measure exactly a quart.

2. Take 8 times the quantity of *senna* and *ginger,* ordered in the Ph. L., put them into a displacement apparatus, either alone, or mixed with *clean washed sand,* and transmit *water,* mixed with ¼th part of *rectified spirit* through the mass, until the proper quantity of infusion is obtained.

3. (Wholesale.) *Alexandrian senna* (best) 7 *lb.; unbleached Jamaica ginger* (finest, bruised), 3 *lb.; rectified spirit* and *water,* of each, 1 gall.; macerate for 14 days, press out the fluid, filter, and set it aside in a well-corked bottle; then take of good *East India senna,* 25 *lb.;* and the "*pressings*" or "*marc*" from the *tincture* (see above), and macerate in the least possible quantity (10 or 12 gall.) of *cold distilled water,* for 12 or 14 hours, employing frequent agitation with a wooden spatula; next press out the liquid, and again macerate the "*marc*" in *cold distilled water* (5 or 6 gall.) for 2 hours; press, mix the two liquors, strain, heat gradually to the boiling point, carefully separate the coagulated albumen, and afterwards evaporate as quickly as possible to

exactly 9 quarts; put the liquid *at once* into a vessel capable of holding 5 gallons, bung close to exclude the air, and when *nearly* cold, add the "*tincture*" obtained from the Alexandrian senna and the ginger; the whole must now be well agitated together, and allowed to stand for a week, when the clear portion must be carefully decanted into bottles (*Winchester quarts*) for sale.

4. As the last, but employing *hot water*, and limiting the period of the infusions to 2 hours, and 1 hour.

Obs. The preceding formulæ are at present employed in the wholesale trade, by nearly all those houses that are most noted for the superior quality of their "*concentrated infusions.*" The products of the whole are excellent. That from No. 3 is very beautiful, and contains all the valuable active matter that it is possible to extract from the ingredients, under the circumstances. It also keeps well. The *last* one like all preparations of senna made with hot water, is apt to drop a large deposit on standing, from which the last portion of the infusion is obtained with difficulty. They each furnish a liquid, of which 1 *fl. dr.* added to 7 *fl. dr.* of *pure water* forms 1 *fl. oz.* of a preparation precisely similar in medicinal qualities to the "*infusion of the Ph. L.*"

From the extreme bulkiness of senna, it has become a common practice with the unprincipled portions of the trade to employ only ⅓ or ¼ of the proper quantity of that drug, and to add *burnt sugar* or *treacle* to bring up the consistence and colour, and *alkaline solution of gamboge* to impart the necessary purgative quality. This fraud may be detected in the way described under "*Extract of Colocnyth*," at *page* 428. *Pure infusion of senna* reddens litmus paper. Concentrated infusion of senna, as generally met with is nearly worthless. This arises from either the employment of *inferior senna*, or the destruction of its active principle, by the lengthened exposure to heat and atmospheric oxygen, during its manufacture.

INFUSION (Senna,—Compound). Syn. *Infusum Sennæ Compositum*,—Ph. E. *Inf. Sennæ cum Tamarindis*,—Ph. D., 1826. *Prep.* (Ph. E.) *Senna*, 3 dr.; *tamarinds*, 1 oz.; *coriander seeds*, 1 dr.; *sugar*, ½ oz.; (if *brown*, 1 oz.); *boiling water*, 8 fl. oz.; infuse for 4 hours, with agitation, and then strain through calico. Pleasanter than the ordinary infusion of senna.

INFUSION (Senna with Coffee). Syn. *Infusum Sennæ cum Caffea*,—Lat. *Prep.* 1. (Foy.) *Senna*, 2 dr.; *roasted coffee* (ground), 1 dr.; *boiling water* and *hot milk*, of each, 3 fl. oz.; infuse for 12 hours (4?), and strain. For an adult; to be taken in the morning fasting.

(Guersand and Blake.) *Senna*, 10 to 30 gr. (according to age); *hot coffee* and *hot milk*, at will; infuse, and when cold, strain, and sweeten it with *sugar*, q. s. As a purge for children.

INFUSION (Senna with Lemon Juice). Syn. *Infusum Sennæ Limoniatum*,—Ph. L. 1746. *Prep.* From *senna*, 1½ oz.; *fresh lemon peel*, 1 oz.; *lemon juice*, 1 fl. oz.; *boiling water*, 16 fl. oz.; infuse.

INFUSION (Senna with Rhubarb). Syn. *Infusum Sennæ et Rhei*,—Lat. *Prep.* (Ellis.) *Senna*, 6 dr.; *manna*, 1 oz.; *rhubarb* and *cardamoms*, of each (bruised), 2 dr.; *boiling water*, 1 pint; infuse 1 hour and strain.

INFUSION (Senna with Tamarinds). See *Compound Infusion of Senna*, Ph. E.

INFUSION (Senna with Tartar). Syn. *Infusum Sennæ Tartarizatum*,—Ph. L., 1788. *Prep.* From *senna*, 1½ oz.; *coriander seeds*, 4 dr.; *cream of tartar*, 2 dr.; *boiling water*, 16 fl. oz.

INFUSION (Serpentary). Syn. *Infusum Serpentariæ*,—Ph. L. & E. *Prep.* (Ph. L.) *Serpentary* or *Virginian snake-root*, ½ oz.; *boiling distilled water*, 1 pint; macerate for 4 hours in a closed vessel, and strain. The form of the Ph. E. is similar. As a stimulating expectorant and diaphoretic; in chronic catarrhs, low fevers, agues, &c.

INFUSION (Serpentary,—Compound). Syn. *Infusum Serpentariæ Compositum*,—Lat. *Prep.* (Guy's Hosp.) *Virginian snake-root* and *contrayerva*, of each, 5 dr.; *boiling water*, 1 pint; macerate 2 hours, strain, and when cold, add of *tincture of serpentary*, 2 fl. oz. As the last.

INFUSION (Silk-weed). Syn. *Infusum Asclepiadis*,—Lat. From the *root-bark* of *common silk-weed* (asclepias Syriaca,—*Linn.*) Expectorant and nauseant; in asthmas, coughs, difficult respiration, &c.

INFUSION (Simaruba). Syn. *Infusum Simarubæ*,—Ph. E. & D.; & Ph. L., 1836. *Prep.* 1. (Ph. E. & Ph. L., 1836.) *Bark of the bitter simaruba* or *mountain damson*, 3 dr.; *boiling water*, 1 pint; macerate 2 hours, and strain.

2. (Ph. D.) *Simaruba bark*, 2 *dr.*; *boiling water*, 9 fl. oz. Tonic, and in large doses, emetic; in chronic diarrhœa and dysentery, either alone or combined with opium; and in agues, dyspepsia, &c.

INFUSION (Simaruba, — Compound). Syn. *Infusum Simarubæ Compositum*,—Lat. *Prep.* (Foy.) *Simaruba bark* and *wormwood*, of each, 2 dr.; *boiling water*, 1 pint; infuse for 15 minutes, strain, and add of *syrup of gentian*, 1 fl. oz. In agues and dyspepsia.

INFUSION (Skunk Cabbage). Syn. *Infusum Dracontii*,—Lat. From the *root* of the perennial *skunk cabbage* (dracontium fœtidum,—*Linn.*) In asthma, hysteria, &c.

INFUSION (Slippery Elm). Syn. *Infusum Ulmi Fulvæ*, — Lat. *Prep.* (Ph. U. S.) *Inner bark of slippery elm* (ulmus fulva), 1 oz.; *boiling water*, 16 fl. oz.; infuse for 2 hours, and strain. Demulcent.

INFUSION (Soap-wort). Syn. *Infusum Saponariæ*,—Lat. From *soap-wort root* (saponaria officinalis,—*Linn.*) Aperient and demulcent; also reputed alterative and antisyphilitic.

INFUSION (Southernwood). Syn. *Southernwood Tea; Infusum Abrotani*,—Lat. From the herb *southernwood* or *old man* (absinthium abrotanum,—*Linn.*) Antispasmodic, tonic, and vermifuge; in hysteria, difficult and painful menstruation, worms, &c.

INFUSION (Stimulant). Syn. *Infusum Stimulans*,—Lat. *Prep.* (Dr. Paris.) *Black mustard seed* (bruised) and *dittander*, of each, ½ oz.; *boiling water*, 16 fl. oz.; macerate for 1 hour, strain, and when cold, add of *spirit of sal volatile*, 1 fl. dr.; *spirit of pimento*, ½ fl. oz. *Dose.* 2 table-spoonfuls, 3 times a day in palsy.

INFUSION (Stinking Hellebore). Syn. *Infusum Hellebori Fœtidi*,—Lat. *Prep.* (Woodville.) *Dried leaves* of *setter-wort* or *helleborus fœtidum* (Linn.), ½ dr. (or *green herb*, 2 dr.); *boiling water*, 16 fl. oz.; macerate 1 hour, and strain. Aperient and vermifuge; and emetic, in large doses. It is chiefly useful against the large round worms of children and females, taken fasting.

INFUSION (Succory). Syn. *Chicory Tea; Infusum Chicorii*,—Lat. From the *dried root.* Aperient, deobstruent, and tonic; either alone or sweetened with honey or sugar.

INFUSION (Sudorific). Syn. *Infusum Sudorificum, Inf. Ayæ-panæ*,—Lat. *Prep.* (Dr. Camera.) *Leaves of Brazilian ayapana* (eupatorium ayapana), 2 dr.; *aniseed*, 1 dr.; *boiling water*, 1 pint. Said to be powerfully alexipharmic and sudorific. It is commonly used in Brazil as an antidote to the bites of venomous reptiles and insects.

INFUSION (Sweet Flag). Syn. *Calamus Tea, Sweet-flag do.; Infusum Acori, Inf. Calami Aromatici*,—Lat. An aromatic stimulant, tonic, and stomachic. See *Acorus Calamus.*

INFUSION (Tamarinds). Syn. *Infusum Tamarindi*,—Lat. Cooling and laxative; in sore throat, febrile affections, &c., taken ad libitum. See *Infusion of Senna.*

INFUSION (Tansy). Syn. *Tansy Tea, Infusum Tanaceti*,—Lat. From the *dried herb*, or the *green herb* using double the quantity. Aromatic, bitter, tonic, and vermifuge.

INFUSION (Tar). Syn. *Tar Water, Tar Tea; Infusum Picis Liquidæ; Aqua P. L.*,—Ph. D. *Prep.* 1. (Bishop Berkeley.) *Wood tar*, 1 quart; *cold water*, 1 gall.; stir with a stick for 15 minutes, then allow the tar to subside, strain, and keep it in well-stoppered jars.

2. (Ph. D.) As the last. Taken to the extent of a pint daily in chronic catarrhal and nephritic affections; also used as a lotion in chronic cutaneous diseases, especially those of the scalp in children.

INFUSION (Thorough-wort). See *Infusion of Boneset.*

INFUSION (Tobacco). Syn. *Tobacco Water; Infusum Tabaci*, — Lat. *Prep.* (Ph. D. 1826.) *Tobacco leaves*, 1 dr.; *boiling water*, 16 fl. oz.; macerate for an hour. *Used* for enemas; in strangulated hernia, obstinate colic, &c., observing not to administer more than one-half at a time; also as a wash to kill pediculi.

INFUSION (Tonic). See *Infusions of Calumba, Cascarilla, Gentian, &c.*, and *Mixtures.*

INFUSION (Trefoil). See *Infusion of Buckbean.*

INFUSION (Tulip-tree Bark). Syn. *Infusum Liriodendri*,—Lat. From the *bark of the tulip tree* (liriodendron tulipifera,—*Linn.*). Diaphoretic, stimulant, stomachic, and tonic; in dyspepsia, fevers, &c.; also used to flavour liquors.

INFUSION (Turmeric). Syn. *Infusum Curcumæ*,—Lat. *Used* as a test and to prepare test-paper. When required for keeping, about 1-7th of its volume of *rectified spirit* must be added.

INFUSION (Valerian). Syn. *Infusum Valerianæ*,—Ph. L. & D. *Prep.* 1. (Ph. L.) *Valerian root*, ½ oz.; *boiling distilled water*, 1 pint; infuse for an hour in a covered vessel, and strain.

2. (Ph. D.) *Valerian*, 2 *dr.; boiling water*, 9 fl. oz. Antispasmodic and nervine; in hysteria, hypochondriasis, epilepsy, and low fevers.

INFUSION (Valerian,—Compound). Syn.

Infusum Valerianæ Compositum,— Lat. *Prep.* *Yellow cinchona bark,* 1 oz.; *valerian,* ½ oz.; *boiling water,* 1 pint; as before. In debilitated nervous habits.

INFUSION (Vanilla). Syn. *Vanilla Tea; Infusum Vanillæ,*—Lat. *Prep. Vanilla,* 1½ dr.; *boiling water,* 1 pint. A stimulant antispasmodic; in hysteria, rheumatism, anaphrodisia, &c.; but chiefly used as a flavouring for liqueurs, confectionery, &c.

INFUSION (Vetiver). Syn. *Vittievayr Tea; Infusum Vetiveriæ,*—Lat. From the *roots* of *andropogon muricatus* (vetiver, vittie-vayr, or cuscus). Antispasmodic, diaphoretic, and stimulant, and when warm, diuretic and emmenagogue; in rheumatism, gout, slight febrile cases, &c.; and as a prophylactic of cholera. See *Essences.*

INFUSION (Wall-pellitory). Syn. *Infusum Parietariæ,*—Lat. From the *dried herb* (parietaria officinalis,—*Linn.*) Aperient, diuretic, and pectoral; in asthmas, dropsies, calculous affections, &c.

INFUSION (Walnut Leaves). Syn. *Walnut-leaf Tea; Infusum Juglandis,*—Lat. From the *fresh leaves* of the *common walnut* (juglans regia,—*Linn.*); also from the *inner wood-bark,* and the *green rind of the fruit.* See *Decoctions.*

INFUSION (Water-fennel). Syn. *Infusum Phellandri,*—Lat. *Prep.* (Bird.) *Seeds of water-fennel,* 5 dr.; *boiling water,* 1 pint. *Dose.* 3 to 4 fl. dr., to check excessive expectoration.

INFUSION (Whortleberry). Syn. *Infusum Uvæ Ursi,*—Lat. With alkalies, henbane, or opium, in diseases of the urinary organs; and with sulphuric acid and foxglove, in affections of the lungs. See *Decoctions.*

INFUSION (Wild-cherry Bark). Syn. *Infusum Pruni Virginianæ,*—Lat. *Prep.* (Ph. U. S.) *Wild cherry-tree bark* (prunus Virginiana), ½ oz.; *cold water,* 16 fl. oz.; infuse 24 hours, and strain. A valuable tonic and febrifuge. Wild-cherry bark "also exercises a sedative action on the circulatory and nervous systems, and is much used" (in America) "in a variety of diseases." (Dr. R. E. Griffith.)

INFUSION (Wild Ginger). Syn. *Infusum Asari Canadensis,*—Lat. From the *root* of *wild ginger* or *Canada snake-root* (asarum Canadense,—*Linn.*) A warm stimulant diaphoretic; in the same cases as infusion of Virginian snake-root.

INFUSION (Willow Bark). Syn. *Infusum Salicis,*—Lat. From the *bark* of the *white* or *common willow* (salix alba,—*Linn.*) Astringent, tonic, and febrifuge; often used instead of infusion of cinchona bark.

INFUSION (Winter Green). Syn. *Infusum Pyrolæ, Inf. Chimaphilæ,*—Lat. Astringent, tonic, and diuretic; in dropsy, nephritic pains, and chronic affections of the urinary organs. It blackens the urine, like uva-ursi. See *Decoctions.*

INFUSION (Wood Soot). Syn. *Soot Tea; Infusum Fuliginis Ligni,*—Lat. Antacid and stimulant. A similar preparation is also made from *coal-soot,* which is reputed antispasmodic and vermifuge.

INFUSION (Wormwood). Syn. *Wormwood Tea; Infusum Absinthii,*—Lat. From the *fresh tops* of the plant, or from only half the quantity of the dried herb. In loss of appetite, dyspepsia, amenorrhœa, leucorrhœa, gout, worms, &c. See *Bitters.*

INHALATIONS. Syn. *Inhalationes,*—Lat. Vapours or gases inhaled along with the breath, for the purpose of medicating the mucous membrane of the air passages. The *substances* that are to *furnish* the *vapours* or *fumes* are put into a vessel called an "*inhaler,*" which is merely a small covered pot or mug of metal or glass, furnished with a short flexible tube, terminating in a small mouth-piece. In many cases, even this simple apparatus may be dispersed with, and the fumes inhaled by holding the head over a vessel containing a little of the substance furnishing them; or, as with chloroform, a little may be dropped on a handkerchief or napkin, which is then held to the nose.

The following are the principal substances that are employed for inhalations at the present day:—

1. *Carbonic acid gas* and *nitrous oxide;* occasionally used in phthisis, by means of a bladder and mouth-piece.

2. *Chlorine gas;* exhibited by adding 5 or 6 drops of aqueous chlorine to the water (tepid) of the inhaler, which should be, in this case, of glass; employed in France for phthisis, but seldom used in England.

3. *Chloroform;* as an anæsthetic.

4. *Vapour of iodine,* administered in the same way as chlorine; occasionally used in phthisis.

5. *Oxygen* and *hydrogen gases,* either alone or diluted with air; employed in asthma and phthisis, by means of a bladder and mouth-piece.

6. *Tar vapour,* obtained by heating tar, mixed with a little carbonate of potash, over a spirit lamp; occasionally employed in bronchitis, and recommended by Sir A. Crighton in phthisis, but appears of little value in the latter.

7. *Steam of hot water;* in bronchitis, and to allay the cough in phthisis; small quantities of the seeds of henbane, opium, poppy-heads, &c., are frequently added to produce an anodyne effect.

INJECTIONS. Syn. *Injectiones,*—Lat. Liquid medicines thrown into the cavities of the body by means of a syringe or an elastic bag. Those thrown into the rectum are commonly called *clysters*, or *enemata,* and are noticed under the latter head. The following are the principal injections employed in medical practice at the present day:—

INJECTION (Acetate of Ammonia). Syn. *Injectio Ammoniæ Acetatis,* — Lat. *Prep.* (Ph. Chirur.) *Solution of acetate of ammonia* (Ph. L.), 1 part; *water,* 3 parts. Refrigerant.

INJECTION (Acetate of Copper). Syn. *Injectio Cupri Acetatis,*—Lat. *Prep.* From *verdigris,* 10 gr.; *oil of almonds* (hot), 4½ oz.; triturate until dissolved, and strain. Detergent.

INJECTION (Acetate of Lead). Syn. *Injectio Plumbi Acetatis,*—Lat. *Prep.* 1. *Sugar of lead,* ½ dr.; *distilled water,* ½ pint.

2. (Dr. Collier.) *Acetate of lead,* 40 gr.; *rose water,* 8 fl. oz. Astringent and sedative.

3. (Wendt.) *Aqueous extract of opium,* 1½ gr.; *mucilage,* 2 dr.; *solution of diacetate of lead,* 4 drops; *water,* 2 fl. oz. Cooling, sedative, and anodyne.

INJECTION (Acetate of Zinc). Syn. *Injectio Zinci Acetatis,*—Lat. *Prep.* 1. (Ellis.) *Acetate of zinc,* 8 gr.; *rose water,* 4 fl. oz.

2. (Brodie.) *Sulphate of zinc,* 1 dr.; *sugar of lead,* 80 gr.; *water,* 1 pint; dissolve separately, mix, and filter. Astringent.

INJECTION (Alkaline). Syn. *Injectio Alkalina, Inj. Lithontriptica,*—Lat. *Prep.* (Chevallier.) *Carbonate of soda,* 1 dr.; *Castile soap,* 2 dr.; *water,* 12 fl. oz.; dissolve. In certain forms of calculus.

INJECTION (Alum). Syn. *Injectio Aluminis,* — Lat. *Prep.* 1. (Dr. Collier.) *Alum,* 18 gr.; *rose water,* 6 fl. oz.; dissolve. For the urethra.

2. (Collier.) *Alum,* 3 dr.; *water,* 1 quart. For the vagina.

3. (Ph. Ch.) *Alum,* 4 gr.; *rose water,* 4 fl. oz. The above are all astringent.

INJECTION (Ammonia). Syn. *Injectio Ammoniæ,*—Lat. *Prep.* 1. (Dr. Ashwell.) *Liquor of ammonia,* 1 to 2 fl. dr.; *milk,* 1 pint. In obstructed menstruation.

2. (Lavagna.) *Liquor of ammonia,* 8 to 20 drops; *milk,* 2 fl. oz. As the last, thrice daily, beginning with the least quantity of ammonia.

3. *Liquor of ammonia,* 1 fl. dr.; *mucilage,* 1 oz.; *water,* 9 fl. oz. As the last.

INJECTION (Ammonio-sulphate of Copper). Syn. *Injectio Cupri Ammoniati,* —Lat. *Prep.* (Swediaur.) *Ammonio-sulphate of copper,* 5 gr.; *rose water,* 8 fl. oz. In chronic gonorrhœa.

INJECTION (Astringent). See the names of the respective ingredients.

INJECTION (Bichloride of Mercury). Syn. *Injectio Hydrargyri Bichloridi,*—Lat. *Prep.* 1. *Corrosive sublimate,* 2 gr.; *rose water,* 5 fl. oz.; *hydrochloric acid,* 1 drop.

2. *Corrosive sublimate* and *sal ammoniac,* of each, 5 to 10 gr.; *water,* 1 pint.

3. *Sublimate,* 5 gr.; *rose water,* 2½ fl. oz. *Used* to promote healthy action, and to prevent infection.

INJECTION (Calomel). Syn. *Injectio Calomelanos, Inj. Hydrargyri Chloridi,*— Lat. *Prep.* (St. B. Hosp.) *Calomel,* 1 dr.; *mucilage,* 1 fl. oz.; *water,* ½ pint. Some parties order quince mucilage.

INJECTION (Carbonate of Lead). Syn. *Injectio Cerussæ, Inj. Plumbi Carbonatis,*— Lat. *Prep.* (Hosp. F.) *Carbonate of lead,* (finely levigated); ½ dr. *sulphate of zinc,* 8 gr.; *mucilage,* 1 oz.; *rose water,* 5 oz. Cooling and astringent.

INJECTION (Chloride of Lime). Syn. *Injectio Calcis Hypochloris,*—Lat. *Prep.* 1. *Chloride of lime,* ½ dr.; *water,* ½ pint; agitate well together, and filter. To prevent infection.

2. (Detmold.) *Chloride of lime,* 2 dr.; *decoction of rhatany,* 13 fl. oz.; dissolve, and filter. In foul discharges, especially in ozœna, or fœtid ulceration of the nose.

3. (Rousse.) *Chloride of lime,* 20 gr.; *water,* 7 fl. oz.; *wine of opium,* 1 fl. oz. In foul discharges, and to allay irritation.

INJECTION (Chloride of Soda). Syn. *Injectio Sodæ Hypochloris,* —Lat. *Prep.* From *solution of chloride of soda,* 1 fl. dr.; *rose water,* 3 fl. oz. As the last.

INJECTION (Chloride of Zinc). Syn. *Injectio Zinci Chloridi,*—Lat. *Prep.* From *chloride of zinc,* 2 gr.; *rose water,* 3 fl. oz.; *hydrochloric acid,* 1 drop. In gonorrhœa.

INJECTION (Copaiba). Syn. *Injectio Copaibæ,* — Lat. *Prep.* 1. (Abernethy.) *Copaiba,* 2 dr.; *thick mucilage,* 5 dr.; *lime water,* 6 fl. oz.; make an emulsion.

2. (Plenck.) *Capivi,* ½ oz.; *yelk of egg,* q. s.; *lime water,* 6 fl. oz.; *honey of roses,* 3 oz.; as the last.

3. (Ricord.) *Capivi,* 6 dr.; *yelk of egg,* q. s.; *decoction of poppies,* 3 to 4 fl. oz. In

ulcers of the rectum, vagina, and urethra; and in gonorrhœa.

INJECTION (Creasote). Syn. *Injectio Creasoti*,—Lat. *Prep.* (Dr. Allnatt.) *Creasote*, 20 drops; *white sugar*, 2 dr.; *liquor of potassa*, 2 fl. dr.; triturate, and add of *water*, 8 fl. oz. In leucorrhœa and piles.

INJECTION (Cubebs). Syn. *Injectio Cubebæ*,—Lat. *Prep.* (Soubeiran.) *Cubebs* (in powder), 1 oz.; *extract of belladonna*, 1 dr.; *boiling water*, 16 fl. oz.; infuse in a covered vessel, and strain. Stimulant and narcotic. In gonorrhœa and leucorrhœa.

INJECTION (for the Ear.) Syn. *Injectio Acoustica*,—Lat. *Prep.* 1. *Ox-gall*, 3 dr.; *balsam of Peru*, 1 dr.; mix. In hardened wax, dryness of membranes, &c.

2. *Oil of almonds* or *olives*, 2 *oz.; oil of amber*, 20 drops; *tincture of castor*, 1 fl. dr.; *spirit of camphor*, ½ dr.; *laudanum*, 3 drops; mix. In ear-ache and chronic deafness.

3. (Alibert.) *Balsam of Peru*, 2 dr.; *tincture of musk*, 4 or 5 drops; *otto of roses*, 1 or 2 drops: *decoction of St. John's wort* (warm), 16 fl. oz.; agitate together, and after repose decant the clear. In discharges from the ear.

Obs. Mr. Yearsley, the eminent aurist of Saville Row, states that drops and injections for the ear should be used with very great caution, and only under proper advice, as they otherwise often aggravate the ailment, instead of curing it.

INJECTION (Ergot). Syn. *Injectio Ergotæ, Inj. Secalis Cornuti*,—Lat. *Prep.* 1. (Boudin.) *Ergot*, 1 dr.; *boiling water*, 8 fl. oz.; infuse until cold. When the urethra is highly sensitive.

2. (Descrolles.) *Powdered ergot*, 1 oz.; *boiling water*, 1 pint. Both the above are used in chronic inflammation of the vagina, and in gonorrhœa.

INJECTION (Gallic Acid). Syn. *Injectio Acidi Gallici*,—Lat. *Prep.* (Dunglison.) *Gallic acid*, ½ dr.; *water*, 1 pint. In leucorrhœa.

INJECTION (Galls). Syn. *Injectio Gallæ*,—Lat. *Prep.* From *galls* (bruised), 2 dr.; *boiling water*, 1 pint; infuse 1 hour, and strain. Astringent; in leucorrhœa.

INJECTION (Hydrochloric Acid). Syn. *Injectio Acidi Hydrochlorici*—Lat. *Prep.* From *hydrochloric acid*, 10 drops; *soft water*, 5 fl. oz. To prevent and to remove recent infection; also to remove particles of lime and iron from the eye.

INJECTION (Hydrocyanic Acid). Syn. *Injectio Acidi Hydrocyanici*,—Lat. *Prep. Medicinal hydrocyanic acid*, 1 fl. dr.; *soft water* or *almond emulsion*, ½ pint. Anodyne; to allay excessive irritability both in chronic ophthalmia and gonorrhœa, and to relieve chordee; but in all cases it must be used with caution, and at first largely diluted with water.

INJECTION (Iodide of Iron). Syn. *Injectio Ferri Iodidi*, — Lat. *Prep.* 1. (Ricord.) *Iodide of iron*, 6 gr.; *water*, 5 fl. oz. In gonorrhœa, gradually increasing the quantity of iodide.

2. (Soubeiran.) *Iodine of iron*, 3 to 4 dr.; *water*, 1 pint. In suppressed and painful menstruation, leucorrhœa, &c. Both are astringent and well adapted to scrofulous patients.

INJECTION (Iodide of Potassium). Syn. *Injectio Potassii Iodidi*, — Lat. *Prep.* (Foy.) *Iodide of potassium*, 3 gr.; *pure water*, 1 pint. As a stimulant to fistulous sinuses and ulcers in persons of scrofulous habits.

INJECTION (Iodine). Syn. *Ioduretted Injection; Injectio Iodureta, Inj. Iodinii*,—Lat. *Prep.* 1. (M. Ameuille.) *Tincture of iodine*, 1 part; *water*, 5 or 6 parts. In refractory fistulæ.

2. (M. Bonnet.) *Iodine*, 1 part; *iodide of potassium*, 2 parts; *water*, 10 parts. In scrofulous hydarthrosis, &c.

3. (Bransby Cooper.) *Compound tincture of iodine*, 2 fl. dr.; *water*, 6 fl. dr. In hydrocele.

4. (Guibourt.) *Iodine*, 4 gr.; *iodide of potassium*, 8 gr.; *water*, 1 pint. To stimulate fistulous sinuses.

5. (Velpeau.) *Tincture of iodine*, 1 fl. dr.; *water*, 3 fl. dr. In hydrocele.

INJECTION (Lithontriptic). Syn. *Injectio Lithontriptica, Inj. Vesicalis*,—Lat. *Prep.* (Dr. Hoskins.) *Nitro-saccharate of lead*, 1 gr.; *saccharic acid*, 5 drops; rub together, then add of *distilled water*, 1 fl. oz. As a solvent for phosphatic calculi. See *Alkaline Injection.*

INJECTION (Mercurial). Syn. *Injectio Mercurialis, Inj. Hydrargyri*,—Lat. *Prep. Quicksilver*, 1 dr.; *gum mucilage*, 1½ oz.; triturate until the globules disappear, and gradually add of *water*, 1½ fl. oz.

2. (Hosp. F.) *Quicksilver* and *balsam of copaiba*, of each, 4 dr.; *yelk of an egg; rose water*, ½ pint. An awkward and useless preparation.

INJECTION (Morphia). Syn. *Injectio Morphiæ*,—Lat. *Prep.* (Brera.) *Morphia*, 2 gr.; *oil of almonds* (warm), 1 oz.; triturate together until united. Anodyne and emollient. To ease the pain in ear-ache, acute gonorrhœa, piles, &c.

INJECTION (Nitrate of Silver). Syn. *Injectio Argenti Nitratis*,—Lat. *Prep.* 1. (Acton.) *Nitrate of silver*, 3 gr.; *distilled water*, ½ pint; dissolve.

2. (Dr. Arnott.) *Nitrate*, 12 gr.; *water*, 1 fl. oz.

3. (Dr. Collier.) *Nitrate*, 2 gr; *rose water*, 1 fl. oz.

4. (Dr. Culverwell.) *Nitrate*, 20 to 30 gr.; *water*, 1 fl. oz.

5. (Dr. Jewell.) *Nitrate*, 12 gr.; *water*, 6 fl. oz.

6. (Ricord.) *Nitrate*, 8 gr.; *water*, 1 fl. oz.

Obs. The weaker solutions are used in chronic gonorrhœa, gleet, and leucorrhœa; those of an intermediate strength to prevent an attack of gonorrhœa following the incipient symptoms of that disease; and the strongest, chiefly in spermatorrhœa. Their use requires great caution.

INJECTION (Opium). Syn. *Injectio Opii, Inj. Opiata*,—Lat. *Prep.* 1. *Tincture of opium* or *wine of opium*, 1 to 2 fl. dr. (according to circumstances); *water*, 5 fl. oz. As an anodyne, in gonorrhœa.

2. (Foy.) *Extract of opium*, 6 gr.; *extract of belladonna*, 1½ dr.; *decoction of wild lettuce*, 16 fl. oz. In neuralgia and hæmorrhages.

INJECTION (Sedative). Syn. *Injectio Sedativa*,—Lat. *Prep.* (Hosp. F.) *Oil of Almonds*, 1 oz.; *solution of diacetate of lead*, 20 drops. Cooling, sedative, and emollient.

2. (Gassincourt.) *Simple emulsion*, 5 fl. oz.; *decoction of poppies*, 16 fl. oz.; *white of* 1 *egg:* mix. In acute gonorrhœa.

INJECTION (Stimulating). Syn. *Injectio Stimulans*,—Lat. *Prep.* (St. Marie.) *Myrrh*, 1 oz.; *quicklime*, 2 oz.; *water*, 1 quart; digest for 2 or 3 days, and decant the clear portion. In fistulous ulcers.

INJECTION (Sulphate of Copper). Syn. *Injectio Cupri Sulphatis*,—Lat. *Prep.* 1. *Sulphate of copper*, 5 gr.; *rose water*, 4 fl. oz. In chronic gonorrhœa.

2. (Hunter.) *Sulphate of copper*, 3 gr.; *water*, 4 fl. oz. As the last.

3. (Swediaur.) *Sulphate of copper*, 6 gr.; *water*, 4 fl. oz.; dissolve, and add *solution of diacetate of lead*, 20 drops. In phymosis.

INJECTION (Sulphate of Iron). Syn. *Injectio Ferri Sulphatis*,—Lat. *Prep.* (Berends.) *Sulphate of iron* and *mucilage*, of each, ½ dr.; *sage water*, 4 fl. oz.; dissolve. In nasal and uterine hæmorrhages.

INJECTION (Sulphuret of Potassium). Syn. *Injectio Potassii Sulphureti*,—Lat. *Prep.* (Wedekind.) *Sulphuret of potassium*, 1 dr.; *water*, ½ pint. In gonorrhœa.

INJECTION (Tannic Acid). Syn. *Injectio Tannini, Inj. Acidi Tannici*,—Lat. *Prep.* (Béral.) *Tannin*, ½ dr.; *distilled water*, 8 fl. oz. (or better, ½ pint). In gleet and leucorrhœa.

INJECTION (Tea). Syn. *Injectio Theæ*,—Lat. *Prep.* (Hosp. F.) *Green tea* (or *rough black tea*), 1 dr. (say 2 teaspoonfuls); *boiling water*, ½ pint. Astringent; in gleet and fluor albus.

INJECTION (Vinous). Syn. *Injectio Vini Rubri, Inj. Vinosa*, — Lat. *Prep.* (Earle.) *Red wine*, 1 part; *water*, 2 or 3 parts. In hydrocele.

INK. Syn. *Atramentum*,—Lat. Coloured liquid employed for writing with a pen. Ink is made of various substances and colours; but in the present article we shall confine ourselves to a notice of the tanno-gallic compounds to which the term, when standing alone, is almost exclusively applied.

Prep. 1. *Aleppo galls* (well bruised), 4 *oz.; clean soft water*, 1 quart; macerate in a *clean* corked bottle for ten days or a fortnight, or even longer, with frequent agitation, then add of *gum arabic* (dissolved in a wine-glassful of water), 1¼ *oz.; lump sugar*, ½ *oz.;* mix well, and *afterwards* further add of *sulphate of iron* (green copperas, crushed small), 1½ *oz.;* agitate occasionally for 2 or 3 days, when the ink may be decanted for use, but is better if the whole is left to digest together for 2 or 3 weeks. When time is an object, the whole of the ingredients may be at once put into a bottle, and the latter agitated daily until the ink is made; and *boiling water* instead of *cold water* may be employed. *Product.* 1 quart of excellent ink, writing pale at first, but soon turning intensely black.

2. *Aleppo galls* (bruised), 12 *lb.; soft water*, 6 gall.; boil in a copper vessel for 1 hour, adding *more water* to make up for the portion lost by evaporation; strain, and again boil the galls with *water*, 4 gall., for ½ an hour; strain off the liquor, and boil a third time with *water*, 2½ gall., and strain; mix the several liquors, and while still hot, add of *green copperas* (coarsely powdered), 4½ *lb.; gum arabic* (bruised small), 4 *lb.;* agitate until dissolved, and after defecation strain through a hair sieve, and keep it in a bunged-up cask for use. *Prod.* 12 gall.; very fine and durable.

3. *Aleppo galls* (bruised), 14 *lb.; gum*, 5 *lb.;* put them into a small cask, and add of *boiling soft water*, 15 gall.; allow the whole to macerate, with frequent agitation, for a fortnight, then further add of *green copperas*, 5 *lb;* (dissolved in) *water*, 7 pints; again mix well, and agitate the whole once daily for 2 or 3 weeks. *Prod.* Fully 15 gall. Resembles No. 1.

4. *Galls* (bruised), 9 *lb.; logwood chips*

(best Campeachy), 3 *lb.;* boil as in No. 2; to the strained mixed liquors, add of *gum arabic* and *green copperas*, of each (bruised small), 4 *lb.;* simmer or digest until dissolved, and at once strain through a hair-sieve into the store-cask or jars. *Prod.* 16½ gall. Excellent, but inferior to the preceding.

5. *Galls* (bruised), 2 *lb.; logwood chips*, *green copperas*, and *gum*, of each, 1 *lb.; water*, 7 gall.; boil 2 hours, and strain. *Prod.* 5 gall. A superior ink for retail.

6. *Galls* (bruised), 1 *lb.; logwood*, 2 *lb.; gum* (common), 1 *lb.; green copperas*, ¾ *lb.; water*, 8 gall.; proceed as last. *Prod.* 6 gall. Common, but fit for all ordinary purposes.

The following formulæ are for some of the advertised inks, or are those recommended by the authorities, whose names are attached to them:—

7. (*Anti-corrosive.*) Same as "*Asiatic Ink.*"

8. (*Asiatic.*) *Galls*, 4 *lb.; logwood*, 2 *lb.; pomegranate peel*, 1 *lb.; soft water*, 5 gall.; boil as in No. 2, then add to the strained and decanted liquor, when cold, of *gum arabic*, 1 *lb.; lump sugar* or *sugar candy*, ¼ *lb.;* dissolved in *water*, 3 pints. *Prod.* 4½ gall. Writes pale, but flows well from the pen, and soon gets black.

9. (Brande.) *Galls*, 6 *oz.; green copperas* and *gum arabic*, of each, 4 *oz.; soft water*, 3 quarts; by decoction.

10. (Chaptal.) As No. 4 (nearly), adding *sulphate of copper*, ½ *lb.* Full coloured, but less durable and anti-corrosive than the preceding.

11. (M. Desormeaux, jun.) *Galls*, 1 *lb.; logwood chips*, 4 *oz.; water*, 6 quarts; boil 1 hour, strain 5 quarts, add of *sulphate of iron* (calcined to whiteness), 4 *oz.; brown sugar*, 3 *oz.; gum*, 6 *oz.; acetate of copper*, ¼ *oz.;* agitate twice a day for a fortnight, then decant the clear, bottle, and cork up for use. Writes a full black. (See No. 10.)

12. (*Exchequer.*) *Galls* (bruised), 40 *lb.* (say 4 parts); *gum*, 10 *lb.* (say 1 part): *green sulphate of iron*, 9 *lb.* (say 1 part); *soft water*, 45 gall. (say 45 parts); macerate for 3 weeks, employing frequent agitation. "This ink will endure for centuries."

13. (Guibourt.) Galls (in powder), 50 parts; *hot water*, 800 parts; digest 24 hours, strain, and add of *green sulphate of iron* and *gum arabic*, of each, 25 parts; when dissolved, add the following solution, and mix well:—*Sal ammoniac*, 8 parts; *gum*, 2 parts; *oil of lavender*, 1 part; *boiling water*, 16 parts. Said to be indelible.

14. (Dr. Hare.) As No. 12 (nearly), but substituting "*finery cinder*" for the sulphate of iron. Recommended as anti-corrosive.

15. (*Japan.*) This is a black and glossy kind of ink, which may be prepared from either of the above receipts by calcining the copperas until white or yellow, or by sprinkling it (in powder) with a little nitric acid before adding it to the decoction (preferably the former), by which the ink is rendered of a full black as soon as made. The glossiness is given by using more *gum.* It flows less easily from the pen than other inks, and is less durable than ink that writes paler and afterwards turns black. It is unfitted for steel pens.

16. (Lewis.) *Bruised galls*, 3 *lb.; gum* and *sulphate of iron*, of each, 1 *lb.; vinegar*, 1 gall.; *water*, 9 quarts; macerate with frequent agitation for 14 days. To produce 3 galls. Fine quality, but apt to act on stee pens.

17. (Old "*Patent.*") As No. 8 (nearly).

18. (*Prerogative Office.*) *Galls*, 1 *lb. gum arabic*, 6 *oz.; alum*, 2 *oz.; green vitriol*, 7 *oz.; kino*, 3 *oz.; logwood raspings*, 4 *oz.; soft water*, 1 gall.; macerate as last. *Said* to write well on parchment.

19. (M. Ribaucourt). *Galls*, 1 *lb.; logwood chips* and *sulphate of iron*, of each, ½ *lb.; gum*, 6 *oz.; sulphate of copper* and *sugar candy*, of each, 1 *oz.;* boil the first two in *soft water*, 2½ gall., to one-half, then add the other ingredients. Full coloured. (See No. 10.)

20. (Dr. Ure.) *Galls*, 12 *lb.; green copperas* and *gum Senegal*, of each. 5 *lb.;* as No. 2 (nearly). To produce 12 gall.

21. (Dr. Wollaston.) *Galls*, 1 *oz.; sulphate of iron*, 3 *dr.; gum*, ¼ oz.*; cold water*, ½ pint; put into a bottle and shaken together every day for a fortnight or longer.

Obs. According to the most accurate experiments on the preparation of black ink, it appears that the quantity of *sulphate of iron* should not exceed ⅓rd part of that of the *galls*, by which an excess of astringent vegetable matter, which is necessary for the durability of the colour, is preserved in the liquid. *Gum*, by shielding the writing from the action of the air, tends to preserve the colour, but if much is employed, the ink flows languidly from *quill pens*, and scarcely at all from *steel pens.* The latter require a very limpid ink. The addition of *sugar* (especially of *moist sugar*) increases the flowing property of the liquid, but makes it dry more slowly, and frequently to pass into an acetous state, in which condition it acts injuriously on the pen. *Vinegar* for a like reason is not calculated for the menstruum, as it rapidly softens quill or horn, and corrodes iron and steel.

The most permanent (tanno-gallate) inks, are those which contain the proper quantity of oxide of iron, at the *minimum* of oxidizement, in a state of solution or minute suspension, by which means, not only does a larger quantity of the fluid flow from the pen on to a given space, but it also sinks into the substance of the paper, by which the stain is rendered more permanent, and less easily removed by attrition or accident. Such inks are uniformly *pale* until exposed to the air for some days, when they acquire their full colour. When the iron is at the *maximum* of oxidizement, as is the case when *calcined copperas* is employed, the ink writes of a *full black* at first; but from its colouring matter being merely a suspended precipitate, it rests upon the surface of the paper without sinking into it, and may consequently be more easily erased than the former. Its black colour is also more liable to fade by the action of light and atmospheric oxygen.

Another matter of importance connected with the *permanency* of the colour of the tanno-gallic inks, is the use of the *best* Aleppo, or blue nut-galls *only*. No second or inferior quality should be employed. A contrary practice, often adopted for the sake of economy, is nearly always followed by unpleasant results, and often by considerable loss.

The only improvement of importance which has been made in the manufacture of writing ink from the common materials, since the publication of our last edition, is the practice of first *roasting* the *gall-nuts*, which is now adopted by a few of the houses most celebrated for their *copying ink*. In this way, a portion of *pyrogallic acid* is formed, which is very soluble in water, and strikes an intense bluish-black colour with the protosulphate or green sulphate of iron. From galls so treated an ink may be made to write *at once black*, without the trouble and disadvantage of calcining or peroxidizing the copperas, as noticed above. Care must, however, be taken to avoid any loss of materials by volatilization; the process, therefore, requires the exercise of a little skill.

To prevent any tendency to *mouldiness* in ink, a few *bruised cloves*, or a *little oil of cloves*, or, still better, a few drops of *creasote*, may be added. The last two should be previously dissolved in a small quantity of *strong vinegar* or *rectified spirit*. With the same intention some of the large makers allow the ink to become covered with a skin of "mould" in the cask, to render it less liable to undergo the same change when subsequently bottled. Formerly, the practice was to add a little *spirit* for the same purpose.

Sumach, *logwood*, and *oak bark*, are frequently substituted for galls in the preparation of *common* ink. When such is the case, only about $\frac{1}{6}$th or $\frac{1}{7}$th of their weight of copperas should be employed. Inks so made possess little durability.

The very general use of steel pens of late years has caused a corresponding demand for "*easy-flowing inks*," many of which are now vended under the titles of "*writing fluids*," "*steel-pen ink*," "*anti-corrosive ink*," *&c.* The greater number of these are prepared from galls in the preceding manner; but a less quantity of gum is employed, and greater attention is paid than heretofore to avoid every source of "*greasiness*," among which *smoke* and *dirty utensils* are perhaps the principal. The *blue writing fluids* which either maintain their colour or turn black by exposure to the air, are in general prepared from *ferrocyanide of potassium*, or from *indigo*, and are fully noticed in another place. "*Copying ink*," another variety of ink of recent introduction, is characterized by its suitableness to metallic pens, and by furnishing a transcript by means of the *copying press* or *copying machine*.

The inks prepared by the *first four* of the above formulæ are very durable and limpid, and will bear dilution with nearly an equal bulk of *water*, and still be superior in quality to the ordinary inks of the shops. The journals of the editor's father, written with one of them in the Mediterranean, during the early part of the long war, though for some time exposed to the sea air, and now above 60 years old, are still as legible as if newly written. See *Copying Ink*, *Galls*, *Pyrogallic Acid*, *Stains*, *Writing Fluids*, *&c.*

INK (Copying). This is usually prepared by adding a little *sugar* or other *saccharine matter* to ordinary *black ink*, which for this purpose should be *very rich* in colour, and preferably made of galls prepared by heat, as noticed above. Writing executed with this ink may be copied within the space of 5 or 6 hours, by passing it through a *press* (*copying press*) in contact with *thin unsized paper* ("*bank post*") slightly damped, enclosed between two sheets of thick *oiled* or *waxed paper*, when a reversed transcript will be obtained, which will read in proper order when the back of the copy is turned upwards. In the *absence* of a *press*, a copy may be taken, when the ink is good and the writing very recent, by rolling the sheets, duly arranged on a ruler, over the surface of a flat smooth table, employing as much force as possible, and avoiding any slipping or crumpling of the paper. Another method is to pass a warm flat-iron over the paper laid upon the writing. The following proportions are employed:—

1. *Sugar candy* or *lump sugar*, 1 *oz.;* or *treacle* or *moist sugar*, 1¼ oz.; *rich black ink*, 1½ pint; dissolve.

2. *Malt wort*, 1 pint; evaporate it to the consistence of a syrup, and then dissolve it in *good black ink*, 1¼ pint.

3. *Solazza juice*, 2 *oz.; mild ale*, ¼ pint; dissolve, strain, and triturate with *lamp black* (previously heated to dull redness in a covered vessel), ¼ *oz.;* when the mixture is complete, add of *strong black ink*, 1½ pint, mix well, and in 2 or 3 hours decant the clear.

Obs. After making the above mixtures, they must be tried with a common *steel pen*, and if they do not "*flow freely*" some more unprepared ink should be added until they are found to do so.

INK (Indelible). *Prep.* 1. *Lamp black*, (previously heated to dull redness in a *covered* vessel), ¼ *oz.;* triturate with *good black ink* (gradually added), 1 pint. Resists chlorine, weak acids, and weak alkaline lyes, in the cold.

2. (M. Bezanger.) *Lamp black* ground in a *lye of caustic soda*, combined with a *mixture* of *gelatine* and *caustic soda.* Said to be indelible, and to resemble genuine China ink. (Moniteur Industriel.)

3. (M. Braconnot.) *Dantzig potash*, 4 parts; *tanned leather parings*, 2 parts; *sulphur*, 1 part; *water*, 20 parts; boil them in an iron vessel to dryness, then raise the heat (constantly stirring with an iron rod) until the whole forms a soft mass, observing that it does not ignite; next dissolve the mass in *water*, q. s., and filter the solution through a cloth. Flows freely from a pen, and resists the action of many chemical substances.

4. (*Carbon Ink.*) Genuine *Indian ink*, rubbed down with *good black ink*, until it will flow easily from a pen. Resists chlorine, oxalic acid, and ablution with a hair pencil or sponge.

5. (Coathupe.) *Borax*, 1 *oz.; shell-lac*, 2 *oz.; water*, 18 fl. oz.; boil in a covered vessel until dissolved, strain, add of *thick mucilage*, 1 *oz.;* and triturate it with *levigated indigo* and *lamp black*, of each, q. s. to give a good colour after 2 hours' repose, decant it from the dregs, and bottle for use. Resists moisture, chlorine, and acids.

6. (*French.*)—*a.* From *Indian ink*, diffused through *water acidulated with hydrochloric acid.* For quills—*b.* From *Indian ink* diffused through *water slightly alkalized with liquor of potassa.* For metallic pens.

7. (Herberger.) *Wheat gluten* (free from starch), q. s., is dissolved in *weak acetic acid* or *good pure vinegar*, 4 fl. oz.; *lamp black* (best), 10 or 12 gr.; *indigo*, 2 or 3 gr.; and *oil of cloves*, 1 or 2 drops, are then added, and the whole is thoroughly incorporated together. The product is inexpensive, has a beautiful black colour, and resists the action of water, chlorine, and weak acids.

8. (Dr. Traill.) Resembles Herberger's (nearly).

9. (Ure.) Similar to No. 4.

Obs. The products of the above formulæ, though called "*indelible ink*" and "*indestructible ink*," are in reality only indelible as compared with common writing ink, as they may all be removed with more or less facility by chemical reagents, assisted by mechanical means. They are intended chiefly for paper, pasteboard, and parchment. No. 5 is also used for glass and metal. See *Marking Ink.*

INK (Horticultural). *Prep.* 1. *Chloride of platinum*, ¼ *oz.; soft water*, 1 pint; dissolve, and preserve it in glass. *Used* with a clean quill to write on *zinc labels.* It almost immediately turns black, and cannot be removed by washing. The addition of gum and lamp black, as recommended in certain books, is unnecessary, and even prejudicial to the quality of the ink.

2. *Verdigris* and *sal ammoniac*, of each, ½ *oz.; levigated lamp-black*, ¼ *oz.; common vinegar*, ¼ pint; mix thoroughly. *Used* as the last, for either *zinc, iron*, or *steel.*

3. *Blue vitriol*, 1 *oz.; sal ammoniac*, ½ oz.; (both in powder); *vinegar*, ¼ pint; dissolve. A little lamp-black or vermillion may be added, but it is not necessary. As No. 1; for *iron, steel*, or *tin-plate.* Some of the preparations described under "*Incorrodible Ink*," are also used by gardeners and nurserymen.

INK (Incorrodible). This name has been given to several preparations of a resinous character capable of resisting the action of damp and acids.

Prep. 1. *Boiled linseed oil*, ground with *lamp-black* and *Prussian blue*, of each, q. s. to impart a deep black colour. It may be thinned with *oil of turpentine.*

2. Good *copal* or *amber varnish*, coloured with either *plumbago* or *vermillion.*

3. *Trinidad asphaltum* (genuine), 1 part; *oil of turpentine*, 4 parts; *colour* (as last), q. s.

4. (Mr. Close.) *Cobalt* (in powder), 25 gr.; *oil of lavender*, 200 gr.; dissolve by a gentle heat, and add of *lampblack*, 3 gr.; *indigo*, 1 gr. (both in impalpable powder); or *vermilion*, q. s.

5. (Mr. Hausmann.) As No. 3 (nearly). Resists the action of iodine, chlorine, alkalies, and acids.

6. (Sheldrake.) *Asphaltum* dissolved in *amber varnish* and *oil of turpentine*, and coloured with *lampblack*.

Obs. The above are also frequently called "*indelible*" or "*indestructible inks.*" They are employed for writing labels on bottles containing strong acids and alkaline solutions. The last four are very permanent, and are capable of resisting the action of iodine, chlorine, alkaline lyes, and acids, together with all the operations of dyeing and bleaching, and at once offer a cheap and an excellent material for marking linen, &c., as they cannot be dissolved off by any menstrua that will not destroy the fabric. They must be employed with *stamps*, *types*, or *stencil plates*, by which greater neatness will be secured than can be obtained with either a brush or pen. See *Horticultural Ink, Indelible Ink, &c.*

INK (Indian). Syn. *China Ink; Atramentum Indicum*,—Lat. *Prep.* 1. *Lamp black* (finest) is ground to a paste with very weak *liquor of potassa*, and this paste is then diffused through *water slightly alkalized* with potassa, after which it is collected, washed with clean water, and dried; the dry powder is next levigated to a smooth, stiff paste, with a *strong filtered decoction of carrageen* or *Irish moss*, or of *quince seed*, a few drops of *essence of musk* and about half as much *essence of ambergris* being added, by way of perfume, towards the end of the process; the mass is, lastly, moulded into cakes, which are ornamented with Chinese characters and devices, as soon as they are dry and hard.

2. A *weak solution of fine gelatine* is boiled at a high temperature in a Papin's digester for two hours, and then in an *open* vessel for 1 hour more; the liquid is next filtered and evaporated to a proper consistence, either in a steam or salt water bath; it is, lastly, made into a paste, as before, with *pure lampblack* which has been previously heated to dull redness in a well-closed crucible. Neither of the above gelatinize in cold weather, like the ordinary imitations.

3. (Gray.) *Pure lampblack* made up with *asses'-skin glue*, and scented with musk.

4. (M. Merimée.) Dissolve *superfine glue* in *water*, add a *strong solution of nutgalls*, and wash the precipitate in *hot water;* then dissolve it in a *fresh solution of glue*, filter, evaporate to a proper thickness, and form it into a paste as before, with *purified lampblack*.

5. (Proust.) As No. 1 (nearly).

6. *Seed lac*, ½ *oz.; borax*, 1½ *dr.; water*, ½ pint; boil to 8 *oz.*, filter, and make a paste with *pure lampblack*, as before. When dry it resists the action of water.

Obs. The Chinese do not use glue in the preparation of their ink, but an infusion or decoction of certain seeds abounding in a glutinous transparent mucilage, which at once imparts brilliancy and durability to the colour. Starch converted into gum by means of sulphuric acid, or British gum, has been recommended as a substitute. (M. Merimée.) *Indian ink* is chiefly *employed* by artists, but it has been occasionally given as a medicine, dissolved in water or wine, in hæmorrhages and stomach complaints. *Dose.* 1 to 2 dr.

INK (Lithographic). *Prep.* 1. *Mastic* (in tears), 8 *oz.; shell lac*, 12 *oz.; Venice turpentine*, 1 oz.; melt together, add of *wax*, 1 *lb.*, *tallow*, 6 *oz.;* when dissolved, further add of *hard tallow soap* (in shavings), 6 *oz.*; and when the whole is perfectly combined, add of *lampblack*, 4 *oz.;* lastly, mix well, cool a little, and then pour it into moulds, or upon a slab, and when cold cut it into square pieces.

2. (M. Lasteyrie.) *Dry tallow soap*, *mastic* (in tears), and *common soda* (in fine powder), of each, 30 parts; *shell lac*, 150 parts; *lampblack*, 12 parts; mix as last. Both the above are used for writing on lithographic stones.

3. (*Autographic.*) — *a.* Take of *white wax*, 8 *oz.;* and *white soap*, 2 to 3 *oz.;* melt, and when well combined, add of *lampblack*, 1 *oz.;* mix well, heat it strongly, and then add of *shell lac*, 2 *oz.;* again heat it strongly, stir well together, cool a little, and pour it out as before. With this ink lines may be drawn of the finest to the fullest class, without danger of its spreading, and the copy may be kept for years before being transferred.

b. From *white soap* and *white wax*, of each, 10 *oz.; mutton suet*, 3 *oz.; shell lac* and *mastic*, of each, 5 *oz.; lampblack*, 3½ *oz.*; mix as above. Both the above are used for writing on lithographic paper. When the last one is employed, the transfer must be made within a week.

Obs. The above inks are rubbed down with a little water in a small cup or saucer for use, in the same way as common water-colour cakes, or Indian ink. In winter, the operation should be performed near the fire, or the saucer should be placed over a basin containing a little *tepid* water. Either a steel pen or a camel's hair pencil may be employed with the ink. See *Lithography.*

INK (Marking). Syn. *Indelible Ink, Permanent do.* Of this there are several varieties, of which the following are the most valuable and commonly used:—

1. *Nitrate of silver*, ¼ *oz.; hot distilled water*, 7 fl. dr.; dissolve, add of *mucilage*, ½ *oz.*, previously rubbed with *sap green* or *syrup of buckthorn*, q. s. to colour. The linen must be first moistened with "*liquid pounce*," or "*the preparation*," as it is commonly called, and when it has again become dry, written on with a *clean* quill pen. This ink will bear dilution if the writing is not required very black.

The "*Pounce*" or "*Preparation.*" A solution of *carbonate of soda*, 1½ *oz.*, in *water*, 1 pint, *slightly* coloured with a *little sap green* or *syrup of buckthorn*, to enable the spots wetted with it to be afterwards known.

2. (*Without preparation.*) Take of *nitrate of silver*, ¼ *oz.; water*, ¾ *oz.;* dissolve, add as much of the *strongest liquor of ammonia* as will dissolve the precipitate formed on its first addition, then further add of *mucilage*, 1½ dr.; and a little *sap green, syrup of buckthorn*, or *finely powdered indigo*, to colour. Writing executed with this ink turns black on being passed over a hot Italian iron, or held near the fire.

3. *Terchloride of gold*, 1½ dr.; *water*, 7 fl. dr.; *mucilage*, 2 dr.; *sap green*, q. s. to colour. To be written with on a ground prepared with a *weak solution of protochloride of tin*, and dried. Dark purple.

4. (Rev. J. B. Reade.) *Nitrate of silver*, 1 oz.; *tartaric acid* (pure), 3 dr.; are triturated together in a mortar, in the dry state; a *little water* is then added, by which crystals of *tartrate of silver* are formed, and the *nitric acid* set free; the latter is then saturated with *liquor of ammonia*, sufficient being added to dissolve all the newly formed tartrate of silver, avoiding unnecessary excess; lastly, a *little gum* and *colouring matter* is added.

5. (Rev. J. B. Reade.) To the last is added an *ammoniacal solution* of a *salt of gold*. Mr. Reade has used for this *purpose* the *purple of Cassius*, the *hyposulphate*, the *ammonio-iodide*, the *ammonio-periodide of gold*, but any other compound of gold which is soluble in ammonia will do as well. The last two substances are new compounds, for which the chemical world is indebted to this gentleman. This ink is unacted on by nearly all those reagents which remove writing executed with solutions of the salts of silver alone; as cyanide of potassium, the chlorides of lime and soda, &c.

6. (Redwood.) *Nitrate of silver* and *pure bitartrate of potassa*, of each, 1 oz. (or, 4 parts), are rubbed together in a glass or Wedgewood-ware mortar, and after a short time, *liquor of ammonia*, 4 oz. (16 parts, or q. s.), is added; when the solution is complete, *archil*, 4 dr. (or, 2 parts); *white sugar*, 6 dr. (or, 3 parts); and *powdered gum*, 10 dr. (or, 5 parts), are dissolved in the liquor, after which *sufficient water* is added to make the whole measure exactly 6 fl. oz., when it is ready to be bottled for use. The last three are used in the same manner as No. 2.

7. (Dr. Smellie.) From *sulphate of iron*, 1 dr.; *vermilion*, 4 dr.; *boiled linseed oil*, 1 oz.; triturated together until perfectly smooth. Used with type.

8. (Soubeiran.) *Nitrate of copper*, 3 parts; *carbonate of soda*, 4 parts; *nitrate of silver*, 8 parts; mix, and dissolve in *liquor of ammonia*, 100 parts. *Used* like No. 2.

9. (Ure.) A *strong solution* of *chloride of platinum*, with a *little potassa*, and *sugar* and *gum*, to thicken.

10. The *fluid* contained between the *kernel* and *shell* of the *cashew nut*. On linen and cotton it turns gradually black, and is very durable. This has been called "*anacardium*" or "*cashew-nut ink*."

11. *Sulphate of manganese*, 2 parts; *lamp black*, 1 part; *sugar*, 4 parts; all in fine powder, and triturated to a *paste* with a *little water*. Used with types or stencil-plates; the part when dry being well rinsed in water. Brown.

12. *Black oxide of manganese* and *hydrate of potassa*, are mixed, heated to redness in a crucible, and then triturated with an equal weight of *pure white clay*, and *water*, q. s. to give it due consistence. *Used* like the last. Brown.

Obs. The products of the first two of the above formulæ constitute the *marking ink of the shops*. They have, however, no claim to the title of "*Indelible ink*," "*which no art can extract without injuring the fabric*"—as is generally represented. On the contrary, they may be discharged with almost as much facility as common iron-moulds. This may be easily and cheaply effected by means of ammonia, cyanide of potassium, the chlorides of lime and soda, and some of the hyposulphites, without in the least injuring the texture of the fabric to which they may be applied. The only precaution required, is that of rinsing the part in clean water immediately after the operation. The "*marking ink without preparation*" is more easily extracted than that "*with preparation.*" The former has also the disadvantage of not keeping so well as the latter, and of depositing a portion of fulminating silver, under some circumstances, which renders its use dangerous. The thinner inks, when intended to be used with type or plates, are thickened by adding a *little more gum*, or some sugar.

INK (Marking). Syn. *Packer's Ink.* Ink bottoms. *Used* by packers for marking bales, boxes, &c.

INK (Perpetual). *Prep.* 1. *Pitch*, 3 *lb.;* melt over the fire, and add of *lampblack*, $\frac{3}{4}$ *lb.;* mix well.

2. *Trinidad asphaltum* and *oil of turpentine*, equal parts. *Used* in a melted state to fill in the letters on tombstones, marbles, &c. Without actual violence it will endure as long as the stone itself.

INK (Printer's). See *Printing Ink.*

INK (Sepia). See *Sepia.*

INK (Sympathetic). Syn. *Diplomatic Ink, Invisible do.* Fluids which, when used for writing, remain invisible until the paper is heated, or acted on by some other chemical agent. Sympathetic inks have been frequently employed as the instruments of secret correspondence, and have often escaped detection; but by heating the paper before the fire until it begins to grow discoloured by the heat, the whole of them may be rendered visible.

The following are the most common and amusing sympathetic inks:—1. *Sulphate of copper* and *sal ammoniac*, equal parts, dissolved in *water;* writes colourless, but turns YELLOW when heated.—2. *Onion juice;* like the last.—3. A *weak infusion of galls;* turns BLACK when moistened with *weak copperas water.*—4. A *weak solution of sulphate of iron;* turns BLUE when moistened with a *weak solution of prussiate of potassa*, and BLACK when moistened with *infusion of galls.*—5. The *diluted solutions of nitrate of silver* and of *terchloride of gold;* become respectively DARK BROWN and PURPLE when exposed to the sunlight.—6. *Aqua fortis, spirits of salts, oil of vitriol, common salt*, or *saltpetre*, dissolved in a *large quantity of water;* turns YELLOW or BROWN when heated.—7. *Solution of chloride* or *nitromuriate of cobalt;* turns GREEN when heated, and disappears again on cooling. If the salt is pure, the marks turn BLUE.—8. *Solution of acetate of cobalt*, to which a *little nitre* has been added; becomes ROSE COLOURED when heated, and disappears on cooling.—9. A *weak solution* of the *mixed chlorides of cobalt* and *nickel;* turns GREEN. The last three are about the best of our sympathetic inks.—10. *Solution of acetate of lead;* turns BROWNISH-BLACK when exposed to the *fumes of sulphuretted hydrogen.*—11. A *weak solution of nitrate of mercury;* turned BLACK by heat and sulphuretted fumes.—12. *Rice water* or *decoction of starch;* turned BLUE by a solution of iodine in *weak spirit*, and by the *fumes of iodine*, if the paper is first slightly moistened by exposure to steam or damp air.

INKS (Coloured). Inks of various colours may be made from a strong decoction of the *ingredients used in dyeing*, mixed with a little *alum* or *other substance* used as a *mordant*, and *gum arabic.* Any of the ordinary *water-colour cakes* employed in drawing, diffused through *water*, may also be used as coloured ink.

Blue Ink. See *Ink* and *Writing Fluids.*

Brown Ink. 1. A strong *decoction of catechu;* the shade may be varied by the cautious addition of a little *weak solution of bichromate of potash.*

2. A strong *decoction of logwood* with a *very little bichromate of potash.*

Gold Ink. From *gold* in the state of an *impalpable powder*, ground up with a little *gum water.* The brilliancy of the writing performed with this ink is considerable, and may be increased by burnishing. (See *page* 539.)

Green Ink. 1. From *sap green* dissolved in very weak *alum water.*

2. A strong solution of *binacetate of copper* in *water*, or of *verdigris* in *vinegar.*

3. (Klaproth.) *Verdigris*, 2 *oz.; cream of tartar*, 1 *oz.; water*, $\frac{1}{2}$ a pint; boil to one-half, and filter.

4. (Winckler.) *Bichromate of potassa*, 3 parts; *hot water*, 8 parts; dissolve, add of *rectified spirit*, 4 parts, mix, and further add of *sulphuric acid*, q. s. to liberate the *chromic acid*, avoiding excess; next evaporate to one-half, dilute with *water*, filter, and add to the filtrate, *rectified spirit*, 4 parts, together with 3 or 4 drops of *sulphuric acid* (if required) to precipitate any remaining potash-salt; lastly, decant and preserve the liquid until it assumes a rich green colour.

5. A solution of *recently precipitated hydrated oxide of chromium* in *liquor of ammonia*, diluted with *distilled water*, q. s.

A magnificent dark green liquid, perfectly anti-corrosive.

Purple Ink. A *strong decoction of logwood,* to which a little *alum* or *chloride of tin* has been added.

Red Ink. 1. *Brazil wood* (ground), 4 *oz.; white-wine vinegar* (hot), 1¼ pint; digest in glass or a well-tinned copper or enamel saucepan, until the next day, then gently simmer for half an hour, adding towards the end, *gum arabic* and *alum,* of each, ½ *oz.*

2. *Ground Brazil wood,* 10 *oz.; white vinegar,* 10 pints; macerate for 4 or 5 days; then boil as before to one-half, and add of *roach alum,* 4½ *oz.; gum,* 5 *oz.;* and when dissolved, bottle for use.

3. As the last, but using *water* or *beer* instead of vinegar.

4. *Cochineal* (in powder), 1 *oz.; hot water,* ½ pint; digest, and when *quite cold,* add of *spirit of hartshorn,* ¼ pint (or *liquor of ammonia,* 1 *oz.*, diluted with 3 or 4 *oz.* of *water;*) macerate for a few days longer, and then decant the clear. Very fine.

5. (Buchner.) *Pure carmine,* 20 gr.; *liquor of ammonia,* 3 fl. oz.; dissolve, then add of *powdered gum,* 18 gr. Half a drachm of powdered *drop lake* may be substituted for the carmine where expense is an object. Colour superb.

6. (Henzeler.) *Brazil wood,* 2 *oz.; alum* and *cream of tartar,* of each, ½ *oz.; rain water,* 16 fl. oz.; boil to one-half, strain, add of *gum* (dissolved), ½ *oz.;* and when cold, further add a *tincture* made by digesting *powdered cochineal,* 1½ dr., in *rectified spirit,* 1½ fl. oz.

7. (Redwood.) *Guarancine* and *liquor of ammonia,* of each, 1 *oz.; distilled water* (cold), 1 pint; triturate together in a mortar, filter, and dissolve in the solution, *gum arabic,* ½ oz.

Silver Ink. From *silver leaf* or *powdered silver,* as *Gold Ink.*

Violet Ink. The same as *purple ink,* but weaker.

Yellow Ink. 1. From *gamboge* (in coarse powder), 1 *oz.; hot water,* 5 *oz.;* dissolve, and when cold, add of *spirit,* ¾ *oz.*

2. Boil *French berries,* ½ *lb.*, and *alum,* 1 *oz.*, in *rain water,* 1 quart, for half-an-hour, or longer, then strain and dissolve in the hot liquor, *gum arabic,* 1 *oz.*

INK POWDERS. *Prep.* 1. *Aleppo galls,* 4 *oz.; sulphate of iron,* 1½ *oz.; gum arabic,* 1 *oz.; lump sugar,* ¾ *oz.;* (all quite dry and in powder); mix, and divide into 3 packets. A pint of *boiling water* poured over one of them produces, in a few hours, a pint of excellent ink.

2. *Aleppo galls,* 3 *lb.; copperas,* 1 *lb.; gum arabic,* ½ *lb.; white sugar,* ¼ *lb.;* all in powder; mix, and divide into two-ounce packets, to be used as the last. *Ink powders* are very useful in travelling.

INOCULATION. Syn. *Inoculatio,*—Lat. The application of poisonous or infectious matter to any part of the body for the purpose of propagating a milder form of disease, and thus preventing or lessening the virulence of future attacks. In this country, the term is generally restricted to the artificial propagation of smallpox. See *Vaccination.*

INOSINIC ACID. An acid said by Liebig to exist in the juice of the flesh of animals, after it has deposited its kreatine.

INOSITE. A species of unfermentable sugar, discovered by Scherer in the juice of flesh. It forms beautiful crystals.

INSANITY. Syn. *Insanitas,* — Lat. Aberration of intellect; madness. Dr. Young divides insanity into the following varieties:—1. *Moral Insanity,* consisting in a morbid perversion of the natural affections, feelings, habits, inclinations, temper, &c.—2. *Monomania,* or partial insanity, in which the mind is influenced by some delusion, or is only disordered in reference to one particular subject.—3. *Mania,* or raving madness, in which the reasoning faculty is either lost or greatly weakened and disordered.—4. *Incoherence* or *dementia,* exhibiting in its different stages, impaired memory, absence of mental volition or reasoning power, deprivation of understanding, and loss of even animal instincts and volition. The consideration of this subject belongs chiefly to medicine and medical jurisprudence. Some remarks that may be useful to the non-professional reader, will be found under *Aberration* (of mind).

INTEMPERANCE. Under this head we refer to habitual indulgence in the use of spirituous or fermented liquors, whether accompanied or not by fits of intoxication or drunkenness.

The action of intoxicating liquors on the human body, in all the numerous relations of cause and effect, has been ably and eloquently treated of, in the "*Anatomy of Drunkenness,*" and it would afford both the editor and the reader much pleasure and instruction, did our space permit, to avail ourselves of the mass of facts and judicious remarks collected in that work. As, however, such is not the case, we must confine ourselves to a short notice of certain physical means of removing this vicious habit. The pernicious influence of intoxicating liquors upon individuals and upon society, and the beneficial effects of temperance, have been so often and ably exposed by the clergy, judges, and magistrates, and by philanthropists of every grade, that it would be folly to do more than merely refer to these points here. Fully one-half of the dark or disreputable deeds of those who fill our gaols, and fully an equal proportion of the poverty and wretchedness which pauperizes our population, and crowds our workhouses, are traceable to that damning vice of the Anglo-Saxon race—*intemperance.* Our judicial authorities appear to be unanimous in their opinion on this subject. *Judge Alderson* has declared that "Drunkenness is the most fertile source of crime; and if it were removed, the assizes of the country would be rendered mere nullities." *Judge Coleridge* has publicly stated, "There is scarcely a crime brought before me that is not, either directly or indirectly, caused by strong drink." According to *Judge Gurney*, "Every crime has its origin, more or less, in drunkenness." *Judge Patteson*, in a recent address, remarked, "If it were not for this drinking, you (the jury) and I would have nothing to do." *Judge Wightman*, in a similar address, observes, "I find in every calender that comes before me, one unfailing source, directly or indirectly, of most of the crimes which are committed — intemperance." Other equally high and competent authorities have expressed themselves in similar language. At the present time more capital is, perhaps, embarked in the manufacture and sale of intoxicating liquors, than in any other similar branch of human industry. And whence comes this enormous capital and the proportionately enormous revenue which its application produces? The reply is, "from the self-imposed taxation of the people, who expend annually in spirits, wine, and beer, fully 70 million sterling; a sum vastly exceeding the whole amount of our exports, and the whole amount of the government taxes, and which is nearly 12 times as great as the sum raised by the poor-rates of the kingdom." Can this enormous expenditure in articles of mere luxury, and which are the chief incentives to the vice, misery, and wretchedness which afflict our land, be judicious, or even useful? Our own opinion is, that there is no vicious habit which has in any equal degree, so tended to corrupt the morals, ruin the character and circumstances, and at once destroy the health and happiness of such multitudes of our fellow-creatures, as *intemperance.* Let every man then avoid, or shake off an habit productive of such frightful consequences. "Poets may sing of the Circean cup—praise in glowing terms the garlands which wreathe it—wit may lend its brilliant aid to celebrate it, and even learning invest it with a charm; but when the poet's song shall have died, and the garlands have all withered; when wit shall have ceased to sparkle, and the lore of ages be an unremembered thing; the baneful *effects* of the intoxicating draught will be felt; and then will the words of wisdom be awfully verified in the miserable doom of the drunkard—'Wine is a mocker—strong drink is raging.' 'At the last it biteth like a serpent, and stingeth like an adder.'" (J. B. Gough.)

To *cure* the "*habit of inebriety*" or "*drunkenness*" various means have been proposed, many of which are more ingenious than useful. Among these the following deserve notice:—

Dr. Kain, an eminent American physician, recommends *tartar emetic*, given in alterative and slightly nauseating doses, for the cure of habitual drunkenness. "Possessing," he observes, "no positive taste itself, it communicates a disgusting quality to those fluids in which it is dissolved." "These liquors, with the addition of a very small quantity of emetic tartar, instead of relieving, increase the sensation of loathing of food, and quickly produce in the patient an indomitable repugnance to the vehicle of its administration. My method of prescribing it has varied according to the habits, age, and constitution of the patient. A convenient preparation of the medicine is 8 gr., dissolved in 4 *oz.* of *boiling water;* ½ an *oz.* (say a table-spoonful) of the *solution* to be put into half a pint, pint, or quart of the patient's favorite liquor, and to be taken daily in divided portions. If vomiting and purging ensue" (which is seldom the case), "I should direct laudanum to allay the irritation, and diminish the dose. In some cases, the change suddenly produced in the patient's habits has brought on considerable lassitude and debility, which, however, were of short duration. In a majority of cases no other effect has been perceptible than slight nausea, some diarrhœa, and a gradual but very uniform distaste to the menstruum." A similar plan has been proposed by Mr. Chambers. The common people in certain parts of the country, have for centuries acted on a similar principle, in infusing *nostoc* or *star-shoot* in the liquor, at drinking which disgust to the menstruum, be it wine, spirit, or beer, is gradually excited. This plant is the *nostoc commune*, an indigenous species of *alga*.

Dr. Schreiber, a Russian physician, of Brzese-Litewski, confines the drunkard in a room, and furnishes him at discretion with his favorite beverage and coffee as he desires. All the food—the bread, meat, and the *legumes*, are steeped in the same. The poor devil is thus kept continually drunk and "*dort*." On the fifth day of this regime he has an extreme disgust for it, and earnestly requests other diet; but his desire is not yielded to, until he no longer desires to eat or drink; he is then certainly cured of his *penchant* for drunkenness. He acquires such a disgust for his favorite beverage, that he is ready to vomit at the very sight of it.

The following appears in a small treatise on '*Naval Discipline*,' published a few years since:—"Separate for one month every man who is found drunk from the rest of the crew; mark their clothes '*drunkard;*' give them *six-water grog*, or, if beer, mixed with one-half water; let them dine when the crew have finished; employ them in every dirty and disgraceful work, &c. This had such a salutary effect, that in less than six months not a drunken man was to be found in the ship." "The culprits were heard to say, that they would rather receive six dozen lashes at the gangway, and be done with it, than be put into the '*drunken mess*' (for so it was named) for a month."

Dr. Pitcairn, in attempting to break the habit in a highland chieftain, exacted a promise that the latter would every day drop as much sealing-wax into his glass as would receive the impression of his seal. He did so, and as the wax accumulated, the capacity of the glass diminished, and, consequently, the quantity of whiskey it was capable of containing. By this plan he was cured of his bad habit altogether. (Coombe.)

INTERMITTENT FEVER. See *Ague*.

INTOXICATION. Drunkenness; inebriety; the disordered condition of the intellectual functions and volition, produced by taking excessive quantities of alcoholic or intoxicating liquors.

Among the remedies employed to remove the "*fit of drunkenness*," the preparations of ammonia, and the vegetable acids, are the most common and important. About 2 or 3 fl. dr. of *aromatic spirits of ammonia* (spirits of sal volatile), or a like quantity of solution of *acetate of ammonia* (mindererus spirit), mixed with a wine-glassful of water, will in general neutralize or greatly lessen the action of intoxicating liquors. In some cases these fluids produce vomiting, which is, however, a good symptom, as nothing tends to restore an inebriated person so soon as the removal of the liquor from the stomach. Hence tickling the fauces with the finger or a feather, until sickness comes on, is a method very commonly adopted by drunkards to restore themselves to a sober state. The use of aromatic water of ammonia was first suggested by Mr. Bromley. With a like intention, some persons have recourse to *soda-water*, which acts by the free carbonic acid it contains, and also as a diluent, and from its coldness, as a tonic on the coats of the stomach. The *carbonates* and *bicarbonates of soda* and *potassa* are also favorite remedies with habitual drunkards. Among the vegetable acids, *acetic acid* is the one that appears to possess the greatest power of removing intoxication; and after this follow the citric, tartaric, malic, and carbonic acids. These substances are commonly taken by soldiers before going to parade. The usual dose of vinegar is a small tea-cupful. In the West Indies, *lime juice* and *lemon juice* are had recourse to. Both these juices act from the citric acid they contain. The use of *bitter almonds* as a means of lessening or retarding the effects of fermented liquors was known to antiquity, and is still common among heavy drinkers at the present day. Even small doses of *medicinal prussic acid* have been foolishly taken with a like intention.

INULINE. Syn. *Alantine*, *Dahline*, *Datiscine*, *Menyanthine*, *Elecampine*. A peculiar starch-like substance first obtained by Rose from the *root* of *inula helenium* or *elecampane*. It has been found in several other vegetables.

Prep. From the *rasped root*, by the same method that is adopted for arrow-root or potato farina; or by boiling the *sliced root* in 7 or 8 times its weight of *water*, and after filtration, whilst hot, allowing the decoction to repose for a short time.

Prop., *&c.* Only very slightly soluble in cold water; very soluble in boiling water, but is nearly all deposited as the solution cools; it is precipitated by alcohol.

Inuline is distinguished from *starch* by giving a yellow or yellowish-brown colour with iodine; in the decoction not being precipitated by either acetate of lead or infusion of galls; and by the precipitate formed in the *cold* decoction by an infusion of gall nuts, not disappearing until the liquid is heated to above 212°, while the precipitate from starch redissolves at 122°

Fahr. It appears to be a substance intermediate between starch and gum.

IODATE. Syn. *Oxiodide; Iodas*,—Lat. A salt of iodic acid. The *iodates* closely resemble the chlorates of the corresponding bases. They are *recognized* by the development of free iodine when treated with the *sulphurous, phosphorous*, and *hydrochloric acids*, and other deoxydising agents, and by their solutions being converted into iodides when treated with *sulphuretted hydrogen.* They are all of sparing solubility, and many are quite insoluble in water. All the *insoluble iodates* may be obtained from the iodate of potassa, by decomposing it in solution, by a solution of a soluble salt of the base. See *Iodic Acid, Iodine*, and *Potassa.*

IODHYDRATE. See *Hydriodate.*

IODHYDRIC ACID. See *Hydriodic Acid.*

IODIC ACID. Syn. *Iodhydric Acid, Oxiodine; Acidum Iodicum*,—Lat. An acid compound of iodine and oxygen discovered by Gay-Lussac and Davy.

Prep. 1. *Iodate of soda* is dissolved in *sulphuric acid* in considerable excess, the solution boiled for 15 minutes, and then set aside to crystallize.

2. Decompose *iodate of baryta* by *dilute sulphuric acid.*

3. *Iodine*, 1 part; *nitric acid* (sp. gr., 1·5), 40 parts; mix, keep them at nearly the boiling temperature, for several hours, or until the iodine is dissolved, then evaporate to dryness, and leave the residuum in the open air at a temperature of about 59° Fahr.; when by attracting moisture it has acquired the consistence of a syrup, put it into a place where the temperature is higher and the air drier, when in a few days very fine white crystals of a rhomboidal shape will form. We are indebted for this plan to M. Boursen.

Prop., *&c.* Iodic acid is decomposed into oxygen and iodine by a heat of about 450 to 500° Fahr., a property of which we avail ourselves for the conversion of the salts of this acid (*iodates*) into iodides. It is very soluble in water and deliquescent, and detonates with inflammable bodies like the nitrates and chlorates. Iodic acid is used as a test for morphia and sulphurous acid. It has been employed by Mr. Monks, the house-surgeon to the Poor-law Schools, at Norwood, as a tonic, stimulant, and alterative, in catarrhal hoarseness, strumous cases, incipient phthisis, &c. *Dose.* 3 to 6 gr.

Test. When iodic acid is mixed with an equal quantity of an alkaloid (preferably *quinine*), on a capsule or watch-glass, and a drop or two of water added, several distinct explosions occur, accompanied by the copious evolution of gas. No other substance exhibits a similar reaction. See *Iodate.*

IODIDE. Syn. *Ioduret, Hydriodate; Iodidum, Ioduretum, Hydriodas*, — Lat. A compound of iodine with a base. The iodides belong to the same class of bodies as the bromides and chlorides, and may be, for the most part, made in the same manner. All the principal iodides are noticed under the names of their respective bases. See *Iodine, &c.*

IODIDES (Double). Several of these compounds have been described by Bonsdorff, Boullay, and Liebig, many of which are formed by dissolving the iodides in a solution of iodide of potassium, when crystals of the double salt are deposited as the liquid cools, or on evaporation. They possess little interest in a practical point of view.

IODINE. Syn. *Iodinium*, Ph. L. & D. *Iodineum*,—Ph. E. *Iodium, Iodum, Iodina*, —Lat. var. An elementary substance accidentally discovered in 1812, by De Courtois, a saltpetre manufacturer at Paris. It was first examined and described by M. Clement, in 1813, and its precise nature was soon afterwards determined by Sir H. Davy and M. Gay-Lussac. It is found in each of the three kingdoms of nature, but exists in greatest abundance in the vegetable family algæ. According to Chatin, all spring water, fresh water, land plants, and every variety of food and beverage contain iodine in minute quantities; and he believes it to be an essential constituent in the organism of all animals, whether fluviatile, marine, or terrestrial. The experiments of Meyric, Marchand, and others, show it to be present everywhere in nature, associated with chlorine. Chatin states that a hen's egg contains more iodine than a litre of milk; whilst milk is richer in this substance than any other food. In atmospheric air, the normal quantity is said to be 1·5 milligramme in every 4000 litres, part of which is absorbed by the organism during respiration. Forcault found that the air of parts where goiture and glandular affections prevailed, was free from iodine. This is confirmed by Chatin in reference to the air of the Alps and of the valley of the Rhone. Oberbeck has detected iodine in the ashes of the ranunculaceæ. Dr. Lohmeyer has endeavoured to throw discredit on these statements, founded on his own experiments, which were, however, of a very inconclusive character. Böttgher has also stated that all (?) nitric acid contains chloride of iodine, and he hence argues that Chatin may have fallen into this source of error. Althongh we mention it, we do not hold the latter to have been likely.

Prep. Iodine is principally manufactured in the neighbourhood of Glasgow, from the mother-waters of kelp, known as *iodine lye.*

1. *Kelp* (the half-vitrified ashes of seaweed) is exhausted with *water*, and the solution filtered; the liquid is then concentrated by evaporation until it is reduced to a very small volume, the chloride of sodium, carbonate of soda, chloride of potassium, and other salts, being removed as they successively assume the crystalline form; *oil of vitriol* is now added, in excess, to the residual dark-brown mother-liquor (*iodine lye*), and the evolved gases (carbonic acid, sulphurous acid, and sulphuretted hydrogen), are either kindled or allowed to escape by a flue; the liquid is next decanted or filtered from the newly-formed sulphur, heated to about 140° Fahr., and mixed with as much *binoxide of manganese* as there was *oil of vitriol* employed; the whole is then introduced into a cylindrical *leaden still*, furnished with a *very short* head and connected with 2 or 3 large globular glass receivers, and heat is applied, when fumes of iodine are evolved and condensed in the receivers. During the distillation very great care is taken to watch the process, and prevent the neck of the still becoming choked with condensed iodine. For this purpose the head of the still is usually furnished with a moveable stopper, by which the process may be watched, and additions of manganese or sulphuric acid made, if required. To render the product pure, it should be passed between blotting paper, and then resublimed in glass or stoneware.

2. (Soubeiran.) A mixed solution of *sulphate of copper*, 4 parts, and *protosulphate of iron*, 9 parts, are added to the *mother liquor of the soda works*, as long as a white precipitate is thrown down; this precipitate (*diniodide of copper*) is collected, dried, mixed with its own weight of *finely-powdered black oxide of manganese*, and distilled by a strong heat in a retort, when *dry iodine* passes over. By the addition of *sulphuric acid* with the manganese, a less heat is required, but the product is wet with water, like that of the last formula.

3. (Ure.) The *residual liquor of the manufacture of soap from kelp* (or other iodine lye), of the sp. gr. of 1·374, is heated to 230° Fahr., with *sulphuric acid diluted with half its weight of water*, after which the liquid is allowed to cool, and is either decanted or filtered; to every 12 *fl. oz.* of the filtrate, 1000 gr. of *black oxide of manganese*, in powder, are added; the mixture is put into a glass globe or matrass with a wide neck, over which is inverted another glass globe, and heat is applied by means of a charcoal chauffer, when iodine sublimes very copiously, and condenses in the upper vessel; as soon as the latter is warm it is replaced by another, and the two globules are thus applied in succession, as long as violet fumes are evolved. The iodine is washed out of the globes with a little cold water. A thin disc of wood, having a hole in its centre, is placed over the shoulder of the matrass, to prevent the heat from acting on the globular receiver. On the *large scale*, a leaden still, as before described, may be employed, and receivers of either stoneware or glass; and the addition of the sulphuric acid is made in a basin or trough of stoneware or wood. *Prod.* 12 *oz.* yield 80 to 100 gr.

Prop. Iodine is usually met with under the form of semi-crystalline lumps having a semi-metallic lustre, or in micaceous, friable scales, somewhat resembling plumbago or gunpowder. It has a grayish-black colour, a hot acrid taste, and a disagreeable odour, not much unlike that of chlorine. It fuses at 225°, volatilizes slowly at ordinary temperatures, boils at 347°, and when mixed with water rapidly rises along with its vapour at 212° Fahr. It dissolves in about 7000 parts of water, and freely in alcohol, ether, solutions of the iodides, and liquid hydriodic acid. It may be crystallized in large rhomboidal plates, by exposing to the air a solution of it in hydriodic acid, and less perfectly by melting it and allowing it to cool slowly under slight pressure. It bleaches like chlorine, only more feebly. Iodine has an extensive range of affinity: with the salifiable bases, it forms compounds termed *Iodides*, *Iodurets*, or *Hydriodates*, of which several are used in medicine. Its compounds with oxygen are the *iodic* and *periodic acids.* Sp. gr., 4·946 to 4·948. According to Debaugne the addition of syrup of orange-peel or tannin to water, greatly increases its power of dissolving iodine. 2 gr. of the latter will enable 6 fl. oz. of water to take up 10 gr. of iodine. A knowledge of these facts may prove useful to the pharmaceutist.

Pur. It is *entirely* soluble in rectified spirit, and in a solution of iodide of potassium. "On applying heat to it, it first liquefies, and then (wholly) sublimes in violet coloured vapour. (Ph. L.) "39 gr. of *iodine*, with 9 gr. of *quicklime*, and

3 fl. oz. of *water*, when heated short of ebullition, slowly form a perfect solution, which is yellowish or brownish, if the iodine be *pure;* but colourless if it contains more than 2% of water or of other impurity." (Ph. E. & L.) The *iodine of commerce* is usually that of the first sublimation, and generally contains from 12% to 20% of water. Some of the foreign iodine, prepared by precipitation with chlorine, without subsequent sublimation, even contains 1-4th part of water, and has a dead leaden-gray colour, and evolves a sensible odour of chlorine. Coal, plumbago, oxide of manganese, crude antimony, and charcoal, are also frequently mixed with iodine to increase its weight. *Water* may be detected by the loss of weight it suffers when exposed to strong pressure between bibulous paper; or more accurately by drying it in the manner directed below,—*chlorine* may be detected by the odour; and the *other* substances mentioned above, by their insolubility in rectified spirit and in a solution of iodide of potassium. Before *use* as a *medicine*, "it must be dried by being placed in a shallow basin of earthenware, in a small confined space of air, with 10 or 12 times its weight of fresh-burnt lime, till it scarcely adheres to the side of a dry bottle." (Ph. E.) The Dublin College orders their *iodinium purum* to be prepared from commercial iodine as follows:— Place it in a deep circular porcelain capsule, and having covered it accurately with a glass matrass filled with cold water, apply a water heat to the capsule for 20 minutes, and then allow the whole to cool; should the sublimate attached to the bottom of the matrass include acicular prisms of a white colour, and a pungent odour, it must be scraped off with a glass rod, and rejected; the apparatus is then to be again exposed to a gentle and steady heat until the whole of the iodine has sublimed; the sublimate is, lastly, to be collected from the bottom of the matrass, and at once enclosed in a stoppered bottle.

Tests. Free iodine may be recognized by —1. The violet colour of its vapour.—2. Striking a blue colour with starch. This test is so delicate, that water containing only $\frac{1}{450000}$th part of iodine, acquires a perceptible blue tinge on the addition of starch. (Stromeyer.)—3. Nitrate of silver causes a white precipitate in solutions containing iodine.—4. Chloride of palladium causes a black, flaky precipitate; equal in sensibility to starch. (M. Baumann.)—5. It strikes a blue colour with opium and narceine.

Iodine in *combination*, as it exists in *iodic acid* and the *iodates*, does not strike a blue colour with starch, without the addition of some deoxydizing agent, as sulphurous acid or morphia; and as it exists in the *iodides*, not until the base is saturated with an acid (as the nitric, or sulphuric), when iodine being set free, immediately reacts upon the starch. An excess of either acid or alkali destroys the proper action of the test. By mixing the liquid containing the iodine with the starch and acid, and lightly pouring thereon a small quantity of aqueous chlorine, a very visible blue zone will be developed at the line of contact, even in very dilute solutions. (Balard.)

Solutions containing *iodates* yield, with nitrate of silver, a white precipitate soluble in ammonia; the *iodides*, under the same circumstances, give a pale yellowish precipitate with nitrate of silver, scarcely soluble in ammonia; a *bright yellow* one with acetate of lead; and a *scarlet* one with bichloride of mercury. The *iodates* deflagrate when thrown on burning coals, but the *iodides* do not. The *iodates* may also be tested as iodides, by first heating them to redness, by which they lose their oxygen, and are converted into iodides.

Chatin and Gaultier de Claubry, prefer the starch test to all others; and for the liberation of the iodine, either nitric acid, or a mixture of nitric and sulphuric acid. Oberbeck treats a little starch or sugar with nitric acid in a test tube, applying heat until a vigorous disengagement of gas commences, which is then passed into the liquid under examination, previously mixed with a little starch paste. If only 1-1,000,000th *grain* of iodine or iodide of potassium is present, a blue colour is immediately developed.

Estim.—1. By separating it by volatilizing it by heat, and collecting and weighing the sublimate.—2. By solution in rectified spirit, adding water, and collecting the resulting precipitate, which must then be dried and weighed.—3. (Thornton J. Herapath.) 1·309 gr. of perfectly pure iodide of potassium (equal to 1 gr. of iodine) is dissolved in 10,000 gr. of water; this constitutes solution No. 1, and contains a little less than 0·01 of iodine. By diluting this with water, other solutions—Nos. 2, 3, 4, 5, 6, &c., are formed. A weak solution of a salt of palladium is now added drop by drop, until no deepening of colour ensues. The standard solutions so prepared are then corked and sealed up in glass tubes, and are then available in future investigations. The iodine in the substance to be tested having been converted into hydriodic acid or a soluble iodide, the latter is introduced into a colorometer containing the standard solutions, aud is then diluted with water to the necessary degree —that is to say, until it occupies respectively 100, 500, 1000, 10,000, or more water-grain measures, the precaution being taken to first add the solution of palladium as before. The tint is then compared with that of the standard solutions, in which certain known quantities of iodine are contained in the same bulk of water, and the quantity of iodine present inferred from the resemblance in colour, in the same way as is adopted with *Crum's chlorometer*, described at p. 244, "Operating in this way, it is possible to estimate the 1-20,000th of a grain of iodine with the greatest readiness."—4. According to M. Rabourdin chloroform is superior to all other substances for quantitatively determining iodine in organic mixtures. If 10 grammes of any liquid containing $\frac{1}{100000}$th of its weight of *iodine* be treated with 2 drops of *nitric acid*, 15 or 20 of *sulphuric acid*, and 1 gramme of *chloroform*, and agitated, it assumes a distinct violet colour. M. Rabourdin judges of the quantity of iodine present by the tint of violet which the chloroform thus treated assumes.

Uses, &c. Iodine is chiefly used as a medicine, a chemical test, and in photography. Recently it has been employed in the manufacture of writing fluids. In small doses it appears to be both alterative and tonic, rapidly diffusing itself through the body, and exerting a stimulating action on the organs of secretion. It is also said to be diuretic, and in some cases to have produced diaphoresis and salivation. It is said to exert a powerful antaphrodisiac action, and instances are recorded where absorption of the mammæ and testæ have followed its exhibition, (Hufeland's Journ.); but such cases are so very rare as to throw doubt on their having been produced by this medicine. Iodine has been exhibited in the following diseases, as well as in most others depending on an imperfect action of the absorbents, or accompanied by induration or enlargement of individual glands or organs:— *Internally*, in *bronchocele, goitre, Derbyshire neck, scrofula, ovarian tumours, enlargement or induration of the lymphatic, prostate, and parotid glands, amenorrhœa, leucorrhœa, diseases of the muco-genital tissues, phthisis, chronic nervous diseases, lepra, psoriasis, chronic rheumatism, dropsies, hydrocele, &c.:— Externally*, in *scrofula, numerous skin diseases (especially the scaly), erysipelas, diseased joints, chilblains, burns, scalds, various wounds, to check ulceration, to promote absorption, &c. Dose.* ½ gr. dissolved in spirit, or in water by means of an equal weight of iodide of potassium. It is seldom exhibited alone, being usually combined with the last-named substance, which in fact, is now generally preferred by practitioners. It is applied *externally* in the form of ointment, solution, or tincture.

IODINE (Bromides of). Bromine and iodine unite rapidly by mere mixture. By careful distillation a red vapour is obtained, which, on cooling, condenses into red crystals, of a form resembling fern leaves. This is said to be the *protobromide*. By adding more bromine, these crystals are converted into a fluid, said to be the *bibromide* or *superbromide*.

IODINE (Chlorides of). When dry chlorine is passed over dry iodine, at common temperatures, heat is evolved, and a yellow solid chloride results when the iodine is fully saturated; and an orange red liquid, when the iodine is in excess. They both absorb moisture in the air, are volatile, and very soluble in water, forming a colourless solution, which exhibits acid properties. The solid iodide is decomposed by water into hydrochloric and iodic acids, forming the *chloriodic acid* of Sir H. Davy. The *protochloride of iodine* is said to be formed when chlorine is passed into water holding iodine in suspension. A liquid so prepared has been recommended by Dr. Turnbull as a source of irritating vapour, useful in certain affections of the eyes. The *perchloride* or *terchloride*, by repeatedly distilling the protochloride, or by adding to a solution of the latter a strong solution of corrosive sublimate.

IODOFORM. Syn. *Iodoformum*,—Lat. A solid, yellow, crystallizable substance, obtained by the action of iodine on alcohol.

Prep. 1. An *alcoholic solution of potassa* is added to *tincture of iodine*, carefully avoiding excess; the whole is then gently evaporated to dryness, the residuum is washed with water, and then dissolved in *alcohol;* the alcoholic solution yields crystals by evaporation.

2. (M. Clary.) *Distilled water*, 12 fl. oz.; *rectified spirit*, 2 fl. oz.; *iodine* and *bicarbonate of soda*, of each, 1 oz.; put the ingredients into a flask and apply the heat of a water bath until the colour of the liquid disappears, and bright yellow scales are deposited; these are to be collected on a filter, washed with a little cold water, and

dried. More iodoform may be obtained by adding *fresh iodine* to the same liquor as long as the latter becomes decoloured on repeating the process.

Prop., &c. Nearly insoluble in water; freely soluble in alcohol; the solution is decomposed by alkalies into an iodide and a formiate of the base. *Dose.* ½ gr. to 3 gr.; where the use of iodine is indicated.

IODONITRIC ACID. See *Iodosulphuric Acid.*

IODOPHOSPHORIC ACID. From *iodine* and *phosphoric acid*, as iodosulphuric acid.

IODOSALICYLIC ACID. A dark brown fusible mass, obtained by distilling a *mixture* of *iodide of potassium* and *chlorosalicylic acid;* or by dissolving *iodine* in *salicylic acid.*

IODOSULPHURIC ACID. *Prep.* Drop *sulphuric acid* into a hot concentrated *aqueous solution of iodic acid*, as long as a precipitate falls. When strongly heated, it sublimes, and is decomposed, but by means of a gentle heat, gradually applied, it melts, and crystallizes in yellow rhomboids as it cools. The *iodonitric* and *iodophosphoric acids* may be formed in a similar manner. All of these compounds act with great energy on the metals, and dissolve gold and platinum.

IODOUS ACID. *Prep.* (Sementini.) *Chlorate of potassa* and *iodine*, equal parts; triturate together, until reduced to a homogeneous yellow mass; then heat the mixture over a spirit lamp, in a glass retort connected with a spacious receiver, until vapours are no longer evolved. The oily liquid in the receiver is the iodous acid.

2. (Pleischl.) *Chlorate of potassa*, 3 parts; *iodine*, 1 part; as last.

Obs. Iodous acid, or oxide of iodine, reddens litmus paper, is volatile at 112° Fahr., and dissolves iodine freely. Little is known respecting its precise composition, and some chemists deny its existence as an independent substance.

IPECACUANHA. Syn. *Radix Ipecacuanhæ; Ipecacuanha,*—Ph. L. E. & D. The "root" of "cephaelis ipecacuanha," or the true ipecacuanha plant, one of the rubiaceæ. "Ashy coloured, tortuous, very much cracked, and marked in rings with deep fissures, having an acrid, aromatic, bitterish taste." (Ph. L.) It occurs in pieces, 3 or 4 inches long, and about the size of a writing quill. *Dose.* As an *emetic*, 10 to 20 gr., assisted by the copious use of warm water; as a *nauseant*, 1 to 3 gr.; as an *expectorant* and *sudorific*, ½ to 1 gr. It is undoubtedly the safest and most useful medicine of its class. It has recently been highly recommended in dyspepsia, combined with other bitters or aperients.

IRIDIO-CHLORIDES. Double salts, formed of the *chlorides of iridium* with *other chlorides.* Some of them are crystallizable and soluble.

IRIDIUM. A rare metal, discovered by Descotils in 1803, and by Tennant in 1804, in the black powder left in dissolving crude platinum. This powder is an alloy of iridium with osmium.

Prep. (Wollaston.) The *pulverulent residuum of the ores of platinum* is reduced to fine powder, along with ⅓rd of its weight of *nitre*, and the mixture is heated to redness in a silver crucible, until reduced to a pasty state, and the odour of oxide of osmium becomes perceptible; as soon as the whole is cold, it is powdered and agitated with the smallest possible quantity of *water;* the solution is placed in a retort, acidulated with *oil of vitriol diluted with an equal weight of water*, and rapidly distilled into a clean receiver, as long as fumes of *osmic acid* pass over and condense as a white crust on the sides of the vessel, afterwards liquefying, and sinking beneath the water, forming a flattened globule. By solution in *water*, agitation with mercury, and the addition of *hydrochloric acid*, OSMIUM is obtained as a black porous powder, which exhibits a metallic lustre when rubbed. The undissolved portion is now digested in *hydrochloric acid*, and the solution treated with *any metal* but gold or platinum, when *iridium* is precipitated.

Prop., &c. Brittle, pulverulent, and, when polished, resembling platinum. It is the heaviest, hardest, most infusible, indestructible, and least affected by acids, of all the metals. With *chlorine*, iridium forms 4 compounds:—the *protochloride*, formed by transmitting chlorine over powdered iridium, heated to a dull red, or by digesting the hydrated protoxide in hydrochloric acid;—the *sesquichloride*, by calcining iridium with nitre, digesting in nitric acid, washing with water, and solution in hydrochloric acid;—the *bichloride*, by digesting the sesquichloride in hot *nitrohydrochloric acid;*—the *terchloride*, obtained as a double chloride of potassium. With *oxygen*, iridium forms a *protoxide, sesquioxide,* and *teroxide*, each of which may be obtained by precipitating a solution of the corresponding chloride with an alkali. *Metallic iridium* is used for the tips of *gold pens, everlasting pens, &c.*

IRON. Syn. *Ferrum,*—Ph. L. E. & D. The early history of iron is lost in its antiquity. It is said to have been employed as a medicine upwards of 3200 years ago. As a remedial agent, when properly exhibited, it acts as a genial stimulant and tonic, and generally proves beneficial in cases of chronic debility, unaccompanied with organic congestion or inflammation. For this purpose, the *protoxide* or *its salts* should be chiefly relied on, as the *peroxide* and *its salts* act, almost universally, as irritant stimulants, occasioning heartburn, febrile symptoms, and accelerated pulse. The powers of the protocarbonate, as it exists in mineral waters, held in solution by carbonic acid in excess, appears to be the form most congenial to the human body; and from its state of dilution, "is rapidly absorbed by the lacteals, and speedily imparts a ruddy hue to the wan countenance." Iron is undoubtedly one of the most valuable articles of the materia medica, and appears from the antiquity of its introduction into medicine, and the number of its preparations, to have been deservedly appreciated.

Prep. Iron is only prepared on the large scale. In Sweden it is extracted from *magnetic iron* and *micaceous iron ore;* and in England, principally from *clay iron ore.* It is obtained by smelting the *ore* along with *coke* and a *flux* (either limestone or clay). The crude iron thus obtained is run into moulds, and then constitutes *cast iron* or *pig iron* (ferrum fusum). By the subsequent processes of *refining* (puddling, welding,) it is converted into *soft iron* or *wrought iron* (ferrum cusum). *Iron filings* (ferri limaturæ), *iron-turnings* (ferri ramenta, ferri scobs), and *iron-wire* (ferrum filum; f. in fila tractum,—Ph. L.), are the forms under which iron is ordered in the pharmacopœias. The last is only used in preparations, but the others are also taken. It is ordered to be "flexible, but not resilient." (Ph. L.) For *medical purposes,* iron-filings and turnings should be purified by washing, drying, and separating them from particles of copper and other metals, by laying a sieve over them, and drawing them through it with a magnet. *Dose.* Of the filings, 5 to 10 gr.

Prop., &c. The properties and uses of iron are too well known to require description. Its applications are almost universal. It is remarkably ductile, and possesses great tenacity, but is less malleable than many of the other metals. Its sp. gr. is 7·788. It is the hardest of all of the malleable and ductile metals, and when combined with carbon or silica (*steel*) admits of being tempered to almost any degree of hardness or elasticity. In dry air it does not oxidize at common temperatures; but at a red heat it soon becomes covered with a scaly coating of black oxide, and at an intense white heat burns brilliantly with the production of the same substance. Pure water, free from air or carbonic acid, does not tarnish the surface of polished iron, but the combined action of air and moisture, especially when a little acid vapour is present, causes its surface to be soon covered with rust, which is hydrated sesquioxide of iron. Nearly all the hydrated acids attack iron; dilute sulphuric and hydrochloric acid do so with considerable energy and the evolution of hydrogen gas. At a red heat, iron decomposes water rapidly, hydrogen being evolved, and the black oxide of iron formed. Iron is magnetic up to a dull-red heat, at which point it loses all traces of that property. It melts at 3300° Fahr. (Daniel.) With oxygen, chlorine, iodine, the acids, &c., it forms numerous important compounds.

Tests. 1. *Metallic iron* is—*a.* Attracted by the magnet.—*b.* Dissolved by dilute hydrochloric and sulphuric acids, with evolution of hydrogen gas, recognised by its inflammability.—*c.* The solution in *b* exhibits the usual reactions of protoxide of iron. (See *below.*)

2. Dry *protoxide of iron* is a black powder; in its hydrated state it is white, and when exposed to air, rapidly absorbs oxygen, assuming first a grayish-green colour, and then a brownish-red, which is much brightened by exposure to a red heat, at the same time that the facility with which it dissolves in the acids is considerably lessened.

3. The *salts of the protoxide of iron* have a greenish colour, but yield nearly colourless solutions, except when concentrated. *Their solutions* are known by—*a.* When *acidulated* they are not precipitated by sulphuretted hydrogen; even *neutral* solutions with weak acids are but incompletely precipitated; whilst *alkaline* solutions are precipitated of a black colour,—*b.* *Neutral* solutions are precipitated black by hydrosulphuret of ammonia.—*c.* Ammonia and potassa give a greenish-white precipitate, gradually becoming green, and then brown in the air. The presence of ammoniacal salts interferes with the action of these tests—*d.* Ferrocyanide of potassium gives a nearly white precipitate, becoming gradually blue in the air, and immediately so on the addition of a little weak nitric acid or chlorine water.—*e.* Ferridcyanide of potassium produces a rich deep blue precipitate, insoluble in hydrochloric acid. In highly dilute solutions the effect is only a deep bluish-green coloration.—*f.* *Aurochloride of sodium* gives a purple precipi-

tate.—*g.* Phosphate of soda, a blue one.—*h.* Cochineal, freed from fat by ether, and then digested in water (or very weak spirit), gives a solution which is coloured violet by the protosalts of iron. (Kastner.)

4. *Peroxide of iron* is a brownish-red powder; in its hydrated form very soluble in acids; when anhydrous, less so.

5. The *salts* of *sesquioxide* or *peroxide of iron* have for the most part a reddish-yellow colour, yielding deep coloured solutions which exhibit the following reactions:—*a.* They redden litmus paper.—*b.* Sulphuretted hydrogen added to *alkaline* solutions gives a black precipitate.—*c.* Hydrosulphuret of ammonia does the same with *neutral* solutions, or in very dilute solutions only a blackish-green discoloration; the precipitate being in both cases soluble in the hydrochloric and acetic acids.—*d.* Ammonia and potassa produce bulky reddish-brown precipitates insoluble in excess.—*e.* Ferrocyanide of potassium gives a rich blue precipitate, insoluble in hydrochloric acid, and readily decomposed by potassa.—*f.* Ferridcyanide of potassium deepens the colour, but does not give a blue precipitate, as it does with the protoxide.—*g.* Sulphocyanide of potassium gives an intense ruby-red colour to *neutral* or *acid* solutions. This is the most sensitive of all known tests.—*h.* Meconic acid and the meconiates also give a red colour.—*i.* Tincture and infusion of galls strike a black colour.—*k.* Phosphate of soda gives a white precipitate.

Estim. 1. The iron may be thrown down in the state of peroxide or sesquioxide, washed, dried, ignited, and weighed. The weight, in grains, multiplied by 0·7, indicates the weight of metallic iron.

2. (Liebig.) The ore is reduced to fine powder, mixed with a *mixed flux* of *cyanide of potassium* and *carbonate of potassa*, and exposed to a very strong heat in a porcelain crucible. The alumina and silica remain in the scoria; the reduced iron is separated by washing the mass with cold water, and is then dried, and weighed.

3. 50 gr. of the ore are reduced to powder, dissolved in *aqua regia*, with the aid of heat, and the solution filtered in order to separate the silica and a little alumina which sometimes is left in an insoluble state; an excess of ammonia is then added to the filtered liquor, which produces a reddish-brown precipitate of peroxide of iron mixed with alumina, which is collected on a filter, washed, and boiled with a *solution of caustic potassa*, in order to dissolve the alumina; the whole is next thrown upon a filter, on which the peroxide of iron is washed, dried, carefully ignited, and weighed. The above (No. 2 & 3) are well adapted to determine the quantity of iron in clay iron-stone, the most common ferruginous ore in England.

Concluding Remarks. Want of space compels us to omit much useful matter which we had collected together on the analysis of iron ores, and the manufacture of iron. The common crude iron of commerce is thrown as *pig iron* or *cast iron*, which is the melted metal discharged from time to time from the furnaces, and allowed to run into moulds of sand, so as to form lumps called "*pigs.*" Of cast iron there are several varieties, varying in colour, hardness, and composition. They are known as *gray*, *black*, and *white iron*, of which the first is commonly the best. These variations in quality and character of the product depend, chiefly, on the method followed and the fuel used in their production.

The preparations of iron used in medicine and the arts are very numerous. The greater number of them are, however, very easily made, either by direct solution of the metal or its hydrated oxide in the acids, or (as in the case of the insoluble compounds especially) by double decomposition. The following list contains the principal substances of this class:—

IRON (Acetates of). *Prep.* 1. *Protacetate of Iron; Ferri Acetas,*—Lat. From freshly precipitated *protoxide* or *carbonate of iron* dissolved in *dilute acetic acid;* or by adding a *solution of acetate of lime* to another of *protosulphate of iron,* and evaporating the filtered liquid, out of contact with the air. Small, pale greenish needles or prisms, very soluble and prone to oxidation.

2. *Sesquiacetate of Iron, Peracetate of Iron; Ferri Sesquiacetas; Ferri Acetas,*—Ph. D. 1826.—*a.* From *hydrated sesquioxide of iron* dissolved in *acetic acid;* or by adding a solution of *acetate of lime* or of *baryta*, to another of *persulphate of iron.*

b. (Ph. D. 1826.) *Carbonate of iron*, 1 part; *acetic acid* (Ph. D.), 6 parts; digest 3 days and filter. A dark brownish-red uncrystallizable liquid, very soluble, and powerfully astringent. The calcined sesquioxide of iron of the shops, commonly sold as carbonate of iron, does not answer well for this or any of the following compounds, owing to its being with difficulty dissolved by acids, especially by the weaker ones. *Dose.* (Of the last) 10 to 25 drops, in water or wine. See *Iron Liquor.*

IRON (Acetate of,—with Alum). *Prep.*

(Guibourt.) *Alum*, 1 part; *sulphate of iron*, 2 parts; *boiling water*, 10 parts; dissolve, filter the solution, add *solution of diacetate of lead* as long as a precipitate forms, and after a short time filter, and evaporate to the consistence of a jelly. *Used* as *marking ink* by packers, either alone, or stirred up with a little lamp black; it resists alkalies and soap, but not acids.

IRON (Acid of). See *Ferric Acid.*

IRON (Albuminate of). Syn. *Ferri Albuminas*,—Lat. *Prep.* 1. Dissolve well washed *hydrated protoxide* or *peroxide of iron* in *white of egg*, previously diluted with *twice its weight of water*, and filtered.

2. (Lassaigne.) Precipitate a filtered *solution of white of egg* with another of *persulphate of iron*, wash the deposit in *water*, and dissolve it in *alcohol holding caustic potassa in solution.*

Obs. This preparation is highly spoken of by M. Lassaigne and other high authorities, as especially adapted by its nature, on theoretical grounds, for combining with the tissues of the body.

IRON (Ammonio-chloride of). Syn. *Ammoniated Iron*, *Ferro-chloride of Ammonia; Ferri Ammonio-chloridum*,—Ph. L. *Ferrum Ammoniatum*,—Ph. L. 1824. *Ferrum Ammoniacale*,—Ph. L. 1788. *Flores Martiales*,—Ph. L. 1775. *Prep.* 1. (Ph. L.) *Sesquioxide of iron*, 3 oz.; *hydrochloric acid*, ½ pint; digest in a sand bath, until dissolved, then add of *sal ammoniac*, 2½ ℔, dissolved in *water*, 3 pints; filter the liquid, evaporate to dryness, and reduce the mass to coarse powder. Orange-coloured crystalline grains.

2. Rub *sal ammoniac* with twice its weight of *colcother* or *rust of iron*, sublime with a quick sudden heat, and repeat the sublimation with *fresh sal ammoniac* as long as the flowers are well coloured. Difficult to manage.

Obs. Ammonio-chloride of iron "is totally soluble in proof spirit and in water. Potassa added to the solution throws down sesquioxide of iron, and when added in excess, it evolves ammonia." (Ph. L. 1836.) Ammonia "throws down from 100 gr. of this salt about 7 gr. of sesquioxide of iron." (Ph. L.)

Ammonio-chloride of iron is tonic, emmenagogue, and aperient. *Dose.* 5 to 15 gr.; in glandular swellings, obstructions, &c.

IRON (Ammonio-citrate of). Syn. *Ferrocitrate of ammonia*, *Ferric do. do.*, *Citrate of Iron and Ammonia; Ferrico-citras Ammoniæ; Ferri Ammonio-citras*,—Ph. L. & D. There are three salts generally known under the name of *citrate of iron—two*, having the peroxide for their base, and *one*, the protoxide. There is also a *fourth*, formed from the magnetic oxide of iron, which has scarcely been introduced into this country, though commonly employed in France, and highly recommended by Béral. The salt at present so much advertised as citrate of iron, is a double citrate of iron and ammonia, and appears to be correctly called *ammonio-citrate of iron* in our pharmacopœia. Several other double citrates of iron may be prepared, but they possess inferior qualities to those just mentioned, and therefore offer no inducement for their manufacture.

Prep. 1. (Ph. L.) *Sulphate of iron*, 12 oz.; *carbonate of soda*, 12½ oz.; dissolve each separately in *boiling distilled water*, 6 pints; mix the solutions whilst still hot, and allow the precipitate to subside; after a time decant the supernatant liquor, wash the precipitate frequently with water (drain it), add of *citric acid* (in powder), 6 oz.; and dissolve by the aid of a gentle heat; when the whole has cooled, add of *liquor of ammonia* (Ph. L.), 9 fl. oz., and gently evaporate to the consistence of a syrup; in this state spread it (very) thinly on flat earthenware dishes (or sheets of glass), dry by a gentle heat, and when dry, keep it in well-stopped bottles.

2. (Ph. D.) *Citric acid*, 4 *oz.; distilled water*, 16 *fl. oz.; hydrated peroxide of iron*, obtained from *sulphate of iron*, 5 *oz.; liquor of ammonia*, 4 *fl. oz.*, or q. s. This differs from the process of the London College chiefly in the precipitate from the sulphate of iron being at once converted into *hydrated sesquioxide of iron* by the addition of *nitric acid*, as noticed below, a trouble and expense uselessly incurred, as the same change occurs spontaneously during the usual process.

3. (*Wholesale.*) A mixture of *iron filings*, and *citric acid*, in powder, with barely sufficient *water* to cover them, are kept in a warm situation for some days, occasionally stirring the mass, and *replacing* the water as it evaporates. A saturated solution is next made in *distilled water*, there being previously added more *citric acid* (about half the weight of the acid first used), as required; it is then neutralized with *liquor of ammonia* (about 1¼ *oz.* of liquor of ammonia, sp. gr. ·882, to every gallon of the solution of sp. gr. 1·025), and the solution is concentrated by evaporation; the process is then completed as in No. 1. The first part of this process produces a salt of the *protoxide of iron*, which is afterwards con-

verted, by exposure to the atmosphere, into a *citrate of the magnetic oxide*, and, lastly, into *citrate of peroxide of iron.*

Obs. This beautiful salt is of a rich ruby colour, and forms glistening transparent scales, very soluble in aqueous menstrua, and the resulting solution is less easily decomposed by reagents, than the solutions of most of the other salts of iron. It is compatible with the alkaline carbonates and bicarbonates, and several other salts, and is nearly tasteless, advantages which have been perhaps overrated by both prescriber and patient. It is doubtful whether this article has not obtained a larger sale from its pleasing appearance than from its medicinal virtues. Several parties who have prepared it in lumps or powder, by the simple evaporation of the solution to dryness, have been unable to sell it under that form, even at a lower price.

The formulæ of the Ph. L. is essentially that of Béral. The third formula is based on Mr. Aikin's process for the preparation of his *ammonio-tartrate of iron.* Pharmaceutical writers have been so diffuse in their disquisitions on the preparation of this salt, as would lead to the inference that there is some difficulty attending it. The contrary is, however, the case. The only care necessary is to spread the syrupy solution *very thinly* on warm sheets of glass to dry, which it will rapidly do, if they are placed in an atmosphere of warm dry air, for which purpose a "*drying closet*" is the most convenient. The dry salt may then be easily detached from the glass, and will form thin scales, or lamellæ, of great brilliancy and beauty. It is also better to use a little more oxide than the acid will dissolve, as the remainder may be employed in a future operation. Less water may be used, or even a larger quantity than that mentioned; but in the first case the liquid will become difficult to filter—in the latter it will require more evaporation. Boiling water dissolves about twice its weight of citric acid, and retain $\frac{13}{20}$th of this quantity in solution when cold, and it takes rather more than twice the weight of the *citric acid* in *most hydrated protoxide of iron,* to produce saturation.

Ammonio-citrate of iron is "soluble in water; the solution neither changes the colour of litmus nor turmeric; nor is it turned blue by ferrocyanide of potassium; but either potassa or lime water being added, it throws down sesquioxide of iron, and ammonia is evolved. From 100 gr. dissolved in water, potassa precipitates about 34 gr. of sesquioxide of iron." (Ph. L.) *Dose.* 3 to 10 gr., in water, wine, or bitter infusions.

IRON (Ammonio-Tartrate of). Syn. *Aikin's Ammonio-tartrate of Iron, Tartrate of Iron and Ammonia, Ferro-tartrate of Ammonia; Ammoniæ Ferro-tartras, Amm. Ferrico-tartras,*—Lat. *Prep.* 1. *Tartaric acid,* 1 part; *iron filings,* 3 parts; digest in a sufficient quantity of *hot water* to barely cover the mixture for 2 or 3 days, observing to stir it frequently, and to add just enough water to allow the evolved gas to escape freely; next add *liquor of ammonia,* in slight excess, stir well, dilute with *water,* decant, wash the undissolved portion of iron, filter the mixed liquors, and evaporate to dryness; dissolve the residuum in water, add a *little more ammonia,* filter, and again gently evaporate to dryness, or to the consistence of a thick syrup, when it may be spread upon hot plates of glass, or on earthenware dishes, and dried in a stove-room, as directed for ammonio-citrate of iron.

2. (W. Procter, Jun.) *Tartaric acid,* $6\frac{1}{4}$ oz.; *water,* 7 pints; dissolve, neutralize the solution with *sesquicarbonate of ammonia,* and add $6\frac{1}{4}$ oz. more *tartaric acid;* to the solution heated in a water bath, further add *moist hydrated oxide of iron* (obtained from *sesquioxide of iron,* $53\frac{1}{2}$ dr.; dissolved in *hydrochloric acid,* and precipitated by *ammonia*); when dissolved, filter, and evaporate, &c., as before.

Obs. Glossy, brittle lamellæ, or irregular pieces, of a deep garnet colour, almost black, very soluble in water, and possessing a sweetish and slightly ferruginous taste. By repeated re-solution and evaporation its sweetness is increased, probably from the conversion of a part of its acid into sugar. It contains more iron than a given weight of the sulphate of the same base. It is the most pleasant-tasted of all the preparations of iron, except the ammonio-citrate, last noticed. (Aikin, Lond. Med. Gaz.) *Dose.* 3 to 10 gr.

IRON (Arseniate of). Syn. *Ferri Arsenias, Ferrum Oxydulatum Arsenicum,*—Lat. *Prep.* From a *solution of arseniate of soda, potassa,* or *ammonia,* added to a solution of *protosulphate of iron,* the precipitate being collected, washed in a little cold water, and dried. *Dose.* $\frac{1}{20}$ to $\frac{1}{12}$ gr., made into a pill; in lupus, psoriasis, cancerous affections, &c. (Biett.) *Externally,* combined with 4 times its weight of phosphate of iron and a little water, as a paint to destroy the vitality of cancerous formations. (Carmichael.) An ointment, (20 to 30 gr. to the oz.) is also used for the same purpose. They are all dangerous remedies in non-professional hands. The *perarseniate* or *sesquiarseniate of iron* is prepared by precipitating *peracetate of iron* with *arseniate of ammonia*, or by boiling nitric acid on the *protarsenite*. It is not used in medicine.

IRON (Arsenite of). Syn. *Protarsenite of iron; Ferri Arsenis*,—Lat. From the *arsenite of potassa, soda*, or *ammonia*, and *sulphate of iron*, as the last. A yellowish brown powder, occasionally used in medicine as a tonic, alterative, and febrifuge. *Dose.* $\frac{1}{16}$ to $\frac{1}{12}$ gr. The *sesquiarsenite* or *perarsenite* is formed in the same way by using the persulphate.

IRON (Benzoates of). Syn. *Ferri Benzoas*,—Lat. Prepared by digesting the corresponding *hydrated oxides* in a *hot solution of the acid;* or from the *benzoate of an alkali* and a *salt of iron*, by double decomposition. The neutral *benzoate of sesquioxide of iron* is soluble; but the basic salt is insoluble.

IRON (Bromide of). Syn. *Ferri Bromidum*,—Lat. *Prep.* 1. (Moir.) *Bromine* and *iron filings*, of each, 1 part; *water*, 3 parts; mix in a stoppered phial, set it aside, occasionally shaking it, for 2 or 3 days, and when the colour of the bromine has disappeared, and the liquid becomes greenish, filter and evaporate to dryness.

2. (Magendie.) As the last, but putting the materials in a flask, and boiling over a sand bath, until the union is complete. *Dose.* 1 to 6 gr., as a tonic, diuretic, and resolvent, in similar cases to those in which iodide of iron is given.

IRON (Carbonate of). Syn. *Protocarbonate of iron; Ferri Carbonas*,—Lat. This preparation is found in a crystallized state in the mineral called *Spathose iron*, and in some chalybeate waters.

Prep. Precipitate a *solution of protosulphate of iron* with a *solution of carbonate of soda*, well wash the green powder with water which has been boiled, and dry it out of contact with the air. On the slightest exposure it is converted into *sesquioxide of iron*. This change is for the most part prevented by combining it with sugar, as in the next preparation.

IRON (Carbonate of,—Saccharine.) Syn. *Carbonate of Iron with Sugar; Klauer's Ferrum Carbonicum Saccharatum; Ferri Carbonas cum Saccharo*,—Ph. L. *Ferri Carbonas Saccharatum*,—Ph. E. & D. *Prep.* 1. (Ph. L.) *Sulphate of iron*, 4 oz.; *carbonate of soda*, 4¼ oz.; dissolve each separately in 1 quart of *boiling water*, and mix the solutions whilst hot; after a time collect the precipitate, wash it frequently with *water*, and add of *sugar*, 2 oz., previously dissolved in *water*, 2 fl. oz.; lastly, evaporate the mixture over a water bath to dryness, and keep it in a well-closed bottle.

2. (Ph. E.) *Sulphate of iron*, 4 oz.; *carbonate of soda*, 5 oz.; proceed as last, collect the precipitate, well wash it with cold water, drain on a cloth, squeeze out as much of the water as possible, and add of *powdered lump sugar*, 2 oz.; mix and dry at a temperature not much above 120° Fahr. The whole operation should be performed as quickly as possible.

3. (Ph. D.) As the last, the desiccation to be conducted under 212° Fahr.

Prop., &c. A sweet-tasted greenish mass or powder, consisting chiefly of carbonate of iron. It is one of the best of the chalybeates. *Dose.* 5 to 10 gr. When pure it should be "easily soluble in hydrochloric acid with brisk effervescence." (Ph. E.)

IRON (Supercarbonate). Syn. *Ferri Supercarbonas*,—Lat. This is iron in the state in which it exists in the carbonated chalybeate mineral waters.

IRON (Carburet of). Syn. *Ferri Carburetum*,—Lat. This is plumbago or black lead. For medical and chemical use it is treated as follows:—

Prep. 1. (Dumas and Stas.) Heat it to redness with *caustic potassa*, in a covered crucible, then wash it well with *water*, boil it in *nitric acid*, and in *aqua regia*, again wash it with water, dry it, and expose it at a white heat to a stream of *dry chlorine gas;* lastly, wash it with *water*, and again heat it to dull redness. In analysis.

2. (Ph. Bor.) *Pure native plumbago*, 1 ℔, is boiled in *water* for 1 hour, then drained, and digested, for 24 hours, in a mixture of *water*, 8 oz.; *nitric acid* and *hydrochloric acid*, of each, 2 oz.; it is lastly well-washed with *water*, and dried. See *Plumbago*.

IRON (Chlorides of). *Prep.* 1. *Protochloride of Iron, Muriate of do.; Ferri Chloridum*,—Lat. Dissolve *iron filings* or *scales* in *hydrochloric acid*, evaporate and crystallize. Soluble, green crystals. In this form it is sometimes called *hydrated chloride of iron* (ferri chloridum hydratum).

2. *Sesquichloride of Iron, Perchloride of do., Permuriate of do.; Ferri Sesquichloridum, &c.*,—Lat. Dissolve *sesquioxide* or *rust of iron* in *hydrochloric acid*, evaporate to the consistence of a syrup, and crystallize. Red crystals.

Obs. Neither of the preceding are absolutely pure; but by transmitting dry *hydrochloric acid gas* over iron heated to redness, a pure white crystalline *protochlo-*

ride of iron is obtained; and by the combustion of *iron wire* in *chlorine gas*, or by passing *chlorine* over *heated iron*, the pure *perchloride of iron* is formed. The *protochloride* is volatile at high temperatures, and the *perchloride* is dissipated by a heat a little above 212° Fahr. The latter is soluble in water, alcohol, and ether, and is very deliquescent and corrosive. See *Tinctures*

IRON (Citrates of). *Prep.* 1. *Citrate of Iron, Protocitrate of Iron, Citrate of Protoxide of Iron.* This salt is easily formed by digesting *iron filings* or *wire* with *citric acid*, and evaporating the solution as quickly as possible out of contact with the air. It presents the appearance of a white powder, nearly insoluble in water, and rapidly passing to a higher state of oxidation by exposure to the air. Its taste is very metallic. It is exhibited under the form of pills, mixed with *gum* or *syrup*, to prevent it from being prematurely decomposed.

2. *Citrate of Magnetic Oxide of Iron.* Prepared from the *magnetic oxide of iron*, in the same way as the *percitrate* from the *peroxide.* It may be formed into beautiful transparent scales, or lamellæ, in a similar manner to the ammonio-citrate. Its solution is of a lively green colour, permanent in the air, and possesses an intensely ferruginous taste. For this reason it can only be exhibited under the form of pills or syrup.

3. *Percitrate of Iron, Citrate of Peroxide of do.; Citrate of do.* (?) This may be prepared by either of the methods adopted for the ammonio-citrate, merely *omitting* the addition of the *ammonia.* It much resembles the ammonio-citrate, but is only *slightly* soluble in water, and has a rather less agreeable taste. *Dose.* (Of each of the above.) 3 to 7 gr.

IRON (Ferridcyanide of). See *Turnbull's Blue.*

IRON (Ferrocyanide of). Syn. *Medicinal Prussian Blue; Ferri Ferrocyanidum; F. Ferrocyanuretum,*—Ph. U. S. *F. Percyanidum,*—Ph. L. 1836. *Prep.* (Ph. U. S.) *Sulphate of iron,* 4 oz.; *water,* 1 pint; dissolve, add to the solution, *nitric acid,* 6 fl. dr., in small portions at a time, boiling for a few moments after each addition; next dissolve *ferrocyanide of potassium,* 4½ oz., in *water,* 1 pint, and add this last solution, by degrees, to the first liquid, stirring well each time; lastly, collect the precipitate, wash it with *boiling water,* drain, and dry it. *Dose.* 3 to 5 gr., three or four times daily, as an alterative, febrifuge, and tonic, gradually increasing the quantity until some obvious effect is produced; in agues, epilepsy, and neuralgia. See *Prussian Blue.*

IRON (Gallate of). Syn. *Ferri Gallas,*—Lat. See *Ink* and *Gallic Acid.*

IRON (Iodide of). Syn. *Protiodide of Iron, Ioduret of do., Hydriodate of do., Iodohydrate of do.; Ferri Hydriodas, F. Ioduretum; F. Iodidum,*—Ph. L. E. & D. *Prep.* 1. (Ph. L. 1836.) *Iodine,* 6 oz.; *iron filings,* 2 oz.; *water,* 4½ pints; mix, boil in a sand bath until the liquid turns to a pale green, filter, wash the residuum with a *little water,* evaporate the mixed liquors in an iron vessel at 212° Fahr., to dryness, and immediately put the iodide into well-stoppered bottles.

2. (Ph. E.) As the last nearly, but the solution is not to be filtered until evaporated to ⅙th, *without removing the excess of iron,* and then *as quickly as possible,* and at once put into a basin, surrounded with 12 times its weight of *quicklime,* and placed in some convenient apparatus in which it may be accurately shut in a small space not communicating with the general atmosphere; the whole is then heated in a hot-air press, in a stove or otherwise, until the water is entirely evaporated, when the *iodide of iron* is to be put into small, dry, stoppered-phials.

3. (Ph. D.) *Iodine,* 1 *oz.*, and *clean iron filings* or *turnings,* ½ *oz.;* are put into a Florence flask with *distilled water,* 4 fl. oz., and having applied a gentle heat for 10 minutes, the liquid is boiled until it loses its red colour; it is then at once filtered into a second flask, the filter washed with *water,* 1 fl. oz., and the mixed liquid is boiled down, until it solidifies on cooling.

4. (M. Kop.) *Iodine,* 4 parts, is triturated with *water,* 2 parts, in a large shallow dish or capsule, and *iron filings* (in a state of fine division), 1 part, added *at once,* and the trituration continued; if the heat developed from the mixture is insufficient to cause the disengagement of iodine vapour, the mixture is slightly heated immediately after the addition of the iron filings; the whole, at first liquid, soon becomes solidified, and must be at once put into bottles as before. In the *protiodide of iron* thus prepared, there exists a small quantity of undecomposed iron, which may be easily separated by a filter, when the salt is used in solution, and the *filtered liquid* will then be *colourless,* and free from any admixture of *binodide,* or of *free iodine.* (*Journ. de Chimie Méd.*)

Prop., &c. Iodide of iron "evolves violet vapours by heat, and sesquioxide of iron remains. When freshly made it is *totally soluble* in water, and from this solution when kept in a badly stoppered vessel, sesquioxide of iron is very soon precipitated; but with iron wire immersed in it, it may be kept clear in a well-stoppered bottle." (Ph. L. 1836.) "Entirely soluble in water, or *nearly* so, forming a greenish solution." (Ph. E.) Its *dilute solution* should be colourless. *Dose.* 1 to 3 gr., or more, as a tonic, stimulant, and resolvent. It has been given with advantage in anæmia, chlorosis, debility, scrofula, and various glandular affections.

Obs. The preparation of the above compound, like that of the *citrates of iron*, has formed a fertile subject during some years, for pharmaceutical amateurs to dilate upon. There is in reality not the *least* difficulty in the process. As soon as *iodine* and *iron* are mixed together under water, much heat is evolved, and if too much water be not used, the combination is soon complete, and the liquor merely requires to be evaporated to dryness, out of contact with the air, at a heat not exceeding 212° Fahr. This is most cheaply and easily performed by employing a glass flask, with a thin broad bottom and a narrow mouth, by which means the evolved steam excludes air from the vessel. The whole of the uncombined water may be known to be evaporated when vapour ceases to condense on a piece of cold glass held over the mouth of the flask. A piece of moistened starch paper occasionally applied in the same way, will indicate whether free iodine is evolved; should such be the case, the heat should be immediately lessened. When the evaporation is completed, the mouth of the flask should be stopped up by laying a piece of sheet Indian rubber on it, and over that a flat weight; the flask must be then removed, and when cold broken to pieces, the iodide weighed, and put into dry and warm stoppered wide-mouth glass phials, which must be immediately closed, tied over with bladder, and the stoppers dipped into melted wax.

Iodine and *iron* have such a powerful affinity for each other, that when rubbed together, even in the dry state, they speedily unite, forming a liquid, which "turns litmus paper green, and which on the addition of water, has the usual acid reaction; thus apparently confirming Davy's original doubt as to the elementary character of iodine." (Rev. J. B. Reade.)

IRON (Iodide of,—Saccharine). Syn. *Saccharum Ferri Iodidi, Ferri Iodidum Saccharatum*,—Lat. *Prep.* 1. (Ph. Bor.) *Iron* (in powder), 1 dr.; *water*, 5 dr.; *iodine*, 4 dr.; obtain a *solution of iodide of iron*, as above, and add to it of *sugar of milk* (in powder), 1½ oz.; evaporate at a temperature not exceeding 122° Fahr., until the mass has a tenacious consistence, then further add of *sugar of milk*, 1 oz., reduce the mixture to powder, and preserve it in a well-stoppered bottle. Every 6 gr. contain 1 gr. of iodide of iron.

2. (Dr. A. T. Thomson.) From *syrup of iodide of iron* exposed in a shallow vessel, in a warm place, until it crystallizes; the crystals are collected, dried, and powdered. A simpler plan is to gently evaporate the whole to dryness, and to powder the residuum. The *saccharated iodide of iron* may be kept for some time in a corked bottle without undergoing decomposition.

IRON (Periodide of). Syn. *Ferri Periodidum*,—Lat. *Prep.* Freely expose a *solution of protiodide of iron* to the air; or digest *iodine*, in excess, on *iron*, under water, gently evaporate, and sublime. A deliquescent, volatile red compound, soluble in water and alcohol.

IRON (Lactate of). Syn. *Protolactate of Iron; Ferri Lactas, Ferrum Lacticum*, —Lat. *Prep.* 1. Boil *iron filings* in *lactic acid* diluted with *water*, until gas ceases to be evolved, and filter whilst hot into a suitable vessel, which must be at once closely stopped; as the solution cools, crystals will be deposited, which after being washed, *first* with a little *cold water*, and then with *alcohol*, are to be carefully dried. The mother-liquor on being digested as before with *fresh iron* will yield more crystals.

2. (Pagenstecher.) *Lactate of lime* (prepared from sour milk) is dissolved in *water*, and *carbonate of ammonia* added until it ceases to produce a precipitate; the liquid is now filtered, and concentrated by heat until it acquires the consistence of syrup; it is then mixed with 6 times its weight of *alcohol* (sp. gr. 0·879), and a concentrated solution of *protochloride of iron* (containing a quantity of the salt equal to 38% of the lactate of lime employed) is added; in about 36 hours the mixed liquid will have deposited all its lactate of iron in minute crystals, which may be obtained by straining and pressure between the folds of bibulous paper.

3. (Wöhler.) Into *sour whey*, 2*lb.*, sprinkle of *sugar of milk* and *iron filings*, of each, in fine powder, 1 *oz.*; digest at about 100° Fahr., until the *sugar of milk* is dissolved, then add a second portion, and as soon as a white

crystalline powder begins to form, boil the whole gently, and filter into a clean vessel; lastly, collect, wash, and dry the crystals, as before.

Prop., *&c.* Lactate of iron is a greenish-white salt; and when pure forms small acicular or prismatic crystals, which have a sweetish ferruginous taste, and are soluble in about 48 parts of cold, and in 12 parts of boiling water. It has been regarded by many high authorities as superior to every other preparation of iron for internal use, as being at once miscible with the lactic acid of the gastric juice, instead of having to be converted into a lactate at the expense of that fluid, as it is asserted is the case with the other preparations of iron. *Dose.* 2 to 6 gr., frequently, in any form most convenient.

IRON (Magnesio-citrate of). Syn. *Citrate of Iron and Magnesia; Ferri Magnesio-citras, Ferri et Magnesiæ Citras,*—Lat. *Prep.* As *ammonio-citrate of iron*, but using *hydrated carbonate of magnesia* instead of ammonia to neutralize the solution. *Dose.* 2 to 10 gr. It has been recommended as a chalybeate in the dyspepsia of gouty and debilitated habits.

IRON (Malate of, — Impure). Syn. *Ferri Malas Impurus,*—Lat. *Prep.* (P. Cod., 1839.) *Porphyrized iron filings*, 1 part; *juice of sour apples*, 8 parts; digest for 3 days in an iron vessel, evaporate to one-half, strain through linen whilst hot, further evaporate to the consistence of an extract, and preserve it from the air. *Dose.* 5 to 20 gr.; where the use of iron is indicated.

IRON (Muriate of). See *Chlorides of Iron.*

IRON (Nitrates of). *Prep.* 1. *Protonitrate of Iron, Nitrate of Protoxide of Iron; Ferri Nitras,*—Lat. By dissolving *protosulphuret of iron* in *dilute nitric acid*, in the cold, and evaporating the solution in vacuo. Small green crystals, very soluble, and prone to oxidation.

2. *Pernitrate of Iron, Persesquinitrate of do., Nitrate of Sesquioxide of do.; Ferri Pernitras, &c.,*—Lat. By digesting *nitric acid* (diluted with about half its weight of water) on *iron* or *sesquioxide of iron.* A deep-red liquid, apt to deposit a basic salt. It is used in dyeing, and has been recommended in dyspepsia, calculous affections, and chronic diarrhœa. *Dose.* 5 to 10 or 12 drops.

IRON (Oxides of). Iron forms *four* compounds with oxygen. *Protoxide* (or oxide), *sesquioxide* (or peroxide), *protosesquioxide* (black or magnetic oxide, intermediate between, and probably formed by the union of the other two), and *ferric acid*, noticed at *page* 453.

IRON (Protoxide of). Syn. *Ferri Protoxydum,*—Lat. This substance is precipitated from solutions of the *protosalts of iron*, as a white *hydrate* by the *pure alkalies*, and as a white *carbonate* by the *alkaline carbonates;* both of which rapidly absorb oxygen, and turn, first green, and then red by exposure to the air. In both states it readily dissolves in the *acids* forming the *green* or *protosalts of iron.* See *Carbonate of Iron.*

IRON (Deutoxide of). Syn. *Black Oxide of Iron, Magnetic do., Protosesquioxide of do.; Ferri Oxydum Nigrum,*—Ph. E.; *F. O. Magneticum,*—Ph. D. *Oxydum Ferroso-ferricum,* — Berzelius. *Martial Ethiops, Æthiops Martialis,*—Obs. This occurs native, but that used in medicine is prepared artificially.

Prep. 1. *Hydrated.*—*a.* (Ph. E.) *Sulphate of iron*, 6 oz.; *oil of vitriol*, 160 minims; *nitric acid*, 4 fl. dr.; *liquor of ammonia* (fort.), 4½ fl. dr.; *boiling water*, 3 pints; dissolve half of the sulphate in half of the water, add the oil of vitriol, boil, add the nitric acid gradually, boiling after each addition for a few minutes; dissolve the remaining half of the sulphate of iron in the rest of the boiling water; mix the two solutions, add the ammonia, stirring well (and boil for a short time); collect the precipitate on a calico filter, wash it with water until it ceases to affect a *solution of nitrate of baryta*, and dry at a heat not exceeding 180° Fahr. The formulæ of Gregory and Dr. Jephson are similar.

b. (Ph. D.) *Sulphate of iron*, 8 *oz.*, dissolved in a mixture of *water*, 10 fl. oz., and *sulphuric acid*, 6 fl. dr., is converted into *sesquisulphate* by means of *nitric acid*, 4 fl. dr., diluted with *water*, 2 fl. oz., as last; this solution is then added to another, formed by dissolving *sulphate of iron*, 4 *oz.*, in *water*, ½ pint; the whole is then mixed with *liquor of potassa* (Ph. D.), 2¾ pints, and after being boiled for 5 minutes, is collected on a calico filter, and washed, &c., as before; and is to be preserved in a well-stoppered bottle.

2. *Anhydrous,*—Ph. D. 1826. From the *black scales of iron* (*Ferri oxydi squamæ*) that fall around the smith's anvil, by washing, drying, detaching them from impurities by means of a magnet, and then treating them by grinding and elutriation, as directed for *prepared chalk.* This process is the cheaper of the two, but the product is inferior as a medicine, being less easily soluble in the juices of the stomach.

Prop., &c. A black sand-like substance, consisting of very minute crystals. When pure, it is "attracted by the magnet, and is entirely soluble in hydrochloric acid; and ammonia added to the solution throws down a black precipitate." (Ph. E.) This oxide is the chief product of the oxidation of iron at a high temperature in the air and in aqueous vapour. It is more permanent than the protoxide, but incapable of forming salts. *Dose.* 5 to 20 gr. two or three times a day. It is said to be less irritating than the sesquioxide.

IRON (Sesquioxide of). Syn. *Peroxide of Iron, Red Oxide of do.; Ferri Sesquioxydum, F. Oxydum Rubrum,*—Lat. This substance is found native under several forms, but that employed in the arts is prepared by one or other of the following methods:—

1. From Metallic Iron,—*Rust of Iron, Crude Carbonate of do.; Ferri Sesquioxydum Hydratum Crudum, Ferrugo; Ferri Rubigo,*—Ph. D. 1826, & Ph. L. 1788. From *iron wire* or *clean iron filings* cut into pieces, moistened with *water*, and exposed to the air until completely converted into rust; it is then ground with water, elutriated, and dried, in a similar way to that adopted for chalk. For sale it is usually made up into small conical loaves or lumps.

2. By Calcination,—*Brown Red Colcothar, Crocus, Crocus Martis, Indian Red, Rouge, Jeweller's do., Trip, Caput Mortuum Vitrioli, C. M. Sulphuratus; Ferrum Oxydum Rubrum,*—Ph. D. 1826.—*a.* (Ph. D. 1826.) Calcine *sulphate of iron* until the water of crystallization is expelled, then roast it with a strong fire until acid vapours cease to rise; cool, wash the residuum with *water* until the latter ceases to affect litmus, and dry it.

b. (Berzelius.) *Green sulphate of iron*, 100 parts; *common salt*, 42 parts; calcine, wash well with water, dry, and levigate the residuum. This process yields a cheap and beautiful product, which is frequently sold for the sesquioxide, Ph. L.; but it is less soluble, and therefore unfitted for a substitute for that preparation.

3. By Precipitation,—*Ferri Sesquioxydum,*—Ph. L. & D. *Ferri Oxydum Rubrum,*—Ph. E. *Ferri Carbonas,*—Ph. D. 1826, and Ph. L. 1809. *Ferri Subarbonas,*—Ph. L. 1829.—*a.* By precipitating a *solution of sesquisulphate* or *sesquichloride of iron* with *ammonia*, in excess, and washing, drying, and igniting the resulting *hydrated peroxide.* Pure; anhydrous.

b. (Ph. L.) *Sulphate of iron*, 4 lb; *carbonate of soda*, 4 lb 2 oz.; dissolve each separately in *water*, 3 gall.; mix the solutions whilst hot, set the mixture aside that the precipitate may subside, and subsequently wash and dry it as before. Contains water, and a trace of alkali.

c. (Ph. E.) From *sulphate of iron*, 4 oz.; *carbonate of soda*, 5 oz.; *water*. 4 pints; as the last.

Prop. Sesquioxide of iron, prepared by *precipitation*, is an impalpable powder, of a brownish-red colour, odourless, insoluble in water, freely soluble in acids, and possessing a slightly styptic taste, especially when recently prepared. When exposed to heat, its colour is brightened, its sp. gr. increased, and it is rendered less easily soluble in acids. The sesquioxide prepared by *calcination* is darker and brighter coloured, less soluble, and quite tasteless. It has either a scarlet or purplish cast, according to the heat to which it has been exposed. The finest *Indian red* or *crocus*, usually undergoes a second calcination, in which it is exposed to a very intense heat. It is then known as "*purple brown.*" The best *jeweller's rouge* is prepared by calcining the precipitated oxide until it becomes scarlet. The *rust of iron* contains some combined water, and is more soluble than the oxide prepared by calcination.

Uses, &c. The precipitated oxide is employed in medicine as a tonic, and emmenagogue, in doses of 10 to 30 gr.; and as an anthelmintic, and in tic douloureux, in doses of 1 to 4 dr., mixed up with honey. It is also employed to make some preparations of iron. *Rust of iron* is likewise used in the same way. The *calcined oxide* is employed as a pigment, as an ingredient in a plaster, &c.

Medicinal sesquioxide of iron "is soluble in dilute hydrochloric acid, scarcely effervescing, and is again thrown down by potassa. The strained liquor is free from colour, and is not discoloured by the addition of either sulphuretted hydrogen or ferrocyanide of potassium." (Ph. L.)

IRON (Sesquioxide of,—Hydrated). Syn. *Hydrated Peroxide of Iron; Ferri Peroxydum Hydratum,*—Ph. D. *Ferrugo,*—Ph. E. *Prep.* 1. (Ph. E.) *Sulphate of iron*, 4 oz.; *oil of vitriol*, 3½ fl. dr.; *water*, 1 quart; mix, dissolve, boil, and gradually add of *nitric acid*, 9 fl. dr.; stirring well and boiling for a minute or two after each addition, until the liquor yields a yellowish-brown precipitate with ammonia; it must then be filtered and precipitated with *liquor of ammonia* (fort.), 3½ fl. oz., rapidly added and well mixed in; collect the precipitate, wash it well with water, drain it on a calico filter, and dry it at a heat not exceeding 180° Fahr. When intended as an antidote for arsenic it should not be dried, but kept in the moist or gelatinous state.

2. (Ph. D.) *Sulphate of iron,* 8 *oz.; water,* ½ pint; *sulphuric acid,* 6 fl. dr.; dissolve; oxidize the solution with *nitric acid,* 4 fl. dr., diluted with *water,* 2 fl. oz.; proceed as last, and pour the liquid into *liquor of potassa* (Ph. D.), 1 quart; the precipitate after being well washed, is to be enclosed, in the pasty state, in a porcelain pot, the lid of which is rendered air-tight by *lard.*

Prop., &c. "Entirely and very easily soluble in hydrochloric acid, *without* effervescence; if previously dried at 180° Fahr., a stronger heat drives off about 18% of water." (Ph. E.) We are indebted to Messrs. Bunsen and Berthold for the introduction of this substance as an antidote to arsenic. A table-spoonful of the moist oxide may be given every 5 or 10 minutes, or as often as the patient can swallow it. (Pereira.) When this preparation cannot be obtained, *rust of iron* or even the dry *carbonate* (sesquioxide) may be given along with water instead. According to Dr. Maclagan, 12 parts, and to Devergie, 32 parts of the *hydrated oxide of iron* are required to neutralize 1 part of *arsenious acid.* Fehling says that the value of this substance as an antidote to arsenic is materially impaired by age, even when kept in the moist state. The presence of potassa, soda, ammonia, or their sulphates, chlorides, or carbonates, is not of consequence, and therefore, in cases of emergency, time need not be lost in washing the precipitate, which, in such cases, need only be drained and squeezed in a calico filter. The magma obtained by precipitating *sulphate of iron* with *magnesia,* in excess, and which contains free magnesia and sulphate of magnesia besides hydrated peroxide of iron, precipitates *arsenious acid,* not only *more quickly,* but in larger quantity, than the *hydrated oxide* does when *alone.* It will even render inert *Fowler's solution,* and precipitate both the copper and arsenic from solutions of *Schweinfurth's green in vinegar,* which the pure gelatinous oxide alone will not do. (Fehling, *Archiv der Pharm.*) *Dose.* As a tonic, 5 to 20 gr.

The *rust of iron* is also a hydrated oxide, but is less soluble than that recently precipitated from its solution in an acid. *Hydrated sesquioxide of iron* is best preserved in a well-stoppered bottle filled with *recently* distilled or boiled water.

IRON (Percyanide of). See *Ferrocyanide of Iron* and *Prussian Blue.*

IRON (Phosphate of). Syn. *Protophosphate of Iron, Blue do. do.; Ferrum Phosphoricum Cæruleum, Ferri Phosphas,* —Lat. *Prep.* (Ph. U. S.) *Sulphate of iron,* 5 oz.; *phosphate of soda,* 6 oz.; dissolve each separately in 2 quarts of *water,* mix the solutions, and after repose for a short time, wash, and dry the precipitate.

Prop., &c. A blue powder; insoluble in water; soluble in dilute nitric and hydrochloric acid. *Dose.* 5 to 10 gr.; in amenorrhœa, diabetes, dyspepsia, scrofula, &c.; and *externally,* as an application to cancerous ulcers.

IRON (Sesquiphosphate of). Syn. *Oxyphosphate of Iron, Perphosphate of do., Superphosphate of do., White Phosphate of do.; Ferri Sesquiphosphas, Ferrum Phosphoricum Album, Phosphas Ferricus, &c.,* —Lat. A white powder, obtained by precipitating *sesquichloride of iron* by *phosphate of soda. Uses* and *dose,* as the last.

Obs. The synonyms of the phosphates of iron have been very loosely given. We have adopted the above arrangement as the simplest, and the one best understood in medicine and pharmacy, without investigating its scientific accuracy. We find certain recent pharmaceutical writers confound the two preparations. The *oxyphosphate of iron* of Fuzet-Duponget is a mixture of the above two, prepared by using a solution of sulphate of iron which has been rendered brown by exposure to light and air. The *superphosphate* of M. Schobeldt is a mere solution of the sesquiphosphate in aqueous phosphoric acid. The *superphosphate* or *suboxyphosphate of iron* of Rammelsberg, is a brownish-red powder, prepared by boiling sesquiphosphate of iron in a weak solution of potassa. It consists principally of sesquioxide of iron. The nondescript compound called *biphosphate of iron* by Dr. Routh, is formed by adding phosphate of iron to boiling monobasic or glacial phosphoric acid contained in a porcelain capsule, as long as the salt is dissolved. The solution solidifies as it cools. The last is recommended in anæmia, and in debility accompanied by great nervous depression, in doses of 1 to 3 gr.

IRON (Phosphuret of). Syn. *Phosphide of Iron; Ferri Phosphuretum,*—Lat. Not used in medicine. It is frequently an accidental constituent of cast iron, and bar iron, which it renders brittle or *cold-short.*

IRON (Potassio-citrate of). Syn. *Citrate of Iron and Potassa; Ferri Potassio-citras,* *Ferri et Potassæ Citras,*—Lat. From *citric acid, carbonate of potassa,* and *iron* or *sesquioxide of iron,* by one or other of the processes described under *ammonio-citrate* or *ammonio-tartrate of iron,* the former of which it resembles in many important particulars, and is preferable to it in affections of the stomach and mucous membranes.

IRON (Potassio-tartrate of). Syn. *Tartrate of Potassa and Iron, Ferro-tartrate of Potassa, Ferric Tartrate of do., Chalybeated Tartar, Tartarized Iron; Tartrate of Iron* (?); *Ferri Potassio-tartras,*—Ph. L. *Ferrum Tartarizatum,*—Ph. E., & Ph. L. 1824. *Ferri Tartarum,*—Ph. D. *Tartras Ferri et Potassæ,*—Ph. E. 1839. *Prep.* 1. (Ph. L.) *Sulphate of iron,* 4 oz., is dissolved in *water,* 1 pint, previously mixed with *sulphuric acid,* ½ fl. oz.; heat is applied to the solution, and *nitric acid,* 1 fl. oz., gradually added; the solution is boiled to the consistence of a syrup, and then diluted with *water,* 4 gall. (less the pint already used); *liquor of ammonia,* 10 fl. oz., is next added, and the precipitate washed, and set aside for 24 hours; at the end of this time the water being decanted, the still *moist precipitate* is added, gradually, to a mixture of *bitartrate of potassa,* 2 oz., and *water,* ½ pint, heated to 140° Fahr.; after a time the undissolved oxide is separated by a linen cloth, and the clear solution either gently evaporated to dryness or treated in the same manner as ammonio-citrate of iron, (lastly, preserve it in well-stopped bottles.) The formulæ of the Ph. E., D., & U. S., are essentially the same. The Ph. D. orders a heat not beyond 150° Fahr. to be applied to the mixture of the oxide and bitartrate, with occasional stirring for 6 hours, and the desiccation to be conducted at the same temperature.

2. (Ph. D. 1826.) *Thin iron wire* (filings), 1 part; *bitartrate of potassa,* in fine powder, 4 parts; *distilled water,* 8 parts, or q. s.; mix, expose the mass to the air in a shallow vessel for 15 days, occasionally stirring, and adding enough water to keep the mass moist; lastly, boil the magma in *water,* filter, and evaporate.

Obs. This preparation is a double *salt* of *potassa* and *sesquioxide of iron;* it is therefore wrongly called *tartrate of iron,* as is commonly heard. It is "totally soluble in water; the solution is neutral to litmus and turmeric, unaffected by ferrocyanide of potassium, and not precipitated by acids nor alkalies, nor acted on by the magnet." (Ph. L. 1836.) "Heated with potassa, 100 gr. throws down about 34 gr. of sesquioxide of iron." (Ph. L.) "Entirely soluble in *cold* water; taste, feebly chalybeate." (Ph. E.) That of commerce, has generally a feebly inky taste, a *slight* alkaline reaction, is slightly deliquescent, dissolves in 4 parts of water, and is nearly insoluble in alcohol.

Potassio-tartrate of iron is an excellent ferruginous tonic. *Dose.* 10 to 20 gr., made into a bolus with aromatics, or dissolved in water, or other convenient menstruum.

IRON (Quinio-citrate of). Syn. *Ferri Quinio-citras, Ferri et Quiniæ Citras,*—Lat. *Prep.* 1. As *ammonio-citrate of iron,* but using *quinine,* recently precipitated, instead of ammonia, to neutralize the acid.

2. (Béral.) *Citrate of iron,* 4 parts; *citrate of quinine,* 1 part; *distilled water,* q. s.; dissolve, gently evaporate, and proceed as directed for ammonio-citrate of iron. *Dose.* 2 to 6 gr.; in cases where the use of both iron and quinine is indicated.

IRON (Silicide of). This compound is found in certain varieties of cast iron, but little is known respecting its chemical constitution.

IRON (Sodio-citrate of). Syn. *Ferri Sodio-citras, Ferri et Sodæ Citras,*—Lat. *Prep.* From *citric acid, carbonate of soda,* and *iron* or the *hydrated oxide,* as *ammonio-citrate* or *potassio-citrate of iron.*

IRON (Sulphate of). Syn. *Protosulphate of Iron, Copperas, Green do., Green Vitriol, Salt of Steel; Ferri Sulphas,*—Ph. L. E. & D. *Shoemaker's Black, Vitriolated Iron, Sal Martis, Sal Chalybis, Vitriolum Ferri, V. Martis, V. Viride, V. Ferratum, Ferrum Vitriolatum, &c.,*—Obs. The crude sulphate of iron or green vitriol of commerce (*Ferri sulphas venalis,*—Ph. L.) is prepared by exposing heaps of moistened iron pyrites or native bisulphuret of iron to the air for several months, either in its unprepared state, or after it has been roasted. When decomposition is sufficiently advanced, the newly-formed salt is dissolved out with water, and the solution crystallized by evaporation. In this state it is very impure. The sulphate of iron employed in medicine is prepared as follows:—

Prep. 1. (Ph. L.) *Sulphuric acid,* 1 fl. oz.; *water,* 4 pints; mix, and add of *commercial sulphate of iron,* 4 ℔; *iron wire,* 1 oz.; digest with heat and occasional agitation until the sulphate is dissolved, strain whilst hot, and set aside the liquor that crystals may form; evaporate the mother-liquor for more crystals, and dry the whole.

2. (Ph. L. 1836.) *Iron filings* (or wire),

8 oz.; *sulphuric acid*, 14 oz.; *water*, 4 pints; dissolve by heat, filter the solution, set it aside to crystallize, and evaporate the mother-liquor for more crystals.

Prop., &c. Sulphate of iron forms pale bluish-green rhombic prisms, having an acid, styptic taste, and acid reaction; it dissolves in two parts of cold, and less than one part of boiling water; it effloresces in the air, loses most of its water at 212° Fahr., and the whole at a somewhat higher temperature; at a dull-red heat it suffers decomposition; sp. gr. 1·82. It is "perfectly soluble in water; a piece of iron put into the solution should not be covered with metallic copper." (Ph. L.) By exposure to the air it is partly converted into sulphate of sesquioxide of iron. *Dose.* $\frac{1}{2}$ to 4 gr., in pills or solution; *externally*, as an astringent or styptic. In the *arts*, sulphate of iron (*copperas*) is extensively used in dyeing, and for various other purposes.

Obs. The *Dublin College* orders *iron wire* to be employed, and the *Edinburgh College* directs the transparent green crystals of the copperas of commerce, to be dissolved in their own weight of boiling water acidulated with sulphuric acid, and re-crystallized.

Crude sulphate of iron is frequently contaminated with the sulphates of copper, zinc, manganese, alumina, magnesia, and lime, which, with the exception of the first, are removed with difficulty. It also contains variable proportions of the neutral and basic sesquisulphates of iron. The preparation obtained by direct solution of iron in dilute sulphuric acid, should, therefore, be alone used in medicine.

In *commerce*, there are four varieties of crude sulphate of iron or copperas known, —*greenish-blue*, obtained from acid liquors, —*pale green*, from neutral liquors,—*emerald green*, from liquors containing sesquisulphate of iron,—and *ochry brown*, which arises from age and exposure of the other varieties to the air. Even the first two of these contain traces of sesquisulphate of iron, and hence give a bluish precipitate with ferrocyanide of potassium; whereas the *pure protosulphate* gives one which is at first nearly white.

IRON (Sulphate of, — Dried). Syn. *Ferri Sulphas Exsiccatum*,—Ph. E. *F. S. Siccatum*,—Ph. D. From *sulphate of iron*, heated in a shallow porcelain or earthen vessel, not glazed with lead, till it becomes a greenish-gray mass, and then reduced to powder. The heat should be that of "an oven," or "not exceeding 400° Fahr." It is chiefly used to make pills. 5 parts of the crystallized sulphate lose very nearly 2 parts by drying.

IRON (Sulphate of,—Granulated). Syn. *Ferri Sulphas Granulatum*,—Lat. *Prep.* (Ph. D.) A solution of *iron wire*, 4 *oz.*, in *oil of vitriol*, 4 fl. oz., diluted with *water*, $1\frac{1}{2}$ pint, after being boiled for a few minutes, is filtered into a vessel containing *rectified spirit*, 8 fl. oz., and the whole stirred until cold, when the granular crystals are collected on a filter, washed with *rectified spirit*, 2 fl. oz., and dried, first, by pressure between bibulous paper, and next, beneath a bell-glass over sulphuric acid, after which they are put into a stoppered bottle, to preserve them from the air.

IRON (Sesquisulphate). Syn. *Persulphate of Iron, Sulphate of Sesquioxide of Iron, Persesquisulphate of do., Oxysulphate of do.; Ferri Persulphas, &c.*,—Lat. *Prep.* By adding to a *solution of sulphate of iron* exactly half as much *sulphuric acid* as it already contains, raising the liquid to the boiling point, and then dropping in *nitric acid*, until the liquid ceases to blacken by such addition. The solution evaporated to dryness, furnishes a buff-coloured mass, slowly soluble in water.

Prop., &c. With the sulphates of ammonia and potassa it unites to form compounds to which the name *iron alums* has been given. It forms the active ingredient in the *liquor oxysulphatis ferri*, of Mr. Tyson, and is said by Dr. Osborne to be a constituent of *Widow Welch's pills.* This salt is also formed when protosulphate of iron is calcined with free exposure to the air. Dissolved in water it is used as a test for hydrocyanic, gallic, tannic, and boletic acid. (See *page* 52.)

IRON (Sulphocyanide of). Syn. *Ferri Sulphocyanidum*,—Lat. By mixing a *solution* of *sulphocyanide of potassium* with a *neutral solution* of *persulphate* or *perchloride of iron.*

IRON (Sulphurets of). Syn. *Sulphides of Iron.* Compounds of sulphur and iron abound in the mineral kingdom, but those employed in chemistry and pharmacy are commonly produced artificially.

Prep. 1. *Sulphuret of Iron, Protosulphuret of do., Sulphide of do., Protosulphide of do.; Ferri Sulphuretum*,—Ph. E. & D. *Chalybs cum Sulphure Præparatus*,—Obs. Lat.—*a.* (Ph. E. & D.) Expose a *bar of iron* to a *full white heat*, and instantly apply a *solid mass of sulphur* to it, observing to let the melted product fall into water; afterwards separate the sulphuret from the sulphur, dry, and preserve it in a closed vessel.

b. From *sublimed sulphur*, 4 parts; *iron filings*, 7 parts; mixed together and heated in a common fire, till the mixture begins to glow, and then removing the crucible from the heat, and covering it up, until the reaction is at an end, and the whole has become cold.

c. (Fownes.) By projecting a mixture of *sulphur*, 2½ parts, and *iron filings*, 4 parts, into a red-hot crucible, excluding the air as much as possible.

2. *Bisulphuret of Iron, Bisulphide of do., Factitious Iron Pyrites.* From *sulphur*, 5 parts; *iron filings*, 4 parts; as the last.

Obs. Several other sulphurets of iron have been prepared and examined by chemists.—*Tetrasulphuret of iron* is made by transmitting hydrogen gas over dry disulphate of peroxide of iron.—*Disulphuret of iron* by a like treatment of the dry protosulphate of iron. (Arfwedson.)—*Sesquisulphuret of iron* by dropping a solution of perchloride of iron into another of hydrosulphate of ammonia, when this compound falls as a black precipitate.—*Bisulphuret of iron* (iron pyrites), is found in large quantities in the mineral kingdom.—*Magnetic iron pyrites*, is a mixed sulphuret of iron found in nature. All the compounds of iron and sulphur, except the *bisulphuret*, yield sulphuretted hydrogen, when treated with sulphuric or hydrochloric acid; hence their frequent employment in chemistry for that purpose. The *bisulphuret* is frequently used for copying medals, &c. It melts easily, and takes sharp casts, and may be coloured red with vermilion. Native iron pyrites is also called *Brass-balls, Horse gold, Copperas-balls, Pyrites Ferri, &c.* (See *below.*)

IRON (Hydrated Protosulphuret of). Syn. *Ferri Protosulphuretum Hydratum*,—Lat. *Prep.* By adding a *solution of hydrosulphuret of ammonia* or of *sulphuret of potassium* to a *neutral solution of protosulphate of iron* made with *recently distilled* or *boiled water;* the precipitate is collected on a filter, washed as quickly as possible with *recently boiled water*, squeezed in a linen cloth, and preserved in the pasty state, *under water*, as directed under *hydrated peroxide of iron.*

Prop., &c. A black, insoluble substance, rapidly decomposed by exposure to the air. Proposed by Mialhe as an *antidote* to the *salts* of *arsenic, antimony, bismuth, lead, mercury, silver*, and *tin*, and to *arsenious acid;* more especially to *white arsenic* and *corrosive sublimate.* "A gargle containing a little hydrated protosulphuret of iron, will instantly remove the metallic taste caused by putting a *little* corrosive sublimate into the mouth." (Mialhe.) On contact with the latter substance it is instantly converted into protochloride of iron and sulphuret of mercury, two comparatively inert substances. It is administered in the same way as the hydrated peroxide of iron. When taken immediately after the ingestion of corrosive sublimate, it instantly renders it innocuous; but when the administration is delayed until 15 or 20 minutes after the poison has been swallowed, it is almost useless. (Orfila.)

IRON (Hydrated Persulphuret of). Syn. *Ferri Persulphuretum Hydratum*,—Lat. *Prep.* By adding, very gradually, a *neutral solution of persulphate of iron* to a *dilute solution of sulphuret of potassium* or *hydrosulphuret of ammonia*, and collecting, &c., the precipitate as above.

Prop., &c. Proposed by Bouchardat and Sandras as a substitute for the last preparation, to which, they say, it is preferable.

IRON (Tannate of). Syn. *Ferri Tannas, Ferrum Tannicum*,—Lat. *Prep.* From *tannin*, 1 part; *boiling water*, 150 parts; dissolve, add of *freshly precipitated sesquioxide of iron* (dried at 212° Fahr.), 9 parts; evaporate by a gentle heat to one-half, filter, add of *sugar*, 1 part, complete the evaporation, and at once put it into bottles. *Dose.* 3 to 5 gr., thrice daily; in chlorosis, internal hemorrhages, &c.

IRON (Tartrates of). *Prep.* By dissolving the corresponding *hydrated oxides* in a *solution of tartaric acid*, employing the former in slight excess, and evaporating, both the *tartrate of protoxide* and of *peroxide of iron*, are easily obtained. (See *above.*)

IRON (Tartrate of). Syn. *Ferri Tartras, Ferri Prototartras*,—Lat. *Prep.* 1. From *iron filings*, 2 parts; *tartaric acid*, 1 part; *hot water*, q. s.; digest together until reaction ceases, agitate the liquid, pour off the turbid solution, and collect, wash, and dry the powder, as quickly as possible, and keep it out of contact with the air.

2. (Soubeiran.) Crystallized *tartrate of potassa* (not bitartrate), 132 parts; *protosulphate of iron*, 139 parts; dissolve each separately, mix the solutions, and collect the precipitate as before. A nearly insoluble powder; seldom used.

IRON (Valerianate of). Syn. *Valerate of Iron; Ferri Valerianas*,—Ph.D. *Prep.* 1. (Ph. D.) By adding a *solution of valerianate of soda* to another of *persulphate of iron* (prepared as directed under hydrated peroxide of iron), and collecting and washing the precipitate, which is to be dried by placing it for some days folded in bibulous paper, on a porous brick; after which it is to be carefully kept from the air. A reddish-brown amorphous powder. This is *valerianate of sesquioxide of iron.*

2. (Ruspini.) Clean *iron filings*, are put into a wedgewood-ware mortar, and triturated with an equal weight of *valerianic acid*, gradually added; in an hour, *distilled water* is poured in, and in a short time longer, the whole is put into a flask and exposed to a gentle heat; the solution is next filtered and the filtrate exposed to the air out of contact with dust; the surface gradually becomes covered with a crystalline layer of *valerianate of iron*, which is collected, and the liquor again set aside that more crystals may be formed. This is *valerianate of protoxide of iron.*

Prop., *&c.* Nearly insoluble in water; soluble in rectified spirit, and in the dilute acids with decomposition. Citrate or tartrate of iron, flavoured with oil of valerian, is frequently sold for it. *Dose.* 1 to 3 gr.; in anæmia and chlorosis complicated with hysteria.

IRON AND ALUMINA (Bisulphate of). Syn. *Ferri et Aluminæ Sulphas*,—Lat. *Prep.* (Sir James Murray.) *Alumina* (recently precipitated and well-washed), 10 parts; *wrought-iron filings* (levigated), 3 parts; *carbonate of soda*, 5 parts; *water*, q. s.; mix, and force in *carbonic acid* under strong pressure; to the resulting solution add *dilute sulphuric acid*, in slight excess, and crystallize. A mixed ferruginous alum. *Dose.* 4 to 8 gr.

IRON AND AMMONIA (Sulpho-tartrate of). Syn. *Ferric Sulpho-tartrate of Ammonia; Ferri et Ammoniæ Sulphurico-tartras*,—Lat. *Prep.* (Aikin.) *Sulphate of iron*, 2 parts; *tartaric acid*, 1 part; *water*, q. s.; dissolve, add *ammonia*, in slight excess, filter, and evaporate the solution to dryness. Compatible with alkaline carbonates. *Dose.* 1 to 5 gr.

IRON AND MANGANESE (Saccharine Carbonate of). Syn. *Ferri et Manganesii Carbonas Saccharatum, F. et M. C. cum Saccharo*,—Lat. *Prep.* (Dr. S. T. Speer.) *Sulphate of iron*, 25 dr.; *sulphate of manganese*, 1 oz. 20 gr.; *carbonate of soda*, 5 oz.; dissolve each separately in *water*, 1 pint; mix the metallic solutions, then add that of the soda, and after a short time, collect, wash, and drain the precipitate; to this, add of *white sugar*, 2½ oz.; dry at 120° Fahr., and keep it in a well-closed bottle. The whole process is similar to that employed in the preparation of the saccharine carbonate of iron.

Prop., *&c.* A reddish-brown, tasteless, amorphous mass or powder. *Dose.* 5 to 20 gr.; in amenorrhœa and anæmia, which are said to yield to this remedy much sooner than to the simple chalybeates. It was introduced to medical practice by M. Hannon (Belgium), was subsequently strongly recommended by M. Petrequin (Lyons), and has very recently been employed with success by Dr. Speer (Cheltenham).

IRON ALUM. See *Alums.*

IRON CEMENT. See *Cements.*

IRON FILINGS. Syn. *Ferri Ramenta*, —Ph. L., 1836. *Ferri Limatura*,—Ph. E. *Ferri Scobs*,—Ph. D. The usual method of preparing iron filings for medical purposes is noticed at p. 636; the only way, however, to obtain them pure, is to act on a piece of soft iron with a clean file. The Fr. Cod. orders them to be forcibly beaten in an iron mortar, and to be separated from oxide and dust by means of a fine sieve, and from the grosser parts by means of a coarse hair-sieve. *Dose.* 10 to 30 gr., in sugar or honey, as a chalybeate; in larger doses it is an excellent vermifuge, especially for ascarides or the small thread-worm.

IRON (Levigated). Syn. *Iron in Powder; Ferrum Divisum, F. Pulveratum, Ferri Limatura Lævigata*, — Lat. *Prep.* (P. Cod.) *Prepared iron filings* ground with a muller and porphyry slab, in the dry state, until reduced to an impalpable powder, which is to be preserved from the air in well-stopped bottles.

Obs. It is very difficult to prevent the oxidation of iron filings, and still more so, of levigated iron. Even inclosing them in stoppered bottles, perfectly fitted, is not sufficient. M. Righini has found that when reduced to powder and mixed with an equal quantity of well *dried sugar*, the mixture is of a lead colour, and may be kept even in paper, without its suffering oxidation, provided it is preserved from moisture. Levigated iron filings is an excellent substitute for *Quevenne's Iron*, and is infinitely superior to nearly all that is sold under that name in the shops. *Dose.* 5 to 25 gr., made into an electuary with honey or treacle, either alone or combined, according to the indications.

IRON LIQUOR. Syn. *Pyrolignite of Iron, Dyer's Acetate of do.; Ferri Acetas Venalis*,—Lat. This article, so extensively used in dyeing, is a crude mixed acetate of the protoxide and sesquioxide of iron, in which the latter commonly greatly predominates. It is usually prepared by one or other of the following methods:—

1. *Old scraps of iron* are left in a cask of *vinegar* or of *pyroligneous acid*, occasional agitation being had recourse to, until a sufficiently strong solution is obtained.

2. A *solution of pyrolignite* or *crude acetate of lime*, is added to another of *green copperas*, as long as a precipitate is formed; after repose, the clear liquor is decanted.

3. (Prof. Runge.) Eight suitable vessels are arranged one above another, like a staircase, so that the top of the upper one may rest a little over the one immediately below it, and so on of the others to the bottom one. The 8 vessels are now filled with *old scraps of iron*, and the upper one with *pyroligneous acid* as well; after half an hour this is drawn off into the vessel next below it, and this again, after the lapse of another half hour, into the *third*, and so on until the last is emptied. The acid is now passed a second time through the vessels in the same way as before, and thus becomes strongly impregnated with iron in a less time than by *any other* means, except the following:—

4. (Dr. Winterfield.) This consists in employing several wooden cylinders, resembling those used in the "*quick process*" of making vinegar; the space between the two perforated bottoms, usually filled with wood shavings, being occupied with *scraps of iron*. Pyroligneous acid is then passed through them, and the same system of ventilation observed as in the manufacture of vinegar.

Obs. Crude pyroligneous acid, or acid of the first rectification, is commonly employed to make iron liquor on the large scale. As soon as the deposit of tarry matter on the surface of the iron hinders the action of the acid, it is burnt off.

IRON (Quevenne's). Syn. *Reduced Iron; Ferrum Reductum; Ferri Pulvis*,—Ph. D. *Fer Reduit*,—Fr. *Prep.* 1. (Ph. D.) Into a gun-barrel, or similar tube of iron, introduce as much *sesquioxide of iron* as will occupy about 10 inches, confining it to the middle portion of the barrel by plugs of *asbestos;* next heat the part containing the oxide to redness, and pass through it a stream of *hydrogen gas* (previously dried by passing it through *oil of vitriol*, and afterwards through a tube containing *caustic potassa*) until it is no longer absorbed or decomposed; then remove the fire, a slow current of the gas being still continued, and when cold, collect the metallic contents of the barrel, and preserve it in an accurately stoppered bottle.

2. (Mr. Arthur Morgan.) *Ferrocyanide of potassium*, 8 oz., after exposure in an oven until all its water is expelled, is reduced to very fine powder, and mixed, by trituration with *precipitated sesquioxide of iron*, 4 oz., and *dried carbonate of potassa*, 3 oz.; the mixture is next introduced, a little at a time, into a red-hot crucible, and the heat is continued until all effervescence has ceased; when the whole is again cold, it is powdered, and thoroughly washed with recently *boiled distilled water*, by agitation with the liquid in a large bottle, after which it is dried as rapidly as possible, out of contact with the air, and preserved as before.

Prop., &c. A fine, dark, gray-coloured powder; soft to the touch; soluble in dilute hydrochloric and sulphuric acid, with the copious evolution of hydrogen gas, which, on being passed through lime water or baryta water, does not occasion a sensible precipitate; the resulting solution is colourless when very dilute, and pale green when concentrated; a solution of ferrocyanide of potassium added to it, gives a nearly white (not a blue) precipitate, whilst a solution of ferridcyanide of potassium gives a deep blue one; sulphocyanide of potassium under the like conditions should not develop a ruby-red colour. In its most perfect condition it is pyrophoric. *Dose.* 5 to 10 gr.; as a mild but certain chalybeate, easily dissolved by the juices of the stomach. See *Levigated Iron.*

IRON WIRE. Syn. *Ferrum in fila tractum*,—Ph. L. *Ferri Filum*,—Ph. E. *Ferri Fila.*—Ph. D. This is the only form of metallic iron retained in the Ph. L. It is used to make preparations of iron. (See *p.* 636.)

ISATHYDE. This name has been given by Erdman to a yellowish-white semi-crystalline powder obtained by adding *hydrosulphuret of ammonia* to a *hot solution of isatine;* sulphur is deposited together with *isathyde* as the liquor cools. By using *sulphuretted hydrogen* instead of hydrosulphuret of ammonia, "*bisulphisathyde*" is obtained. This last is converted by an *alcoholic solution of potassa* into "*sulphisathyde;*" and by cold *aqueous solution of potassa*, into "*indine.*"

ISATINE. A product of the oxidation of indigo, discovered by Erdman and Laurent.

Prep. From *indigo* (in fine powder), 1 part, rubbed to a paste with a *little water*, and then gently heated with a mixture of *bichromate of potassa* and *sulphuric acid*, of each, 1 part; *water*, 30 parts; as soon as a deep yellowish-brown solution is obtained the whole is allowed to cool, when crystals of impure isatine are deposited; these are purified by carefully washing them with a *little cold water* and by recrystallization, first, in water, and then in alcohol.

Prop., *&c.* Lustrous, orange-red crystals, soluble in boiling water, and alcohol, and in cold liquor of potassa, forming a rich purple-coloured solution. By boiling the liquid this colour is destroyed, and *isatinate of potassa* formed, which may be obtained in crystals by careful evaporation.

ISATINIC ACID. Syn. *Isatic Acid. Prep.* The crystals of *isatinate of potassa*, obtained as above, are dissolved in *alcohol*, recrystallized, the crystals redissolved in water, and the solution precipitated with *acetate of lead;* the white powder (*isatate of lead*) is next diffused through *water*, and *sulphuretted hydrogen* passed through the liquid, when a solution of isatic acid is obtained, which by spontaneous evaporation, yields *isatic acid.*

Prop., *&c.* A white semi-crystalline powder, soluble in cold water, but decomposed when the solution is heated. It forms salts with the bases called *isatates* or *isatinates.*

ISERINE. Titaniate of iron.

ISETHIONIC ACID. A new compound discovered by Magnus. It is obtained by boiling a *solution of ethionic acid*, and concentrating the liquid by evaporation. It is a viscid oily liquid, and, as well as its salts (*isethionates*) is rather stable; their solutions may be boiled without suffering decomposition. The *isethionates* of *ammonia*, *baryta*, *copper*, *lead*, *potassa*, and *soda*, are soluble, and crystallize with facility.

ISINGLASS. Syn. *Ichthyocolla*,—Lat. The finest kinds of isinglass are obtained from various species of the genus *acipenser*, that from the *acipenser huso* (Linn.) or *great sturgeon* being perhaps the most esteemed. It is the air-bag, swimming bladder, or sound, dried without any other preparation than opening, folding, or twisting it. The *picked* or *cut isinglass* of the shops, consists of the lumps of *staple isinglass* picked into shreds by women and children, or cut by machines.

Good isinglass is the purest natural gelatine known. Its quality is determined by its whiteness, absence of the least fishy odour, and ready, and almost entire solubility in boiling water; the solution forming a nearly white, scentless, semi-transparent, solid jelly, when cold. It is soluble in weak acids, and this solution is precipitated by alkalies. The aqueous solution is not precipitated by spirit of the common strengths. 1 part of *good isinglass* dissolved in 25 parts of *hot water* forms a rich, tremulous jelly. It is very commonly adulterated. (See *Gelatine.*) A *false isinglass* has been recently imported from Para, which is the dried ovary of a fish commonly called "*gilbriker*" (the *siluris Parkerii*, of Trail.)

ISOLUSINE. A name given by Peschier to a substance found by him in several species of polygala, and which he conceived to be a new principle.

ISOMERISM. Identity of composition, with dissimilarity of properties. *Isomeric compounds* are such as contain the same elements in the same proportions, but which differ from each other in their chemical properties.

ISOMORPHISM. The quality possessed by bodies differently composed of assuming the same crystalline form. *Isomorphous*, as well as *isomeric substances*, are numerous in chemistry, and their resemblance in these respects often furnishes an important indication of other properties and relations.

ISOPATHY. It is Germany which enriches the world with this new benefit. "Homœopathy, magnetism, and phrenology salute their younger sister under the name of isopathy. Dr. Hermann is the prophet of this doctrine, which is based on the following assumed principle:—*Every diseased organ has its remedy in the same organ*—thus, if you have disease of the liver, *eat liver;* if a headache, *eat brain;* if you suffer in the bladder or kidneys, *nourish yourself on bladder and kidneys.* As the organs may not appear very tempting to certain squeamish persons, M. Hermann has made *tinctures* of them, which his patients take in spoonfuls, under the scientific names of *stomachine*, *cystine*, *gesticuline*, *unbria*, *&c.* (*Pharm. Times.*)

ISSUE. Syn. *Fontanel; Fonticulus*,—Lat. A small artificial ulcer formed on any part of the body by means of caustic or the lancet, and kept open by daily introducing an *issue pea* covered with some digestive or stimulating ointment; the whole being duly secured by an appropriate bandage.

ISSUE PEAS. Syn. *Pisæ pro Fonticulis*, —Lat. Those of the shops are the immature fruit of the orange tree (*orange berries*). They are usually smoothed in a lathe. Issue peas are also "turned" from *orris root.* The following are occasionally employed:—

1. *Orris root* (in powder), and *Venice*

turpentine, of each, 1 part; *turmeric*, 2 parts; *bees' wax*, 3 parts; melted together and made into peas whilst warm.

2. *Bees' wax*, 3 parts; melt, add of *Venice turpentine*, 1 part; mix, and further add, of *turmeric*, 2 parts; *orris root* (in powder), 1 part; mix well, and form the mass into *peas* whilst warm. More irritating than the common peas.

3. (Dr. Gray.) *Bees' wax*, 12 parts; *verdigris* and *white hellebore*, of each, 4 parts; *orris root*, 3 parts; *cantharides*, 2 parts; *Venice turpentine*, q. s. *Used* to open issues instead of caustic, but their employment requires care.

ISSUE PLASTERS. See *Plasters*.

ITACONIC ACID. An acid compound, formed along with *citraconic acid*, by the action of heat on *aconitic acid*. It resembles, if it be not identical with pyrocitric acid.

ITCH. Syn. *Psora, Scabies*,—Lat. *Gale*,—Fr. There are four varieties of itch, distinguished by nosologists by the names,—*scabies papuliformis*, or rank itch;—*scabies lymphatica*, or watery itch;—*scabies purulenta*, or pocky itch;—*scabies cachectica*, a species exhibiting appearances resembling each of the previous varieties. Our space will not permit more than a general notice of the common symptoms, and the mode of cure which is equally applicable to each species, and will not prove injurious to other skin diseases simulating the itch.

The *common itch* consists of an eruption of minute vesicles, principally between the fingers, bend of the wrist, &c., accompanied by intense itching of the parts, which is only aggravated by scratching. The *usual treatment* is repeated applications of *sulphur-ointment* (simple or compound), well rubbed in, once or twice a day, until a cure is effected; accompanying its use by the internal exhibition of a spoonful or more of *flowers of sulphur*, mixed with *treacle* or *milk*, night and morning. Where the external use of sulphur is objectionable, on account of its smell, a *sulphur bath*, or a *lotion* or *bath of sulphuret of potassium*, or of *chloride of lime* may be employed instead. See *Baths, Lotions, Ointments, Psoriasis, &c.*

IVORY. The osseous portion of the husks and teeth of the male elephant, the hippopotamus, wild boar, &c. That of the *narwhal* or *sea-horse* is the most esteemed, on account of its superior hardness, toughness, translucency, and whiteness. The dust or shavings (*ivory dust, ivory shavings*) of the turner, form a beautiful *size* or *jelly* when boiled in water. *Vegetable ivory* is the indurated fruit of the *phytelephas macrocarpa* or *Tagua plant*.

Ivory may be *dyed* or *stained* by any of the ordinary methods employed for woollen, after being freed from dirt and grease; but more quickly as follows:—

1. *Black*. The ivory well-washed in an *alkaline lye* is steeped in a *weak neutral solution of nitrate of silver*, and then exposed to the light, or dried and dipped into a *weak solution of hydrosulphuret of ammonia*.

2. *Blue*. Steep it in a *weak solution of sulphate of indigo* which has been nearly neutralized with *salt of tartar;* or in a *solution of soluble Prussian blue*. A still better plan is to steep them in the *dyer's green indigo-vat*.

3. *Brown*. As for black, but using a *weaker* solution of silver.

4. *Green*. Dissolve *verdigris* in *vinegar*, and steep the pieces therein for a short time, observing to use a glass or stone ware vessel; or, in a *solution of verdigris*, 2 parts, and *sal ammoniac*, 1 part, in *soft water*.

5. *Purple*. Steep it in a *weak neutral solution of terchloride of gold*, and then expose it to the light.

6. *Red*. Make an infusion of *cochineal* in *water of ammonia*, then immerse the pieces therein, having previously soaked them for a *few minutes* in *water* very slightly acidulated with aquafortis.

7. *Yellow.*—*a*. Steep the pieces for some hours in a *solution of sugar of lead*, then take them out, and when dry, immerse them in a solution of *chromate of potassa*.

b. Dissolve as much of the *best orpiment* in *water of ammonia* or *hartshorn* as it will take up, then steep the pieces therein for some hours; lastly, take them out and dry them in a warm place, when they will turn yellow.

Ivory is *etched* or *engraved* by covering it with an *etching ground* or *wax*, and employing *oil of vitriol* as the *etching fluid*.

Ivory is rendered *flexible* by immersion in a solution of *pure phosphoric acid* (sp. gr., 1·13) until it loses, or partially loses its opacity, when it is washed in clean *cold soft water*, and dried. In this state it is as flexible as leather, but gradually hardens by exposure to dry air. Immersion in hot water, however, restores its softness and pliancy. According to Dr. Ure, the necks of infants' sucking bottles (*biberons* or *artificial mothers*) are thus made.

Ivory is *whitened* or *bleached* by rubbing it with *finely powdered pumice-stone and water*, and exposing it to the sun, whilst still moist, under a glass shade, to prevent desiccation and the occurrence of fissures; observing to repeat the process until a proper effect is produced. Ivory may also be bleached by immersion for a short time in *water* holding A LITTLE *sulphurous acid*, *chloride of lime*, or *chlorine* in solution; or by exposure in the moist state to the *fumes of burning sulphur*, largely diluted with air.

Ivory is *wrought*, *turned*, and *fashioned*, in a similar manner and with similar tools to those used for bone and soft brass.

Obs. Bone for ornamental purposes, is treated in a similar way to ivory, but less carefully, owing to its inferior value. The bones of living animals may be dyed by mixing *madder* with their food. The bones of young pigeons may thus be tinged of a *rose colour* in 24 hours, and of a *deep scarlet* in 3 or 4 days; but the bones of adult animals take fully a fortnight to acquire a rose colour. The bones nearest the heart become tinged the soonest. In the same way *logwood* and *extract of logwood* will tinge the bones of young pigeons *purple*. (Mr. Gibson.)

IVORY BLACK. See *Black Pigments.*

IXINE. A gummy matter which exudes from the wounded roots of the *atractylis gummifera* or *pine thistle.* It is chewed for the purpose of strengthening the gums.

JAGGERIES. These are coarse brown sugar made in India, by the evaporation of the juice of several species of palms.

1. *Cocoa jaggery; Ténné véllum.* From the juice or toddy of the cocoa-nut palm.

2. *Malabar jaggery; Koondee panei véllum.* From Malabar toddy.

3. *Mysore jaggery.* From Mysore toddy; 17 gall. yield 46 *lb.*

4. *Palmyra jaggery; Pannay vellum.* From Palmyra toddy; 6 pints yield 1 *lb.*

JALAP. Syn. *Jalapæ Radix; Jalapa,*—Ph. L., & D. *Jalapium,* — Ph. L., 1745. *Convolvuli Jalapæ Radix,*—Ph. E. "The tuber" of "*Exogonium purga,* Bentham," (Ph. L.; *Ipomea purga,*—Wender; *I. jalapa,* —Royle.) *Jalap* is a powerful stimulant and drastic purgative, producing copious liquid stools; but when judiciously administered, both safe and efficacious. It appears to be intermediate in its action between aloes and scammony. *Dose.* 10 to 25 gr., in powder; in constipation, cerebral affections, dropsies, obstructed menstruation, worms, &c. Owing to its irritant properties, its use is contra-indicated in inflammatory affections of the alimentary canal, and after surgical operations connected with the abdomen and pelvis. It is usually administered in combination with sulphate of potassa or bitartrate of potassa, and ginger; with mercurials, as the case may indicate. The powder is very generally adulterated.

JALAP (Resin of). Syn. *Jalapate of Jalapine; Resina Jalapæ,*—Lat. *Prep.* 1. (Ph. E.) See *Extract of Jalap.*

2. (M. A. Nativelle.) *Jalap root* is digested in *boiling water* for 24 hours, and after being reduced to thin slices, more *water* is added, and the whole boiled for 10 minutes, with occasional agitation; the liquid is then expressed in a tincture press, and the boiling and pressing repeated a *second* and a *third* time (these decoctions by evaporation yield *aqueous extract of jalap*); the *pressed root* is next placed in an alembic, *rectified spirit*, q. s. added, the whole boiled for 10 minutes, and then allowed to cool; the tincture is then pressed out, and the boiling with *fresh alcohol* and expression is repeated twice; a little *animal charcoal* is added to the mixed tinctures, and, after thorough agitation, the latter are filtered; the liquid is now distilled until nothing passes over, the supernatant fluid is poured off the fluid resin, and the latter dried by spreading it over the surface of the capsule, and continuing the heat. The product is a friable and nearly colourless resin, which forms a white powder resembling starch. *Prod.* Fully 10% of pure resin.

3. (M. Planche.) *Resinous extract of jalap* is dissolved in *rectified spirit,* the tincture agitated with *animal charcoal,* and after filtration gently evaporated to dryness.

Pur. The jalap resin of commerce is generally adulterated with scammony, gum guaiacum, or rosin. When in a state of purity, *it does not form an emulsion with milk,* like scammony resin, but runs into a solid mass. It is *insoluble in fixed oils* and *turpentine;* whilst the common resins are freely soluble in those menstrua. Its *alcoholic solution* dropped on a piece of absorbent white paper, and exposed to the action of nitrous gas, *does not acquire a green or blue colour;* if it does, guaiacum resin is present. 2% of this adulteration may be thus detected. (M. Gobley.) It is *insoluble in ether;* but guaiacum resin, common resin, and some others are so; the *decanted ether* should *not become opalescent* when *mixed with water,* and should evaporate without leaving any residuum. *Pow-*

dered jalap resin placed in cold water *does not dissolve*, but forms a semi-fluid, transparent mass, as if it had been melted. *Digested* in a watch-glass with a little *oil of vitriol*, a rich *crimson-coloured solution is obtained*, from which, in a few hours, a brown viscid resin separates. These last two characteristics distinguish it from other resins.

Obs. Earthenware, or well-tinned copper vessels must alone be used in the above processes, as contact with copper or iron turns the resin black, and this tinge can only be removed by redissolving the resin in alcohol, the addition of animal charcoal, and re-evaporation.

Jalap resin is an energetic cathartic. *Dose.* 1 to 5 gr.

JALAP (Resin of,—Factitious). Syn. *Resina Jalapæ Factitia*,—Lat. A substance frequently sold for jalap resin is made by fusing a mixture of *pale yellow rosin* (*white rosin*), and *scammony resin*, and adding, when it has cooled a little, but still semi-fluid, a few drops of *balsam of Peru* or *tolu;* the mixture is then poured into small paper capsules or tin moulds. Its effects resemble those of jalap resin, but it inflames less. (X. Landerer.)

JALAP (Soap of). Syn. *Sapo Jalapæ*, *Sapo Jalapinus*,—Lat. *Prep.* (Ph. Bor.) *Resin of jalap* and *Castile soap*, of each, 1 part; *rectified spirit*, 2 parts, or q. s. to dissolve the ingredients softened by a gentle heat; subsequently evaporate the mixture by the heat of a water bath until reduced to 4½ oz., or it has acquired the consistence of a pill-mass.

Prop., &c. A grayish-brown mass, soluble in rectified spirit. Said to be milder in its action than the resin alone. *Dose.* 5 to 15 gr.

JALAPIC ACID. Syn. *Odorous Principle of Jalap*,—Pereira. *Prep.* Add an *alcoholic solution of acetate of lead* to a *similar solution of jalap resin*, collect the precipitate (*jalapate of lead*), and throw down the *lead* by means of *sulphuretted hydrogen.* (See *Absinthic Acid.*) A brownish, soft, greasy substance, smelling strongly of jalap, soluble in alcohol, and alkalies, and slightly so in ether. Jalap resin contains about 13% of this substance.

JALAPINE. Syn. *Jalapina*, *Rhodeoretine.* Jalap resin is commonly sold under this name, but pure jalapine is prepared by one or other of the following formulæ:—

Prep. 1. The *liquid* filtered from the *jalapate of lead* in preparing jalapic acid, is a solution of *acetate of jalapine*, which after any trace of lead is removed by adding a few drops of *dilute sulphuric acid*, and filtration, yields the whole of its *jalapine*, as a precipitate, on the addition of 5 or 6 times its volume of *water;* this is collected, washed with a little *cold distilled water*, and dried by exposure to a current of warm dry air.

2. (Hume.) *Coarsely powdered jalap* is digested in *strong acetic acid*, for 14 days, the tincture filtered, *ammonia* added in excess, and the whole agitated strongly; the mixture is then filtered, the deposit washed in *cold water*, redissolved in *acetic acid*, reprecipitated by *ammonia*, and again washed and dried.

3. (Kayser.) Pure *jalap resin*, in powder, is digested for some time in *boiling ether*, by which means the *jalapic acid* is removed, and *pure jalapine* remains undissolved.

Prop., &c. A transparent, colourless, scentless, insipid resin, very soluble in alcohol, but insoluble in ether. It is the active purgative principle of crude jalap resin.

JAMAICINE. Syn. *Jamaicina.* A peculiar alkaloid obtained by Huttenschmidt from cabbage-bark (*cortex andiræ inermis.*) It is a brownish-yellow, crystalline substance; soluble in water and alcohol; fusible, and very bitter tasted. It forms salts with the acids, which, in small doses, produce restlessness and trembling; and in larger ones, purging. It is said to be vermifuge.

JAMES'S POWDER. See *Powders.*

JAMS. Conserves of fruit with sugar, prepared by boiling. In the latter respect they differ from the conserves of the apothecary.

Prep. The *pulped* or *bruised fruit* is boiled along with ½ to ⅔ of its weight of *loaf sugar*, until the mixture jellies, when a little is placed on a *cold* plate; the semi-fluid mass is then passed through a coarse hair-sieve whilst hot, to remove the stones and skins of the fruit, and as soon as it has cooled a little, is poured into pots or glasses. It is usual to tie these over, when cold, with paper which has been *dipped* in brandy. The pots must then be placed aside in a dry and rather cold situation.

The following fruits are those from which jams are commonly prepared:—*Apricots*, *cherries* (various), *cranberries*, *currants* (black, red, and white), *gooseberries* (ripe and green), *mulberries*, *Orleans plums*, *raspberries*, and *strawberries.* Red currants are commonly added to the last, to remove insipidity.

JAPAN. See *Varnishes.*

JAPANNING is the art of covering

paper, wood, or metal with a coating of hard, brilliant, and durable varnish. The material employed for this purpose in *Japan*, is the resinous juice of the *rhus vernix* or *poison sumach*, which rapidly blackens and hardens in the air. For *use* it is purified by defecation and straining, and is afterwards mixed with a little oil, and with colouring matter, as required. The *Chinese transparent lacquer* or *japan* is the balsamic juice of the *augia sinensis*. In this country, varnishes of amber, asphaltum, or copal, or mixtures of them, pass under the names of *japan* and *japan varnish*.

Proc. The surface is *coloured* or *painted* with devices, &c., as desired, next covered with a *highly transparent varnish* (amber or copal), then *dried* at a high temperature (135° to 165° Fahr.), and, lastly, *polished*. Wood and paper are first sized, polished, and varnished. For plain surfaces asphaltum varnish or japan is used. See *Varnishing*.

JAPONIC ACID. When catechine is exposed to the air in contact with caustic alkalies, black solutions (*alkaline japonates*) are formed; with carbonated alkalies, red solutions (*alkaline rubinates*); the acid of the former may beseparated. It is a black powder, insoluble in water, soluble in alkalies, and precipitated by acids. *Rubic* or *rubinic acid* forms red insoluble compounds with the earths and some other metallic oxides.

JARAVE. Syn. *Spanish Jarave, Sarsaparilla Beer; Infusum Sarzæ paratum fermentatione, Inf. Sarzæ Hispanicum*,—Lat. *Prep.* From *sarsaparilla* (sliced), ¾ *lb.; guaiacum bark* (bruised small), ¼ *lb.; guaiacum wood* (rasped) and *liquorice root* (sliced), of each, 2 *oz.; aniseed* (bruised), 1½ *oz.; mezereon root-bark*, 1 *oz.; moist sugar*, 1 *lb.; hot water* (not boiling), 2 gall.; mix in a clean stone-jar, and shake it twice a day until active fermentation has set in, when it is fit for use. *Said* to be superior to the other preparations of sarsaparilla as an alterative or purifier of the blood. *Dose*. A small tumblerful 3 or 4 times a day.

JASPER. Syn. *Iaspis*,—Lat. An impure variety of quartz, of various colours; sometimes banded, spotted, or variegated. It was formerly used as an amulet against hæmorrhages and fluxes. It is now extensively worked up into rings, seals, snuff-boxes, vases, &c., for which it is well calculated from its extreme hardness and susceptibility of receiving a fine polish.

JATROPHIC ACID. Syn. *Crotonic Acid, Iatrophic do.* A peculiar fatty acid discovered by Pelletier and Caventou, and originally regarded by them as the cathartic principle of croton oil and croton seeds, but since shown by Redwood and Pereira to be nearly inert.

Prep. The *oil* is saponified by *caustic potassa*, and the resulting soap is decomposed by *tartaric acid;* the fatty matter which floats on the surface of the liquid is then skimmed off the *aqueous portion*, and the *latter* submitted to distillation; the liquid in the receiver is a *solution* of *jatrophic acid*.

Prop., *&c.* Volatile; very acid; has a nauseous odour; is solid at 23°, and vaporizes at 35° Fahr. It forms salts called *Jatrophates* or *Crotonates* with the bases, none of which possess any practical importance. The *crotonates* of *ammonia*, *baryta*, *magnesia*, *potassa*, and *soda*, have been formed; all of which are soluble in water, and crystallize with more or less difficulty.

JAUMANGE. *Prep.* From *isinglass*, 1 *oz.; boiling water*, 12 *oz.;* dissolve, add of any *sweet white wine*, ½ pint; the *yelks* of 2 *eggs* beaten to a froth, and the *grated yellow peel* of 2 *lemons;* mix well, and heat the whole over the fire until sufficiently thickened, stirring all the time; lastly, serve it up, or pour it into moulds.

JAUNDICE. Syn. *Icterus, Morbus Luteolus*,—Lat. A disease characterised by a yellow colour of the eyes and skin, deep-coloured urine, and pale alvine evacuations. It *appears to arise* from a disordered action of the biliary organs. The *treatment* consists of the administration of *saline aperients*, and small doses of *blue-pill*, followed by *tonics* and *diaphoretics*. The action of these remedies should be promoted by the copious use of *diluents* (particularly *saline waters*), and *exercise* in the open air, when possible. When there is much pain and vomiting, *anodynes* (as opium, morphia, &c.) may be administered. Jaundice is not in itself a dangerous disease, but it sometimes lays the patient open to attacks of others which are so.

JELLY. Syn. *Gelly*. A term now very loosely applied to various substances which are liquid or semi-liquid whilst warm, and become gelatinous on cooling.

Jellies are *coloured* by the addition of the usual *stains* used by confectioners, and are rendered *transparent* by clarification with white of egg. See *Stains* (and *below*.)

JELLY (Almond). Syn. *Gelatina amygdalarum*,—Lat. *Prep.* From rich *almond milk*, ¼ pint; thick *hartshorn jelly*, ½ pint; *sugar*, 2 oz.; with 2 or 3 *bitter almonds* and a little *lemon-peel*, to flavour, heated together, strained, and moulded.

JELLY (Arrow Root). Syn. *Gelatina Marantæ,*—Lat. From *arrow root* 1½ *oz.*, to *water*, 1 pint. (See p. 85.) *Tous les mois jelly* is made in the same way.

JELLY (Biscuit). *Prep.* From *white biscuit* (crushed beneath the rolling-pin), 4 *oz.; cold water*, 2 quarts; soak for some hours, boil to one half, strain, evaporate to 1 pint, and add of *white sugar*, ¾ *lb.; red wine*, 4 *oz.*, and *cinnamon*, 1 tea-spoonful. In weakness of the stomach, and in dysentery and diarrhœa, and in convalescences combined with rich beef gravy or soup.

JELLY (Bread). Syn. *Panada; Gelatina Panis,*—Lat. *Prep.* Cut a *French roll* into slices, toast them on each side, and boil in *water*, 1 quart, until the whole forms a jelly, adding *more water* if required; strain, and add *sugar, milk, &c.*, to palate. It may be made with broth from which the fat has been skimmed, instead of water. *Used* as the last.

JELLY (Broth). Syn. *Soup Jelly.* From *broth* or *soup* from which the fat has been skimmed, evaporated until it becomes gelatinous on cooling. A *few shreds* of *isinglass* are commonly added. See *Portable Soup.*

JELLY (Calves' Feet). *Prep.* For *each foot* take of *water*, 3 pints, and boil to one-half; cool, skim off the fat, and again boil for 2 or 3 minutes with the *peel of a lemon* and a *little spice;* remove it from the fire, strain through a *jelly bag*, (see *Filtration,*) add the *juice of a lemon* and a *glass of wine*, and when it has cooled a little, put it into glasses or "forms."

Obs. If this jelly is required to be very transparent, it must be treated as follows:—After the fat is removed, it should be gently warmed, just enough to melt it, next well beaten with the white of an egg and the seasoning, and then brought to a boil for a minute or two, when it will be ready for straining, &c. The calf's feet should not be bought ready boiled, but only scalded. *Cows' feet* or *heels* make nearly as good jelly as that from calves' feet, and are much more economical.

JELLY (Ceylon Moss). Syn. *Gelatina Fuci Amylacei,*—Lat. *Prep.* (Dr. Sigmond.) Boil *Ceylon moss* ½ oz., in *water*, 1 quart, for 25 minutes, or till the liquid jellies on cooling; strain and flavour. Very nutritious; recommended in irritation of the mucous membranes and phthisis.

JELLY (Corsican Moss). Syn. *Gelatina Helminthocorti,*—Lat. *Prep.* (P. Cod.) *Corsican wormweed* or *moss*, 1 oz.; *water*, q. s.; boil for 1 hour, and strain 8 fl. oz.; to this add of *isinglass* (previously soaked in a little water, 1 dr.; *refined sugar*, 2 oz.; *white wine*, a wine-glassful. Vermifuge. See *Decoctions.*

JELLY (Gravy). By evaporating *meat gravies.*

JELLY (Hartshorn). Syn. *Gelatina Cornu Cervi,*—Lat. *Prep.* (P. Cod.) *Hartshorn shavings*, 8 oz.; wash it in water, then boil in *clean water*, 3 pints, till reduced to one-half; strain, press, add of *sugar*, 4 oz.; the *juice of one lemon*; and the *white of an egg* beaten up with a little *cold water;* mix well, clarify by heat, evaporate till it jellies on cooling, then add the *peel of the lemon*, and set it in a cool place. It may be *flavoured* with wine, spices, &c. Very nutritious.

JELLY (Iceland Moss). Syn. *Gelatina Lichenis,*—Lat. *Prep.* (P. Cod.) *Iceland moss*, 2 oz.; soak for 1 or 2 days in *cold water*, then boil for 1 hour in *water*, q. s. to yield a strong solution; strain, decant the clear after repose, apply heat, and dissolve therein of *isinglass*, 1 dr.; evaporate the whole to a proper consistence, put it into pots, and set them in a cool place. Nutritious. Recommended in phthisis. The jelly of Iceland moss and cinchona (*Gelatina lichenis cum cinchona,*—P. Cod.) is made by adding to the above, *syrup of cinchona*, 6 fl. oz.

JELLY (Irish Moss). Syn. *Gelatina Chondri,*—Lat. *Prep.* From *Irish* or *carrageen moss.* See *Decoctions.*

JELLY (Isinglass). Syn. *Confectioners' Jelly; Gelatina Icthyocollæ,*—Lat. *Prep.* From *isinglass* dissolved in *water* by boiling, and evaporated till it "jellies" on cooling, adding flavouring, as desired. 1½ *oz.* of good *isinglass* makes fully a pint of *very strong jelly.* See *Blancmange, Isinglass, Calves'-feet Jelly, &c.*

JELLY (Rice). Syn. *Crême de Riz.* From *rice* boiled in *water*, sweetened, and flavoured.

JELLY (Sago). *Prep.* Soak *sago* in *cold water* for 1 hour, strain, and boil in *fresh soft water* until it becomes transparent; then add *wine, sugar, clear broth, milk*, or *spices*, to flavour. 1 *oz.* of sago makes a pint of good jelly.

JELLY (Tapioca). As the last, but using *tapioca* in lieu of sago.

JELLIES (Fruit). These are prepared by boiling the *strained juice of the fruit* mixed with ⅓ to ½ its weight of *refined sugar*, until it "jellies" on cooling, observing to carefully remove the scum as it rises. The process should be conducted by a gentle heat, and it is preferable not to add the sugar until the juice is somewhat concentrated, as by *lengthened* boiling the quality of the sugar is injured.

Jellies are sold in pots or glasses, like jams. Both *jams* and *fruit jellies* are refrigerant and laxative; they are, however, mostly employed as relishes, especially during fevers and convalescences. The following are the principal fruit jellies:—

Apple jelly. From *apple juice.*

Barberry jelly. (Gelatina berberorum, —Ph. E., 1744.) From the *juice of barberries.*

Cherry jelly.—a. (Rob de cornis.) From Cornelian cherries.—*b. Kentish cherry jelly* (Rob de cerasis.)

Currant jelly, (Rob de ribes.) From the *juice of currants* (black, red, and white). Black currant juice requires the most sugar; some add twice the above quantity of sugar to either sort.

Elderberry jelly (Rob of elderberries; Rob baccarum sambuci cum saccharo.) From *elder juice.*

Gooseberry jelly. From the *juice.*

Hibiscus jelly. From *juice* and *sugar*, equal parts.

Lemon jelly. From *isinglass,* 2 *oz.; water,* 1 quart; boil, add of *sugar,* 1 *lb.,* clarify, and when nearly cold, add the *juice of* 5 *lemons,* and the *grated yellow rinds of* 2 *oranges* and of 2 *lemons;* mix well, strain off the peel, and put it into glasses.

Noyeau jelly. As *punch jelly,* but strongly flavoured with *bitter almonds.*

Orange jelly. From *orange juice,* 1 pint; let it stand over the *grated yellow rind* of 3 or 4 of the *oranges* for a few hours, then strain, and add of *loaf sugar,* ½ *lb.,* or more; *isinglass,* 2 *oz.,* dissolved in *water,* 1 pint; mix, and put it into glasses before it cools.

Plum jelly (Rob prunorum acidorum). From *unripe plums.*

Punch jelly. From *isinglass,* 2 *oz.; sugar,* 1¾ *lb.; water,* 1 pint; dissolve, add of *lemon juice,* ½ pint; the *peels of* 2 *lemons* and of 2 *oranges; rum* and *brandy,* of each, ¼ pint; keep it in a covered vessel until cold, then liquefy it by a very gentle heat, strain, and pour it into moulds. A pleasant and deceptive way of swallowing alcohol.

Quince jelly (Gelatina cydoniorum; Rob cydoniorum, Ph. E., 1744). *Quince juice,* 3 *lb.; refined sugar,* 1 *lb.;* boil to a jelly.

Raspberry jelly. From the *juice.*

JERVINE. The same as *barytin.*

JESUIT'S BARK. See *Cinchona.*

JESUIT'S DROPS. See *Drops* and *Tinctures.*

JESUIT'S POWDER. Powdered cinchona.

JET. A variety of mineral bituminous carbon, very hard, and susceptible of a fine polish.

JEWELS. See *Diamond, Emerald, Gems, &c.*

JEWELRY. The gold in articles of jewelry, whether solid or plated, which are not intended to be exposed to very rough usage, is generally "*coloured,*" as it is called in the trade. This is done as follows:—

1. (*Red gold colour.*) The article, after being coated with the *amalgam,* is gently heated, and, whilst hot, is covered with *gilder's wax;* it is then "flamed" over a wood fire and strongly heated, during which time it is kept in a state of continual motion, to equalise the action of the fire on the surface. When all the composition has burned away, the piece is plunged into *water,* cleaned with the "*scratch-brush* and *vinegar,* and then washed and burnished. To bring up the beauty of the colour, the piece is sometimes washed with a *strong solution* of *verdigris in vinegar,* next gently heated, plunged *whilst hot* into *water,* and then washed, *first* in *vinegar,* or *water soured with nitric acid,* and then in pure water; it is lastly, burnished and again washed and dried.

2. (*Or-molu colour.*) This is given by covering the parts with a *mixture* of *powdered hematite, alum, common salt,* and *vinegar,* and applying heat until the coating blackens, when the piece is plunged into *cold water,* rubbed with a *brush dipped in vinegar,* or in *water strongly soured with nitric acid,* again washed in *pure water,* and dried. During this process, the parts not to be in "or-molu colour" should be carefully protected.

The *frauds* practised in reference to the "fineness" of the metal used in jewelry, is noticed at *page* 538. The *means of determining* the *quality* of the leading articles of jewelry, are explained under the heads—*Gems, Diamond, Assaying, &c.*

JEW'S PITCH. See *Asphaltum.*

JEW'S STONE. Syn. *Lapis Judaicus, L. Syriacus, Phœnicites.* Small fossil stones found in Palestine, which, when reduced to powder, were formerly in repute as internal remedies for fluxes and urinary complaints.

JUICE (Spanish). See *Extracts* and *Liquorice.*

JUICES. See *Extracts* and *Vegetable Juices.*

JUJUBES. A fruit, resembling a small plum, produced by the *rhamnus ziziphus.* Combined with sugar, it forms the *jujube paste* of the shops, when genuine; but that now almost generally sold under the name is a mixture of *gum* and *sugar*, slightly coloured and flavoured.

JULEP. Syn. *Julap; Julepum, Julepus, Julapium,*—Lat. A term usually regarded as synonymous with *mixture*; but according to the best authorities, implying a medicine which is used as a vehicle for other forms of medicine. The word comes through the French, from a Persian expression, which signifies "sweet drink." A *julep*, according to Continental writers, is a drink of little activity, generally composed of *distilled waters*, *infusions*, and *syrups*, to which *mucilages* and *acids* are sometimes added; "but never powders or oily substances, which could interfere with its transparency." In England, the juleps of old pharmacy are now classed under mixtures (*misturæ*,—Ph. L.)

JUNIPER BERRIES. Syn. *Juniperi Baccæ; J. Communis Baccæ,*—Ph. E. *Juniperus,*—Ph. L. "The fruit," of "*Juniperus communis*, Linn." (Ph. L.), or *common juniper tree.* In the old Ph. L., & D., both the tops and berries (*juniperi fructus et cacumina,*—Ph. L., 1836; *juniperus; baccæ, cacumina,*—Ph. D., 1826,) were ordered. The berries are stomachic and diuretic, and have been long employed in dropsies, either alone, or combined with foxglove and squills. The tops (*summitates*) have been highly praised in scurvy and certain cutaneous affections. *Dose.* 1 or 2 dr., made into a conserve with sugar, or in the form of infusion or tea.

JUNKET. Syn. *Devonshire Junket, Curd Jelly.* From *warm milk* put into a bowl, and then turned with a *little rennet;* some *scalded cream* and *sugar* are next added, with a sprinkling of *cinnamon* on the top, without breaking the curd. Much esteemed by "holiday folk" in the western counties, during the hot weather of summer. Sometimes, very strangely, a *little brandy* finds its way into these "trifles."

KAKODYLE. Syn. *Kadodyle, Kadodule, Kakododyle.* A peculiar compound of hydrogen, carbon, and arsenic, discovered by M. Bunsen, and shown by him to be an organic basyle, capable of forming a vast number of combinations, and generally deporting itself like a metal.

Prep. Pure *anhydrous chloride of kakodyle* is digested for about 3 hours, at a temperature of 212° Fahr., with slips of clean *metallic zinc* contained in a bulb blown upon a glass tube, previously filled with *carbonic acid gas*, and hermetically sealed; when the action is complete, and the whole has become cold, the tube is cautiously opened, and the white saline matter which has formed is dissolved in a *little water;* a heavy oily liquid (*kakodyle*) separates, and is purified by distillation from a little *fresh zinc*, in an atmosphere of *carbonic acid gas.* The operation is conducted in a tube having two bulbs blown on it, and bent at right angles, so that one bulb may serve as the retort, and the other, as the receiver; the two extremities being drawn to a point and hermetically sealed.

Prop., &c. A colourless, transparent, thin liquid; extremely fetid and inflammable; inflames on contact with chlorine and oxygen; on the least exposure to atmospheric air, it gives off white fumes and passes first into the state of *oxide of kakodyle*, and then into *kakodylic acid;* it boils at 338°; crystallizes in square prisms when cooled to 21° Fahr.; and is decomposed by a heat much below redness.

Obs. All the preparations of *kakodyle* (except *alkargen*) are *exceedingly poisonous*, and therefore great caution should be exercised in experimenting on them. All the operations connected with them must be conducted in the *open air*, and the *strictest precautions* adopted to avoid the accidental inhalation of the *smallest* quantity of the vapour or its products. Vomiting, numbness of the extremities, fainting, and other alarming symptoms, are the consequences of the most *trifling neglect.* They all evolve a most offensive odour, and this property has led Bunsen to propose the following *test* for *arsenic* and the *acetates:*—The *suspected substance* is boiled with *water* containing a *little potassa*, the resulting liquid is filtered, mixed with *acetic acid*, and evaporated to dryness; the *residuum* heated in a test tube, will evolve the *horrible odour* of *alkarsine*, if arsenic is present. This odour is rendered, if possible, even more offensive by the addition of *protochloride of tin* to the ignited mass. As a *test* for the *acetates*, the addition of a *little arsenic* must be made.

KAKODYLE (Chloride of). *Prep.* A *dilute alcoholic solution* of *oxide of kakodyle* is very cautiously mixed with an *equally dilute solution of bichloride of mercury*, avoiding excess of the latter; the resulting white precipitate is distilled with *concentrated hydrochloric acid*, and the distillate (*hydrated chloride of kakodyle*) is left for some time in contact with some *chloride of calcium* and a *little quicklime*, and is, lastly, rectified alone in an atmosphere of *carbonic acid gas.*

Prop., *&c.* Limpid; colourless; heavier than water; soluble in alcohol; boils at 215° Fahr.; its vapour inflames on contact with the air, and has the density, 4·56. The latter is more fearful in its effects, and more insupportable in odour, even in the most dilute form, than that of the oxide. It combines with the subchloride of copper to form a white, insoluble, crystalline, double salt (*chloride of kakodyle and copper*); and with alkarsine to form *oxychloride of kakodyle;* crystals of the latter are also deposited when the chloride is exposed to the air.

KAKODYLE (Cyanide of). *Prep.* By distilling *oxide of kakodyle* with *concentrated hydrocyanic acid,* or with *cyanide of mercury.*

Prop., *&c.* Lustrous, colourless, four-sided prisms; slightly soluble in water; melts at 91° Fahr.; boils at 285° Fahr. It is, perhaps, the most fearful poison known. A few grains vaporized and diffused through the atmosphere of a large room, produces instantaneous numbness of the hands and feet, vertigo, delirium, and even paralysis and unconsciousness, from which, if the parties be not *instantly* rescued by exposure to a current of cold air, and ammoniacal stimulants, death ensues as an inevitable consequence.

KAKODYLE (Iodide of). Prepared by distilling *oxide of kakodyle* with a *strong solution of hydriodic acid.* A thin, yellowish, fetid, heavy liquid. The yellow crystalline substance which is formed at the same time is said to be *oxy-iodide of kakodyle.* By using hydrobromic acid and hydrofluoric acid, *bromide* and *fluoride of kakodyle* are respectively formed.

KAKODYLE (Oxide of). *Alkarsine, Cadet's Fuming Liquor. Acetate of potassa* and *arsenious acid,* equal parts, are mixed together, and slowly heated to redness in a glass retort, placed in a sand bath, and connected with a tubulated receiver placed in a freezing mixture, and provided with a safety-tube to carry off the non-condensable gases; the heavier liquid that distils over is collected, agitated with *recently-boiled distilled water,* and rectified along with *caustic potassa,* in an atmosphere of *pure hydrogen* or *carbonic acid.* By a second rectification over *lime* or *baryta* it may be obtained anhydrous.

Prop., *&c.* A colourless liquid, boiling at about 300°; congealing at —10° Fahr., and evolving a very offensive odour, resembling that of arseniuretted hydrogen. "It is *highly poisonous* in every shape." "The minutest quantity painfully affects the eyes and mucous membrane of the nose." In a larger dose it is destructive to life. It possesses feeble basic properties, is soluble in alcohol and ether, sparingly soluble in water, and fumes and inflames spontaneously by exposure to the air. Sp. gr. of the vapour, 7·5.

KAKODYLE (Sulphuret of). Formed by distilling a *mixture of chloride of kakodyle* and *hydrosulphuret of sulphuret of barium.*

Prop., *&c.* A colourless fetid liquid, heavier than water, with a high boiling point, and very poisonous. It dissolves sulphur forming *tersulphuret of kakodyle* or *sulpho-kakodylic acid,* and combines with the sulphurets of *antimony, bismuth, copper, gold,* and *lead,* forming *sulphur-salts.* A *seleniuret* or *selenide of kakodyle* has also been formed by a similar method to that adopted for the sulphuret.

KAKODYLIC ACID. Syn. *Alkargen, Kadodylic Acid.* This is obtained when *alkarsine* is *gradually* exposed to the air, in the *cold;* as soon as a semi-solid mass is formed, it is treated with *cold water,* the solution evaporated until it solidifies, and then pressed in *bibulous paper,* to remove *hydrarsine;* the residuum is dissolved in *boiling absolute alcohol,* and is again obtained in crystals as the liquid cools; by repeating the process several times with *alcohol,* or by evaporating the *aqueous solution* in a water-bath, and subsequent treatment with *hydrated peroxide of iron,* and a final crystallization from *alcohol,* pure *kadodylic acid* is obtained. *Another method* is to add *oxide of mercury* to *kakodyle* or to *alkarsine,* covered with a *layer of water* and artificially cooled, until the mixture entirely loses its odour, and afterwards decomposing any *kakodylate of mercury* which may have formed, by the *cautious* addition of a *little* more *alkarsine;* the liquid is then evaporated for crystals, as before.

Prop., *&c.* Brittle, glossy, prismatic crystals, deliquescent, inodorous, tasteless, and soluble in water and alcohol; the solution has an acid reaction; with the bases it forms salts (*kakodylates*). The *kakodylates of potassa* and *soda* are a gummy, amorphous mass; the *kakodylates of mercury* and *silver* are crystallizable. "*Kakodylic acid* is an exceedingly stable compound; it is neither affected by red, fuming nitric acid, aqua regia, nor even by chromic acid in solution; it may be boiled with these substances without the least change." It is, however, deoxidized by phosphorous acid and protochloride of tin. Dry hydriodic acid converts it into *iodide,* and hydrochloric acid into *terchloride of kakodyle.* "What is extremely remarkable, this substance (kakodylic acid) is not in the least degree poisonous." (Fownes.)

KALEIDOSCOPE. Syn. *Flower-glass.* A pleasing philosophical toy, invented by Sir David Brewster, which presents to the eye a series of symmetrical changing views. It is formed as follows:—Two *slips of silvered glass,* from 6 to 10 inches long, and from 1 to $1\frac{1}{2}$ inch wide, and rather narrower at one end than the other, are joined together lengthwise, by one of their edges, by means of a *piece* of *silk* or *cloth,* glued on their back; they are then placed in a *tube* of *tin* or *pasteboard,* blackened inside, and a little longer than is necessary to contain them, and are fixed by means of *small pieces of cork,* with their faces at any angle to each other that is an even aliquot part of 4 right angles (*as the* $\frac{1}{6}$, $\frac{1}{8}$, $\frac{1}{10}$, *&c.*) The one end of the tube is then closed with an *opaque screen,* or *cover,* through which a small eyehole is made in the centre; and the other end is fitted, first with a *plate of common glass,* and at the distance of about $\frac{1}{8}$th of an inch, with a plain piece of *slightly-ground glass,* parallel to the former; in the intermediate space or cell are placed the objects to form the images. These consist of *coloured pieces* of *glass, glass beads,* or any other *coloured diaphonous bodies,* sufficiently small to move freely in the cell, and to assume new positions when the tube is shaken or turned round. A tube so prepared presents an infinite number of changing and symmetrical pictures, no one of which can be *exactly* reproduced. This toy is so easily constructed, is so very inexpensive, and at the same time, so capable of affording an almost inexhaustible fund of amusement to the young, that we advise our juvenile friends to try their hands at its construction. Any common tube of tin or pasteboard may be used, and strips of glass smoked on one side will answer for mirrors.

KALI. See *Potassa.*

KALISACCHARIC ACID. See *Glucic Acid.*

KALYDOR (Rowlands'). This resembles *Gowland's Lotion,* but is got up in a rather more pleasing style.

KAOLIN. Syn. *Porcelain Clay.* A fine white clay, derived from the decomposition of the felspar of granitic rocks. The potteries and porcelain works of this country are chiefly supplied with this substance from extensive tracts of it which occur near St. Austle, Cornwall.

KAPNOMOR. See *Capnomor.*

KATALYSIS. Syn. *Catalysis.* Dissolution; that condition in which the decomposition, and the recombination of the elements of compound bodies, is excited by the mere presence of, or contact with, other bodies, which do not themselves suffer such a change. The *katalytic* or *catalytic force* is that modification of chemical affinity which determines catalysis. The mode of preparing oxygen gas, by heating a mixture of *chlorate of potassa* and *binoxide of manganese* or *red oxide of lead,* is a familiar example of this force. The salt is decomposed at a temperature very far lower than would be required if it were heated alone; yet the oxide of manganese is not in the slightest degree altered, and is found after the experiment in the same state as it was before. It may, indeed, be employed for the same purpose, any number of times. See *Eremacausis* and *Fermentation.*

KELP. The alkaline ashes obtained by burning various species of sea-weed. Those most valued for the purpose are the *fucus vesiculosus, nodosus,* and *serratus, laminaria bulbosa* and *digitata, himanthalia lorea,* and *chorda filum.*

Kelp seldom contains more than 2% to 5% of real soda. According to Dr. Ure, the best samples contain from 53% to 62% of soluble matter, consisting of—

Sulphate of soda .	8·	19·
Soda (carbonate and sulphuret) . .	8·5	5·5
Muriates of soda and potash . . .	36·5	37·5
	53·	62·

Of late years, the manufacture of kelp, like that of barilla, has been almost abandoned, except as a source of iodine. A few years since, in the Orkney Islands alone, about 20,000 persons were occupied in its manufacture. (Greville.) See *Barilla* and *Alkalimetry.*

KERMES. Syn. *Kermes-grains, Alkermes; Granum Tinctorium,*—Lat. The dried bodies of the female *coccus ilicis of* Linnæus, a small insect of the order hemiptera, which flourishes on the *quercus ilex.* It has been used as a red and scarlet dye-stuff ever since the time of Moses; but is now superseded in this country by cochineal, which gives colours of much greater brilliancy.

KERMES MINERAL. Syn. *Kermes Minerale, K. Mineralis,*—Lat. *Prep.* 1. *In the humid way.—a.* (P. Cod.) *Carbonate of soda* (cryst.), 128 parts, (*say,* 21 parts,) is dissolved in *water,* 1280 parts, (*say,* 210 parts,) contained in a cast iron pan; *tersulphuret of antimony* (in fine powder), 6 parts, (*say*, 1 part,) is next added, and the whole boiled for an hour, with constant agitation with a wooden spatula; the boiling liquid is then filtered into a *heated* earthen pan containing a small quantity of *very hot water*, and the solution is allowed to cool as *slowly as possible;* the red powder which is deposited is collected on a cloth, on which it is well-washed with *cold water*, and the superfluous water being removed by pressure, the powder is dried by a gentle heat, and is, lastly, passed through a fine silk-gauze sieve, and preserved from light and air.

b. (*Wholesale.*) From *black sulphuret of antimony*, 4 *lb.*, *carbonate of potassa*, 1 *lb.;* boil in *water*, 2 gall., for half an hour, filter, &c., as before. The undissolved portion of sesquisulphuret of antimony may be boiled again several times with *fresh potassa* and *water*, until the whole is dissolved. Inferior to the last.

c. (*Cluzell's Kermes.*) From *tersulphuret of antimony*, 4 parts; *crystallized carbonate of soda*, 90 parts; *water*, 1000 parts; boil, &c., as in 1, *a*, and dry the powder folded up in paper, at a heat not exceeding 90° Fahr.

2. In the dry way.—*a.* (*Kermes igne paratum,*—P. Cod.) *Carbonate of potassa*, 100 parts; *tersulphuret of antimony*, 50 parts; *sulphur*, 3 parts; mix, fuse in a Hessian crucible, pour the melted mass into an *iron mortar*, and when cold reduce it to powder; next boil it in *water*, 1000 parts, contained in an iron vessel, filter the solution, and otherwise proceed as before. *Product;* large, but of inferior quality.

b. (Fownes.) From *tersulphuret of antimony*, 5 parts; *carbonate of soda* (dry), 3 parts; *water*, 80 parts; fuse, &c., as before. Nearly equal to 1, *a*.

c. (Berzelius.) *Carbonate of potassa* (pure), 3 parts; *tersulphuret of antimony*, 8 parts; *water*, q. s. Resembles the last.

Prop., &c. An odourless, tasteless powder, insoluble in both water and alcohol, and, when pure and carefully prepared, entirely soluble in hydrosulphuret of ammonia. As prepared by the formulæ 1, *a*, & 1, *c*, it is a very dark crimson powder, of a velvety smoothness; but that from the other formulæ has a brownish-red colour, more or less deep. The secret of preparing this compound of a fine and velvety quality, like that imported from the Continent, consists simply in filtering the solution whilst *boiling hot*, and allowing it to cool *very slowly*, by placing the vessel in an appropriate situation for that purpose. Another important point, according to Rose, is to employ sufficient alkali to keep the *whole* of the teroxide of antimony in solution as the liquid cools, instead of allowing a part of it to be deposited with the kermes. This is the reason of the superior quality and mildness of that prepared according to the directions of the French Codex. The liquor decanted from the *kermes mineral* yields the *golden sulphuret of antimony* on the addition of an acid, for which purpose the *acetic* is generally employed.

Kermes mineral is an amorphous tersulphuret of antimony, combined with a small portion (probably accidental) of teroxide of antimony. It is a *hydrated oxysulphuret of antimony*, (Gay-Lussac;) *a hydrated amorphous tersulphuret*, (Berzelius; Fuch;) an *amorphous tersulphuret of antimony* combined with some *sulphantimoniate* of either *sodium* or *potassium.* (Rose.) *Dose.* ½ gr. to 3 or 4 gr.; as a diaphoretic, cathartic, or emetic. It occupies in foreign practice the place of our James's Powder.

KETCHUP. Syn. *Catchup*, *Catsup*, *Katchup.* The juice of certain vegetables strongly salted and spiced, so as to be used as sauce.

Camp ketchup. Take of *good old beer*, 2 quarts; *white wine*, 1 quart; *anchovies*, 4 *oz.;* mix, heat it to the boiling point, remove it from the fire, and add of *peeled shalots*, 3 *oz.; mace*, *nutmegs*, *ginger*, and *black pepper*, of each, bruised, ½ *oz.;* macerate for 14 days, with frequent agitation, then allow it to settle, and decant and bottle the clear portion.

Cucumber ketchup. From *ripe cucumbers*, in the same way as *mushroom ketchup.* Very luscious. Mixed with cream, or melted butter, it forms an excellent *white sauce* for fowls, &c.

Marine ketchup. Take of *strong old beer*, 1 gall.; *anchovies*, 1½ *lb.; peeled shalots* (crushed), 1 *lb.; bruised mace*, *mustard seed*, and *cloves*, of each, ½ *oz.; bruised pepper* and *ginger*, of each, ¼ *oz.; mushroom ketchup* and *vinegar*, of each, 1 quart; heat the mixture to the boiling point, put it into a bottle, and macerate for 14 days, frequently shaking; then strain through flannel, and bottle it for use. Excellent with anything; like the last, it makes good *white sauce*, and keeps well.

Mushroom ketchup.—*a.* Sprinkle *mushroom flaps*, gathered in September, with *common salt*, stir them occasionally for 2 or 3 days, then lightly squeeze out the juice, and add to each gallon, *cloves* and *mustard seed*, of each, bruised, ½ *oz.: allspice, black pepper*, and *ginger*, of each, bruised, 1 *oz.;* gently heat to the boiling point in a covered vessel, macerate for 14 days, and decant or strain. Should it exhibit any indications of change in a few weeks, bring it again to the boiling point, with a *little more spice*, and a *table-spoonful* more *salt.*

b. Take of *mushroom juice*, 2 gall.; *pimento*, 2 *oz.; cloves, black pepper, mustard seed*, and *ginger*, of each, bruised, 1 *oz.; salt*, 1 *lb.* (or to taste); *shalots*, 3 *oz.;* gently simmer for 1 hour in a covered vessel, cool, strain, and bottle.

c. Take of *mushroom juice*, 100 gall.; *black pepper*, 9 *lb.; allspice*, 7 *lb.; ginger*, 5 *lb.; cloves*, 1 *lb.;* (all bruised;) *salt*, q. s.; gently simmer in a covered tin boiler for 1 hour.

Oyster ketchup. Pulp the *fish*, and to each pint, add of *sherry wine*, or *very strong old ale*, 1 pint; *salt*, 1 *oz.; mace*, ¼ *oz.*; *black pepper*, 1 *dr.*; simmer very gently for 10 minutes, strain, cool, bottle, and to each bottle add a spoonful or two of *brandy*, and keep them in a cold situation. *Cockle ketchup* and *muscle ketchup* are made in the same way. *Used* to flavour sauces when the fish are out of season; excellent with rump steak, &c.

Pontac ketchup. Take of the *juice of elderberries* and *strong vinegar*, of each, 1 pint; *anchovies*, ½ *lb.; shalots* and *spice*, q. s. to flavour; boil for 5 minutes, cool, strain, and bottle. *Used* to make *fish sauces.*

Tomato ketchup. Prepared from *tomatoes* or *love apples*, like *mushroom ketchup*, except that a little *very strong Chili vinegar* is commonly added. An admirable relish for "high" or rich flavoured viands.

Walnut ketchup.—a. Take of the *expressed juice of young walnuts* when tender, 1 gall.; boil 10 minutes, skim, add of *anchovies*, 2 *lb.; shalots*, 1 *lb.; cloves* and *mace*, of each, 1 *oz.;* 1 clove of *garlic*, sliced; simmer in a covered vessel for 15 minutes, strain, cool, and bottle, adding a little *fresh spice* to each bottle, and *salt*, q. s. Will keep good in a *cool* place for 20 years.

b. Take of *green walnut-shells*, 16 gall.; *salt*, 5 *lb.;* mix and beat together for a week, press out the liquor, and to *every gallon* add of *allspice*, 4 *oz.; ginger*, 3 *oz.; pepper* and *cloves*, of each, 2 *oz.;* all bruised; simmer for half an hour, and set aside in a closed vessel and in a cool situation until sufficiently clear.

c. Take of *walnut-juice*, 1 gall.; *vinegar*, 1 quart; *British anchovies* (sprats), 3 or 4 *lb.; pimento*, 3 *oz.; ginger*, ¼ *oz.; long pepper*, ½ *oz.; cloves*, 1 *oz.; shalots*, 2 *oz.;* boil and bottle, as before.

d. From the *juice of walnut-shells*, 30 gall.; *salt*, 1 bushel; *allspice* and *shalots*, of each, 6 *lb.; ginger, garlic*, and *horse-radish*, of each, 3 *lb.; essence of anchovies*, 3 gall.; as before.

Wine ketchup. Take of *mushroom* or *walnut ketchup*, 1 quart; *chopped anchovies*, ½ *lb.;* 20 *shalots; scraped horse-radish*, 2 *oz.; spice*, q. s.; simmer for 15 minutes, cool, and add of *white* and *red wine*, of each, 1 pint; macerate for 1 week, strain, and bottle.

Obs. In preparing the above articles vessels of *glazed earthenware*, or *stoneware*, or *well-tinned copper pans* should alone be used to contain them whilst being boiled or heated, as salt and vegetable juices *rapidly corrode* copper, and render the ketchup *poisonous.* Nothing in the shape of *copper, lead*, or *pewter* should be allowed to touch them. *Even* a *plated copper spoon* left in a bottle of ketchup for some time will render its contents *poisonous.* Unpleasant and even dangerous fits of vomiting, colic, and diarrhœa, have resulted from the neglect of this precaution. See *Sauces, &c.*

KIBES. The vulgar name for ulcerated chilblains. (See *p.* 236.)

KIDNEYS. Syn. *Renes*,—Lat. The kidneys, as almost every one knows, are abdominal viscera which secrete the urine, and form the great channels by which the effete nitrogenous matter is removed from the blood. They are subject to various affections, both functional and organic, chronic and acute, of which some are imperfectly understood, and others only admit of alleviation, but not of being cured. Under the heads "*Urine*" and "*Urinary Organs*" will be found some remarks in connection with this subject which will prove highly serviceable to the emigrant, and to other parties beyond the reach of the assistance of a duly-qualified medical practitioner.

KIDNEYS. Soyer recommends kidneys to be dressed by gently broiling them, having previously split them, "so as nearly to divide them, leaving the fat in the middle," and "run a skewer through them, that they may remain open." After being rubbed with a little *butter*, and seasoned with *salt* and *pepper*, "they may be served on toast, or with any sauce." "You may also egg and bread-crumb them." "Five minutes suffice for a sheep or lamb's kidney of common size." (Soyer.) One or two lamb's kidneys plainly broiled and served up with the gravy in them, eaten along with a little dry-toasted bread, form a most excellent and appropriate luncheon or dinner for a dyspeptic or convalescent.

KINATE OF CINCHONIA. Syn. *Cinchoniæ Kinas*,—Lat. *Prep.* (Magendie.) By precipitating a *solution of sulphate of cinchonia in rectified spirit* with an *aqueous solution of kinate of lime*, filtering, evaporating the filtrate to dryness, and redissolving it, so as to obtain it in crystals. See *Cinchonia* and *Quinine.*

KING'S CUP. *Prep. Yellow peel of* 1 *lemon; lump sugar*, 1½ *oz.; cold water*, 1 pint; infuse 8 or 10 hours, and strain. The addition of a tea-spoonful of *orange-flower water* is a great improvement. *Used* as a diluent in cases where acid liquors are inadmissible. See *Lemonade.*

KING'S EVIL. See *Scrofula.*

KING'S YELLOW. See *Yellow Pigments.*

KINIC ACID. Syn. *Cinchonic Acid, Quinic Acid.* A compound discovered by Hoffmann, in 1790, in the cinchona barks, in which it exists associated with the alkaloids. It is readily obtained from *kinate of lime*, by the action of *dilute sulphuric acid;* the filtered solution evaporated to the consistence of a syrup, gradually deposits large crystals resembling those of tartaric acid.

Prop., &c. It is soluble in 2 parts of water, and in alcohol; and forms salts called *kinates. Kinate of lime* is obtained from an acidulated infusion of cinchona bark, by adding an excess of lime, filtering, evaporating to a syrup, and setting the liquid aside to crystallize. These crystals are purified by redissolving them, treating the solution with a little animal charcoal, and crystallizing the salt as before. The *liquid* from which the bark-alkaloids have been precipitated by hydrate of lime, affords an almost inexhaustible supply of this salt. See *Kinone.*

KINO. Syn. *Gum Kino; Kino* (Indicum),—Ph. L. E. & D. "The juice flowing from the incised bark" of the "*pterocarpus marsupium*" or *Indian kino-tree*, "hardened in the sun." (Ph. L.) The "concrete juice of *pterocarpus marsupium*, and of other undetermined genera and species." (Ph. E.) *Dose.* 10 to 30 gr., in powder; as an astringent in chronic diarrhœa, &c. It is regarded as less useful than catechu.

A *factitious kino*, met with in the shops, is made as follows:—*Logwood*, 48 *lb.; tormentil root*, 16 *lb.; madder root*, 12 *lb.;* exhaust by coction with *water*, q. s., to the liquor add of *catechu*, 16 *lb.;* dissolve, strain, and evaporate to dryness. *Prod.* 24 *lb. Extract of mahogany* is also commonly sold for kino.

KINONE. *Prep.* A mixture of *kinic acid, binoxide of manganese*, and *sulphuric acid*, are distilled together; the liquid in the receiver is a *solution* of *kinone*, from which crystals may be obtained.

Prop., &c. Yellow; crystallizable; pungent; soluble in water; vapour exceedingly irritating to the eyes; the aqueous solution treated with ammonia, and then exposed to the air, becomes at first brown, and finally black; with chlorine water it strikes a bright green colour. The presence of kinic acid in bark is readily detected by converting it into kinone. (Dr. Stenhouse.)

KINOVIC ACID. Syn. *Chiococeic Acid, Kinova Bitter.* A white amorphous substance, almost insoluble in water, but freely soluble in alcohol and ether, found by Hlasiwetz in *calisaya* and *quinquina nova bark.*

KIRSCHWASSER. Syn. *Kirschenwasser.* A spirituous liquor distilled in Germany and Switzerland from *bruised cherries.* From the rude manner in which it is obtained, and from the distillation of the cherry-stones (which contain prussic acid) with the liquor, it has usually a very nauseous *taste*, and is frequently *poisonous.*

KISH. A mixed *carburet of iron and manganese* occasionally produced in iron-smelting furnaces. It closely resembles plumbago in appearance, and is said to possess peculiar efficacy in certain forms of anæmia and chlorosis.

KITCHEN. Our friend Alexis, assures us, that one of the crying faults of our countrymen, is the employment of an apartment for the kitchen, which is either too small or inconveniently situated, and which, in general, is not sufficiently provided with "kitchen requisites." "As a workman cannot work properly without the requisite tools, or the painter produce the proper shade without the necessary colours, in like manner does every person wishing to economize his food, and to cook it properly, require the proper furniture wherewith to do it." The neglect of these matters, which is so general, is, we are told, a mischievous and deceptive economy.

KNEES (Broken). See *Veterinary Medicine.*

KNOX'S POWDER. *Prep.* From *common salt*, 8 parts; *chloride of lime*, 3 parts; mixed together. An ounce of it dissolved in a tumblerful of water, furnishes a solution which is similar to *Labarraque's disinfecting fluid.*

KŒCHLIN'S LIQUID. *Prep.* From *copper filings,* 96 gr.; *liquor of ammonia,* 2 fl. oz.; digested together until it turns of a full blue colour, and then mixed with *hydrochloric acid,* 5 fl. dr.; *distilled water,* 5 ℔. *Dose.* 1 to 2 tea-spoonfuls daily; in scrofula. It is poisonous in large doses.

KOMENIC ACID. Syn. *Comenic Acid, Parameconic do.* A compound resulting from the action of heat on meconic acid. See *Comenic Acid.*

KOOCHLA NUT. See *Nux Vomica.*

KOUMISS. A liquor prepared by the Calmucs, by fermenting *mare's milk,* previously kept until sour, and then skimmed. By *distillation* it yields a spirit called *rack, racky,* or *araka.* 21 *lb.* of *fermented milk* yield about ¾ pint of *low wines,* and this, by rectification, gives fully ¼ pint of *strong alcohol.*

KOUSSO. Syn. *Cusso, Kosso; Brayera Anthelmintica,*—Kunth. This substance is the dried flowers of an Abyssinian tree which grows to the height of about 20 feet, and belongs to the natural order *rosaceæ.* It is one of the most effective remedies known for both varieties of tape-worm. The *dose,* for an adult, is 3 to 5 dr., in powder, mixed with about half a pint of warm water, and allowed to macerate for 15 or 20 minutes. The method prescribed for its successful administration is as follows:—The patient is to be prepared by a purgative or a lavement, and the use of a very slight diet the day before. The next morning, *fasting,* a little *lemon juice* is to be swallowed, or a *portion of a lemon* sucked, followed by the *dose of kousso* (both liquid and powder) at 3 or 4 draughts, at short intervals of each other, each of which is to be washed down with *cold water acidulated with lemon juice.* The action of the medicine is subsequently promoted by drinking weak tea *without* either milk or sugar, or *water flavoured with lemon juice* or *toasted bread;* and if it does not operate in the course of 3 or 4 hours, a dose of *castor oil* or a *saline purgative* is taken.

The flavour of kousso is rather disagreeable and nauseating. Its operation is speedy and effectual; but at the same time, it is apt to produce, in large doses, great prostration of strength, and other severe symptoms, which unfit it for administration to the delicate of both sexes, or during pregnancy, or affections of the lower viscera. Care should be taken not to purchase it in powder, as owing to its high price (40*s.* to 48*s.* per *oz.* retail), it is uniformly adulterated. The *powdered kousso* of the shops, is, in general, nothing more than the *root-bark of pomegranate,* coloured and scented.

KRAMERIC ACID. A peculiar substance found by M. Peschier, of Geneva, in *rhatany root* (krameria triandria), and to which he ascribes its stypticity.

KREASOTE. Syn. *Creasote, Creosote, Kreosote; Kreasoton; Creasoton,*—Ph. L. *Creazotum,*—Ph. E. *Creasotum,*—Ph. D. & U. S. A peculiar substance discovered by Reichenbach, and so named on account of its powerful antiseptic property. It is a product of the dry distillation of organic bodies, and is the preservative principle of wood smoke and pyroligneous acid.

Prep. Creasote is manufactured from wood-tar, in which it is sometimes contained to the amount of 20% to 35%, and from crude pyroligneous acid, and pyroxilic oil.

1. (P. Cod.) *Wood-tar* is distilled in a wrought-iron retort until white vapours of *paraffine* appear; the *heavy oily matter* which forms the *lower layer* of the product, is collected, washed with *water slightly acidulated with sulphuric acid,* and then distilled in a glass retort, rejecting the first portions, which are chiefly *eupione;* the distillate is treated with a *solution of potassa* (sp. gr. 1·12), the mixed liquids being shaken strongly together; after it is settled, the layer of *eupione* which forms, is removed from the surface, and the potash-solution of creasote exposed to the air until it becomes black; it is then saturated with *dilute sulphuric acid,* the watery liquid rejected, and the remainder (consisting of *crude creasote*) submitted to distillation in glass; the treatment by *exposure, potassa, sulphuric acid,* and *distillation,* is repeated three times or oftener, until the combination of *creasote* and *potassa* ceases to become coloured by the action of the air; it is, lastly, saturated with *concentrated phosphoric acid,* and again distilled, rejecting the first portion that comes over.

2. (M. Simon.) A copper still, capable of containing 80 Berlin quarts, is filled to one third with the *oil of wood-tar,* and heat is applied; *first,* the more volatile matters pass over; these do not contain creasote, and are, therefore, rejected; but when, by gradually increasing the temperature, there passes over a very acid liquid, which becomes turbid, and at the same time an oil separates from it when mixed with water, the product is collected, and the distillation continued until the operator notices a squirting in the still, when this part of the

process is complete; the *distilled product* is then *nearly* saturated with *potassa*, and returned to the still, which, in the mean time, has been well cleaned out, and about half-filled with *water*, and the distillation is recommenced; at first an oil comes over, which floats on water, and which consists chiefly of *eupione*, and is, therefore, rejected; as soon, however, as the oil begins to sink in the water which comes over with it, it is charged with creasote, and is carefully collected; the distilling *aqueous* fluid being reintroduced, from time to time, into the still, and the distillation continued so long as any oil continues to come over with it; the heavy oily distillate is now agitated with *liquor of potassa*, sp. gr. 1·120; the portion which remains undissolved is *eupione*, and is skimmed off; the *potassa-solution of creasote* still, however, contains a considerable quantity of *eupione*, the greater portion of which may be separated by dilution and distillation with an *equal quantity*, or with at least ⅘ths of its volume of *water*, fresh *water* being added from time to time, as long as any *eupione* comes over with the distilled liquor; when this has ceased to pass over, *sulphuric acid* is poured into the still in quantity exactly sufficient to saturate ⅓rd only of the *potassa* formerly employed, and the distillation is again renewed; *creasote* now distils over, the *first* portions of which, however, still contain *eupione*, after which *pure creasote* follows; that is to say, "a creasote which, when mixed with 6 or 8 times its quantity of a *solution of pure potassa*, furnishes a mixture which, by the addition of any further quantity whatever of water, does not become turbid." The combination of creasote remaining in the still is now mixed with sulphuric acid in slight excess, and the distillation renewed, the water coming over with it being from time to time returned into the still; and when no further oil passes over with the water, the process is complete. The creasote thus obtained is re-distilled with the water which has passed over with it, whilst the distilled water, as before, is allowed from time to time to run back into the still. The creasote thus obtained is then colourless; but it contains a considerable quantity of water in solution, which is separated by distillation in a glass retort. The water distils first, and then creasote, which, after cleaning the neck of the retort from the water, must be received in another dry receiver. If the creasote assumes a red colour after being exposed for some time to the air, it must be re-distilled, and then it keeps very well. Korne found that tar prepared from turf, furnishes much more creasote than that from fir-wood, &c. (Berzelius' Lehr.)

3. (Ure.) In operating upon *pyroligneous acid*, if we dissolve *effloresced sulphate of soda* in it to saturation, at the temperature of 267° Fahr., the creasote separates, and floats upon the surface; it is then decanted, and left in repose for some days, during which it deposits a fresh portion of salt and vinegar; it is next saturated whilst hot with *carbonate of potassa*, and distilled along with water; a pale yellow oily liquid passes over, which is rectified with *phosphoric acid, &c.*, like the crude product of creasote from tar.

Prop. Creasote is a colourless, transparent liquid, heavier than water, of a peculiar, unpleasant, penetrating odour, resembling that of smoked meat, and a very pungent and caustic taste; its vapour irritates the eyes; it boils at 397° Fahr., and is still fluid at —16·6° Fahr.; it produces on paper greasy spots, which afterwards disappear; dissolves in 80 parts of water, and mixes in all proportions with spirit of wine, ether, the essential and fatty oils, acetic acid, naphtha, carburet of sulphur, ammonia, and potassa; it dissolves iodine, phosphorus, sulphur, resins, the alkaloids, indigo blue, several salts (especially the acetates and the chlorides of calcium and tin); reduces the nitrate and acetate of silver; is resinified by chlorine, and decomposed by the stronger acids. The aqueous solution is neutral, and precipitates solutions of gum and the white of eggs. It kindles with difficulty, and burns with a smoky flame. When quite pure it is unaltered by exposure to the air. Sp. gr. 1·037, at 68° Fahr.

Pur. The fluid commonly sold in the shops for creasote is a mixture of creasote, picamar, and light oil of tar; in many cases it is little else than impure carbolic acid, with scarcely a trace of creasote. Pure creasote is *perfectly soluble* in both acetic acid and liquor of potassa; shaken with an equal volume of water in a narrow test tube, not more than the 1-80th part disappears; otherwise it contains water, of which creasote is able to assume $\frac{1}{10}$th, without becoming turbid.—If it can be dissolved completely in 80 parts by weight of water, at a medium temperature, it then forms a perfectly neutral liquid.—An oily residue floating on the surface betrays the presence of other foreign products (*eupione, capnomor, picamar*), which are obtained at the same time with the creasote during the dry distillation of organic substances.

The specific gravity of picamar is 1·095, of paraffine 0·87, of capnomor 0·977, and of eupione 0·655. The first of these is readily detected by agitating the sample with strong liquor of potassa, when, if it is present in any quantity, the mixture solidifies into a mass of crystals in about 24 hours. Eupione may be discovered by its little solubility in liquor of potassa.

Creasote is "devoid of colour, has a peculiar odour, and is soluble in acetic acid. When it is dropped on bibulous paper, and a boiling heat is applied for a short time, it entirely escapes, leaving no transparent stain." (Ph. L.) "Entirely and easily soluble in its own weight of acetic acid." (Ph. E.) Sp. gr. 1·046 (Ph. L.), 1·066 (Ph. E. & D.) The density and boiling-point of absolutely pure creasote is given above. (See *Prop.*, *&c.*)

Uses. Creasote has been recommended in several diseases of the organs of digestion and respiration, in rheumatism, gout, torpid nervous fever, spasms, diabetes, tape-worm, &c.; but its use has not, in general, been attended with satisfactory results. It is given in the form of pills, emulsion, or an ethereal or spirituous solution. *Externally* it has been employed in various chronic diseases of the skin, sores of different kinds, mortification, scalds, burns, wounds (as a styptic), caries of the teeth, &c.; mostly in the form of an aqueous solution (1 to 80); or mixed with *lard* (5 drops to 1 dr.) as an ointment; dissolved in *rectified spirit*, it forms a useful and a popular remedy for toothache arising from decay or rottenness. In the *arts*, creasote is extensively employed to preserve animal substances, either by washing it over them or by immersing them in its aqueous solution. A few drops in a saucer, or on a piece of spongy paper, if placed in a larder, will effectually drive away insects, and make the meat keep several days longer than it otherwise would. A small quantity added to brine or vinegar is commonly employed to impart a smoky flavour to meat and fish, and its solution in acetic acid is used to give the flavour of *whiskey* to *malt spirit.*

KREATINE. Syn. *Creatine.* A crystallizable substance obtained from the juice of the muscular fibre of animals. It was first observed by Chevreul, but has recently been carefully studied by Liebig.

Prep. (Liebig.) *Lean flesh* is reduced to shreds, and then exhausted with successive portions of cold water, employing pressure; the mixed liquid is heated to coagulate the albumen and colouring matter of the blood, and is then strained through a cloth; pure *baryta water* is next added as long as a precipitate forms, the liquid is filtered, and the filtrate is gently evaporated to the consistence of a syrup; after repose for some days in a warm situation, *crystals of kreatine* are deposited; these are purified by redissolving them in water, agitating the solution with animal charcoal, and evaporating, &c., so that crystals may form.

Prop., *&c.* Brilliant, colourless, prismatic crystals; readily soluble in boiling water, sparingly so in cold water and in alcohol; the aqueous soluton is neutral, bitter tasted, and soon putrefies.

KREATININE. This substance exists in small quantities both in the juice of flesh and in conjunction with kreatine in urine. It is also produced by the action of the *stronger acids* on *kreatine.* It forms colourless prismatic crystals, which are soluble in water, and the solution has a strongly alkaline reaction. It is a powerful organic base, and produces crystallizable salts with the acids.

KRENIC ACID. Syn. *Crenic Acid.* A brown substance, discovered by Berzelius, in certain mineral waters. It is a modification of humus, and is produced by the decay of vegetable matter. *Apocrenic acid* is a nearly similar compound.

KRUMMHOLZOL. Syn. *Oleum Templinum.* An essential oil, obtained in Hungary, from the young branches of the mountain pine (*pinus pumilio*) by distilling them along with *water.*

KRYSTALLINE. The name originally applied by Unverdorben to aniline.

KUSTITIEN'S METAL. *Prep.* Take of *malleable iron*, 3 parts; heat it to whiteness, and add of *antimony*, 1 part; *Molucca tin*, 72 parts; mix under charcoal, and cool. *Used* to coat iron and other metals with a surface of tin; it polishes without a blue tint; is hard, and has the advantage of being free from lead and arsenic.

KYANIZING. A method of preserving *wood* and *cordage* from decay, long known and practised, but patented by Mr. Kyan, a few years since. It consists in immersing the bodies in a solution of *corrosive sublimate*, 1 part, and *water*, 50 or 60 parts, either under strong pressure or the contrary, as the urgency of the case, or the dimensions of the bodies operated on may require.

KYANOL. A substance obtained from *coal-tar oil*, and at first thought to be an independent principle, but since shown to be identical with *aniline.*

LABARRAQUE'S FLUID. See *Chloride of Soda.*

LABDANUM. Syn. *Ladanum.* An odorous, resinous substance found on the leaves and twigs of the *cystus creticus,* a plant growing in the island of Candia, and in Syria. It was formerly much used for making stimulating plasters. The following compound is often vended for it:—

LABDANUM (Factitious). *Prep.* From *gum anime, rosin, Venetian turpentine,* and *sand,* of each, 6 parts; *Spanish juice* and *gum arabic,* of each (dissolved in a little water), 3 parts; *Canada balsam,* 2 parts; *ivory black,* 1 part; *balsam of Peru,* q. s. to give a faint odour.

LABELS which are *insoluble,* and capable of *resisting* the action of *oils, spirits, water, syrups,* and *dilute acids,* may be obtained as follows:—Lay a coat of *strained white of egg* over the label (an ordinary paper one), and immediately put the vessel into the upper portion of a common steam-pan, or otherwise expose it to a gentle heat till the albumen coagulates and turns opaque, then take it out and dry it before the fire, or in an oven, at a heat of about 212° Fahr.; the opaque white film will then become hard and transparent. The *labels on bottles* containing *strong acids* or *alkaline solutions,* should be either etched upon the glass by means of *hydrofluoric acid,* or be written with *incorrodible ink.* See *Etching* and *Inks.*

LABORATORY. Syn. *Laboratorium,* Lat. A place fitted up for the performance of chemical operations.

It was our intention to have described the best mode of fitting up a chemical and a pharmaceutical laboratory, both on the *small* and *large scale,* and also to have presented the reader with a copper-plate engraving of the celebrated laboratory of Giessen, prepared expressly for this work; but owing to the doubtlessly judicious admonitions of our publisher, on account of the number of our previous pages, we are compelled to withdraw the article and illustrations. We must therefore content ourselves with recommending the reader to consult the last edition of Faraday's '*Chemical Manipulation,*' a work replete with correct and valuable information.

Among *Portable Laboratories,* the cheapest and best arranged which we have lately seen, are those of Messrs. Jackson and Townson, of No. 89, Bishopsgate Street within. The little collection sold by them under the title of "*Professor Stockhardt's Chemical Apparatus*" is truly one that deserves universal patronage. It is, indeed, a miracle of cheapness, and judicious arrangement and selection. Whilst its price places it within the reach of almost the humblest student in chemistry, its intrinsic usefulness adapts it for illustrating all the more valuable facts of chemical science, and performing all the ordinary operations of qualitative analysis. With this tube laboratory, and the collection of tests and chemicals provided by Messrs. Jackson and Townson to accompany it, as a sort of stock-in-trade to operate on, he must be really dull and indifferent who does not become at once fascinated with this delightful science, and, ere long, an adept in its leading operations.

LAC. Syn. *Lacca,*—Lat. A resinous substance combined with much colouring matter, produced by the puncture of the female of a small insect, called the *coccus lacca* or *ficus,* upon the young branches of the *ficus Indica, croton lacciferum,* and some other trees. There are several varieties:—Stick lac (*lacca in ramulis, lacca in baculis*); seed lac (*lacca in granis, lacca in seminis*); lump lac (*lacca in massis*); shell lac (*lacca in tabulis*). The preceding differ chiefly in colour and form. *Shell lac* is the kind most generally used. The palest is the best, and is known as "*orange-lac.*" The darker varieties—"*liver-coloured,*" "*ruby,*" "*garnet,*" *&c.,* respectively diminish in value in proportion to the depth of their colour.

Uses, &c. Lac was formerly used in medicine, and was said to be calefacient, attenuant, aperient, diaphoretic, and diuretic. Its only action, if any, was, however, that of a very mild astringent. It is now only used in *dentifrices, varnishes, lacquers,* and *sealing wax,* and to make *toys* and *trinkets.*

LAC (Bleached). Syn. *White Lac; Lacca Alba.* By dissolving *lac* in a boiling lye of *pearlash* or *caustic potassa,* filtering and passing *chlorine* through the solution until all the lac is precipitated; this is collected, well-washed and pulled in *hot water,* and finally, twisted into sticks, and thrown into *cold water* to harden. *Used* to make pale varnishes and the more delicate coloured sealing wax.

LAC DYE. A colouring substance used to dye scarlet, imported from the East Indies in small cubical cakes. It is prepared by digesting *ground stick lac* in *water,* and evaporating the coloured infusion to dryness.

LAC LAKE. Syn. *Lac Colour, East Indian Cochineal.* A superior kind of *lac dye,* also imported, prepared by dissolving out the *colour* of *ground stick lac* by means of a *weak alkaline solution*, and then precipitating it along with *alumina* by adding a *solution of alum.*

Obs. Either of the above dissolved in an equal weight of *lac spirit*, by digestion for about 6 hours, and then added to *hot water*, along with about as much *tartar* as lac dye, ½ that quantity of *ground sumach*, and about ⅓rd of *solution of tin*, dyes cloth of a brilliant scarlet colour. 1 *lb.* of good *lac dye* is sufficient for 10 *lb.* of *cloth.* In some cases the stuff is first *yellowed* with *quercitron.*

LAC SPIRIT. See *Solutions of Tin.*

LACCID ACID. A crystalline wine-yellow coloured, sour substance, soluble in water, alcohol, and ether, extracted by Dr. John from stick lac. It forms salts called *laccates* with the bases.

LACCINE. A substance discovered in shell lac by Unverdorben. It is the portion left after all the matters soluble in water, ether, and alcohol, have been dissolved out. It is brittle, yellow, translucent, soluble in caustic potassa and in sulphuric acid.

LACE. See *Muslin.*

LACQUER. A solution of *shell lac* in *alcohol*, tinged with *saffron*, *annotto*, *aloes*, or other *colouring* substances. It is applied to wood and metals to impart a golden colour. See *Varnish.*

LACTALBUMEN. See *Caseine.*

LACTAMIDE. A compound of *lactide* and *ammonia.* It is colourless, soluble, and crystallizable.

LACTATE. Syn. *Lactas,*—Lat. A salt of lactic acid. The *lactates* are characterised by yielding an enormous quantity of perfectly pure *carbonic oxide gas* when heated with 5 or 6 parts of *oil of vitriol.* Most of these salts may be directly formed by the solution of the *hydrated oxide* or *carbonate of the base* in the *dilute acid.* The *lactates* of *ammonia*, *potassa*, *soda*, *lime*, *baryta*, *alumina*, *zinc*, *nickel*, *lead*, *mercury*, *magnesia*, *iron*, *copper*, *silver*, and of some other bases, have been formed and examined, but only those of *iron* and *zinc* have been used in medicine.

LACTATION. See *Infancy*, *Nursing*, *&c.*

LACTIC ACID. Syn. *Acid of Milk; Nanceic Acid,*— Braconnot (?); *Acidum Lacticum*, *A. Lactis,*—Lat. A sour syrupy liquid discovered by Scheele in whey. It is also found in some other animal fluids, and in several vegetable juices, especially in that of beet root.

Prep. 1. Dissolve *lactate of baryta* in *water*, precipitate the *baryta* with *dilute sulphuric acid*, carefully avoiding excess, and gently evaporate to the consistence of a syrup, or until it acquires the density 1·215. *Lactate of lime* may be used instead of lactate of baryta, in which case a *solution of oxalic acid* must be employed as the precipitant. Pure.

2. *Milk* (skimmed or stale), 1 gall.; *bicarbonate of soda*, ½ *lb.;* dissolve, and expose the liquid to the air for some days, until it becomes sour, then saturate the excess of acid with some more *bicarbonate of soda*, and again expose it to the air; repeat this as often as the liquid becomes sour; next heat the liquid to the boiling point, filter, evaporate to the consistence of a syrup, and exhaust the residuum with *rectified spirit;* filter the alcoholic solution, add *sulphuric acid* as long as it causes a precipitate to form, again filter, and evaporate the clear liquid, as before.

3. (Boutron and Fremy.) *Milk*, 3 or 4 quarts; *sugar of milk*, 200 to 300 gr.; mix, and expose for 2 or 3 days in an open vessel at 70° to 80° Fahr., then saturate with *bicarbonate of soda*, again expose at a moderate temperature, saturate with more *bicarbonate of soda*, and repeat the process until the whole of the sugar of milk is decomposed; then coagulate the casein by heat, filter, evaporate, extract the *acid lactate of soda* by *alcohol* of sp. gr. 0·810, and decompose it by the cautious addition of *dilute sulphuric acid;* again filter, distil off the alcohol, and evaporate as before.

4. (Scheele.) Evaporate *sour whey* to ⅛th of its bulk, saturate with *slaked lime*, filter, add 3 or 4 times the quantity of *water*, cautiously precipitate the *lime* with a *solution of oxalic acid*, filter, and gently evaporate to dryness in a water-bath; digest the residuum in strong *rectified spirit*, and again filter and evaporate.

5. (Wholesale.)—*a.* Good *raw cane-sugar*, 7 *lb.*, is dissolved in *milk* (skimmed or stale), 2 gall., and *cheese* (in a moist or putrescent state), ½ *lb.*, and *chalk*, 4 *lb.*, previously rubbed to a cream with *water*, 1½ gall., is then added; the mixture is next exposed in a loosely-covered jar, at a temperature of 80° to 86° Fahr., with occasional stirring, for 2 or 3 weeks, or until the whole is converted into a semi-solid mass of crystals of *lactate of lime;* this is purified either by draining off and expressing the liquid portion, dissolving the residue in water, and evaporating the solution for crystals; or the whole is put into a stoneware vessel and heated to the boiling point, by which the *caseine* is coagulated, and the *lactate of lime* is dissolved; the solution, fil-

tered whilst hot, furnishes the salt in crystals on cooling; these crystals are subsequently dissolved in *water*, and the filtered solution decomposed by *oxalic acid*, as before.

b. From *cane-sugar*, 4 parts; *moist cheese*, 1 part; *chalk*, 3 parts; *water*, 20 parts; as the last.

Prop. The syrupy liquid obtained as above is *hydrated lactic acid;* it is heavier than water, soluble in water, alcohol, and ether, exhibits the usual acid properties, and forms salts with the bases, called *lactates.* Heated in a retort to 266° Fahr., a small portion distils over, and the residuum on cooling concretes into a yellowish, solid, fusible mass of *anhydrous lactic acid*, which has a very bitter taste, and is nearly insoluble in water. By long boiling in water, this substance is reconverted into hydrated lactic acid. Heated to 480° Fahr., it suffers decomposition, *lactide* (the *anhydrous*, *concrete*, or *sublimed lactic acid* of former writers) and other products being formed. This new substance may be purified by pressure between bibulous paper and solution in *boiling alcohol*, from which it separates in dazzling white crystals on cooling. By solution in hot water and evaporation to a syrup, it furnishes *pure hydrated lactic acid.*

Uses. Lactic acid has been given in dyspepsia, gout, phosphatic urinary deposits, &c. From its being one of the natural constituents of the gastric juice, and from its power of dissolving a considerable quantity of phosphate of lime, it appears very probable that it may prove beneficial in the above complaints. *Dose.* 1 to 5 gr.; in the form of lozenges, or solution in sweetened water.

Obs. The *products* of the last five of the above formulæ may be rendered quite pure by dilution with *water*, saturation with *baryta*, evaporation, crystallization, re-solution in *water*, and the careful addition of *dilute sulphuric acid* as before; the liquid is, lastly, again filtered and evaporated. *Another plan* is to convert the acid into *lactate of zinc*, and to redissolve this last salt in *water*, and to decompose the solution with a stream of *sulphuretted hydrogen.* In all cases the evaporation should be conducted at a very gentle heat, and, when possible, finished over sulphuric acid, or in vacuo. For very nice purposes, this last product may be dissolved in *ether*, filtered, and the ether removed by a very gentle heat. Care must also be taken to remove the *solid lactate of lime* at the proper period from the fermenting liquid, as otherwise it will gradually redissolve and disappear, and on examination the liquid will be found to consist chiefly of a solution of *butyrate of lime.*

LACTIC FERMENTATION. The peculiar change by which saccharine matter is converted into lactic acid. Nitrogenous substances which in an advanced state of putrefactive change act as alcohol-ferments, often possess, at certain periods of their decay, the property of inducing an *acid* fermentation in sugar, by which that substance is changed into *lactic acid.* Thus, the nitrogenized matter of malt, when suffered to putrefy in water for a few days only, acquires the power of *acidifying* the sugar which accompanies it; whilst in a *more advanced state of decomposition* it converts, under similar circumstances, the *sugar* into *alcohol.* The glutin of grain behaves in the same manner. Wheat flour, made into a paste with water, and left for four or five days in a warm situation, becomes a true *lactic acid ferment;* but if left a day or two longer, it changes its character, and then acts like common yeast, occasioning the ordinary *panary* or *vinous fermentation.* Moist animal membranes, in a slightly decaying condition, often act energetically in developing lactic acid. The rennet employed in the manufacture of cheese, furnishes a well-known example of this class of substances.

In preparing *lactic acid* from *milk*, the acid formed, after a time coagulates and renders insoluble the caseine, and the production of the acid ceases. By carefully neutralizing the free acid by carbonate of soda, the caseine becomes soluble, and, resuming its activity, changes a fresh quantity of sugar into lactic acid, which may be also neutralized, and by a sufficient number of repetitions of this process all the sugar of milk present may, in time, be acidified. This is the rationale of the common process by which lactic acid is obtained. *Cane-sugar* (probably by previously becoming grape-sugar) and the *sugar of milk*, both yield lactic acid; the latter, however, most readily, the grape-sugar having a strong tendency towards the alcoholic fermentation. If the lactic fermentation is allowed to proceed too far, the second stage of the process of transmutation commences, hydrogen gas and carbonic acid gas are evolved, and the *butyric fermentation*, by which oily acids are formed, is established.

LACTIDE. See *Lactic Acid.*

LACTINE. See *Sugar of Milk.*

LACTOMETER. Syn. *Galactometer.* An instrument for ascertaining the quality of milk. The best way of *testing milk* is to place it in a long *graduated tube* or *lactometer*, and to allow it to remain until all the cream has separated, then to decant off the *clear whey*, and to take its *specific gravity;* the result of the two operations when compared with the known quantity of cream and the density of the whey of an average sample of milk gives the value of the sample tested.

LACTONE. A colourless volatile liquid, boiling at 198° Fahr., formed with *lactide* and other products, when lactic acid is submitted to a heat sufficient for its decomposition. See *Lactic Acid.*

Recently, a useful little instrument has been vended in the shops of London at the low price of 1*s.* each, under the title of "*milk tester.*" It is essentially a hydrometer which sinks to a given mark on the stem in *pure water*, and floats at another mark at the opposite end of the scale, in *pure milk.* The intermediate space indicates the quantity of water (if any) employed to adulterate the article.

LACTUCARIUM. Syn. *Lettuce Opium, Thridace*; *Lactucarium,* — Ph. E. & D. The inspissated milky juice of the *lactuca sativa* (common garden lettuce), or the *lactuca virosa* (strong-scented wild lettuce), obtained, by incision, from the flowering stems, and dried in the air. M. Arnaud, of Nancy, adopts the following method of procuring this substance, which appears to be the most productive and simple of any yet published:— Before the development of the lateral branches, the *stems of twelve plants* are cut, one after another, a little below the commencement of these branches; returning to the *first one*, a *milky exudation* is found on the cut portion, and on that which remains fixed in the earth; this milky exudation is adroitly collected with the end of the finger (or with a bone knife), which is afterwards scraped on the edge of a small glass; the same operation is performed on *twelve other heads,* and so on; on the third day it is repeated on every portion of the plant remaining in the ground, a thin slice being first cut off the top; this is done every day until the root is reached. As soon as the lactucarium is collected, it coagulates; the harvest of each day is divided into small pieces, which are placed on plates, very near each other, but without touching, and allowed to dry for two days, after which they are set aside in a bottle. In this way 15 or 20 times the ordinary product is obtained. (Journ. de Pharm. et de Chim.)

Prop., *&c.* Lactucarium is anodyne, hypnotic, antispasmodic, and sedative, allaying pain and diminishing the force of the circulation. It has been recommended in cases in which opium is inadmissible, and has been administered with advantage in chronic rheumatism, colic, diarrhœa, asthma, the troublesome cough of phthisis, the irritability and watchfulness in febrile disorders, &c. *Dose.* 2 to 5 gr.; made into pills, lozenges, or tincture.

Obs. The quantity of lactucarium obtained from an average-sized plant of the following species is—*lactuca sativa,* 17 gr.; *l. scariola,* 23 gr.; *l. virosa,* 56 gr. (Schültz, *Buchner's Repert.*, 1823.)

LACTUCERINE. Syn. *Lactucon, Lettuce Wax.* A neutral, crystallizable substance found in lactucarium. It is soluble in alcohol, ether, and the volatile and fixed oils.

LACTUCIC ACID. A substance discovered by Pfaff in the juice of the strong-scented wild lettuce. It closely resembles oxalic acid; from which, however, it differs in giving a green precipitate with the protosalts of iron, and a brown one with sulphate of copper. Walz declares it to be oxalic acid.

LACTUCINE. Syn. *Lactucinum,*—Lat. This is the active principle of lactucarium, and is found in the juice of several species of lettuce.

Prep. Exhaust *lactucarium* with hot *rectified spirit*, agitate the *tincture* with a little *animal charcoal,* filter, add a little *milk of lime,* and evaporate to dryness; digest the residuum in hot *rectified spirit,* filter, and evaporate by a gentle heat, so that crystals may form.

Prop., &c. A nearly colourless, odourless, fusible, neutral, bitter substance; sparingly soluble in cold water and in ether; but freely soluble in alcohol. It possesses feeble basic properties. Good lactucarium contains fully 20% of this substance.

LADANUM. See *Labdanum.*

LADYBIRD. The *coccinella septempunctata* (Linn.) This beautiful little insect was formerly in repute in domestic medicine as an antispasmodic and sedative, in similar cases to those in which cochineal is occasionally prescribed.

LAENNEC'S CONTRA-STIMULANT. See *Draughts.*

LAKE. *Lacca,*—Lat. Animal or vegetable colouring matter, precipitated in combination with oxide of tin or alumina; usually the latter. The term was formerly restricted to *red* preparations of this kind, but is now indiscriminately applied to all compounds of alumina and colouring matter. The term *lake,* when unqualified by an adjective, is, however, understood to apply exclusively to that prepared from cochineal.

Prep. Lakes are made—1. By adding a *solution of alum*, either alone or partly saturated with *carbonate of potassa*, to a filtered *infusion* or *decoction of the colouring substance*, and after agitation, precipitating the mixture with a *solution of carbonate of potash.*—2. By precipitating a *decoction* or *infusion of the colouring substance* made with a *weak alkaline lye*, by adding a *solution of alum.*—3. By agitating recently *precipitated alumina* with a *solution of the colouring matter*, prepared as before, until the liquid is nearly decoloured, or the alumina acquires a sufficiently dark tint. The *first* method is usually employed for *acidulous solutions* of colouring matter, or for those whose tint is *injured* by alkalies; the *second*, for those that are brightened, or at least *uninjured* by alkalies; the *third*, for those colouring matters that have a great affinity for gelatinous alumina and readily combine with it by mere agitation. By attention to these general rules, lakes may be prepared from almost all animal and vegetable colouring substances that yield their colour to water, many of which will be found to possess great beauty and permanence. The precise process adapted to each particular substance may be easily ascertained by taking a few drops of its infusion or decoction, and observing the effects of alkalies and acids on the colour. The *quantity of alum* or of *alumina* employed, should be nearly sufficient to decolour the dye liquor; and the *quantity of carbonate of potassa* should be so proportioned to the *alum* as to exactly precipitate it without leaving free or carbonated alkali in the liquid. The *first portion of the precipitate* has the *deepest colour*, and the shade gradually becomes paler as the operation proceeds. A beautiful tone of *violet*, *red*, and even *purple*, may be communicated to the *colouring matter* of *cochineal* by the addition of *nitrohydrochlorate* or *perchloride of tin;* the addition of *arseniate of potassa* (neutral arsenical salt) in like manner gives shades which may be sought for in vain with *alum* or *alumina.* After the lake is precipitated, it must be carefully collected, washed with *cold distilled water*, or the *purest rain water*, until it ceases to give out colour, and then carefully dried in the shade. In this state it forms a soft velvety powder. That of the shops is generally made up into conical or pyramidal drops (*drop lake*), which is done by dropping the moist lake through a small funnel on a clean board or slab, and drying it by a gentle heat as before. A very little *clear gum water* is commonly added to the paste to give the drops consistence when dry.

LAKE (Blue). Syn. *Lacca Cœrulea*,—Lat. Prepared from some of the *blue-coloured flowers;* fugitive. The name is also applied to *lump archil* (lacca cœrulea), to *moist alumina coloured with indigo*, and to *mixed solutions* of *pearlash and prussiate of potash*, precipitated with another *solution of sulphate of iron and alum.* These are permanent and beautiful; but are seldom used, in consequence of indigo and prussian blue supplying all that is wanted in this class of colours.

LAKE (Brazil-wood). Syn. *Drop Lake; Lacca in Globulis*,—Lat. *Prep.* 1. Take of *ground Brazil wood*, 1 *lb.;* *water*, 4 gall.; digest for 24 hours, then boil for 30 or 40 minutes, and add of *alum*, 1½ *lb.*, dissolved in a *little water;* mix, decant, strain, and add of *solution of tin*, ½ *lb.;* again mix well and filter; to the *clear liquid* add, cautiously, a *solution of salt of tartar* or *carbonate of soda*, as long as a deep-coloured precipitate forms, carefully avoiding excess; collect, wash, dry, &c., as directed above.

Obs. The product is *deep red.* By collecting the precipitate in separate portions, lakes varying in richness and depth of colour may be obtained. The first portion of the precipitated lake has the brightest colour. An excess of *alkali* turns it on the *violet*, and the addition of *cream of tartar*, on the *brownish-red.* The tint turns more on the *mellow violet red* when the solution of tin is omitted. Some persons use less, others more alum.

2. Add *washed* and *recently precipitated alumina* to a strong and filtered *decoction of Brazil wood.* Inferior to the last.

LAKE (Carminated). Syn. *Cochineal Lake, Florence do., Florentine do., Paris do., Vienna do.; Lacca Florentina*, — Lat. *Prep.* 1. The *residuum of the cochineal* left in making carmine, is boiled with *repeated portions of water*, until it is exhausted of colour; the resulting liquor is mixed with that *decanted off the carmine*, and at once filtered; some *recently precipitated alumina* is then added, and the whole gently heated, and well agitated for a short time; as soon as the alumina has absorbed sufficient colour, the mixture is allowed to settle, after which the clear portion is decanted, the lake collected on a filter, washed, and dried, as before. The decanted liquor, if still coloured, is now treated with *fresh alumina* until exhausted, and thus a lake of a second quality is obtained. Very fine.

2. To the *coloured liquor obtained from the carmine and cochineal* as above, a *solution of alum* is added, the *filtered liquor* precipitated with a *solution of carbonate of potassa*, and the lake collected and treated as before. Scarcely so good as the last.

Obs. Some makers mix a little *solution of tin* with the coloured liquor before adding the *alum* or *alumina:* this brightens the colour. The above lake is a good glazing colour with oil, but has little body. It may be made directly from a decoction of cochineal. (See below.)

LAKE (Cochineal). *Prep.* 1. *Cochineal* (in coarse powder), 1 *oz.; water* and *rectified spirit*, of each, 2½ *oz.;* digest for a week, filter, and precipitate the tincture with a few drops of *solution of tin*, added every 2 hours, until the whole of the colouring matter is thrown down; lastly, wash the precipitate in *distilled water*, and dry it. Very fine.

2. Digest *powdered cochineal* in *ammonia water* for a week, dilute the solution with a *little water*, and add the liquid to a *solution of alum*, as long as a precipitate falls, which is the lake. Equal to the last.

3. *Coarsely-powdered cochineal*, 1 *lb.; water*, 2 gall.; boil 1 hour, decant, strain, add a *solution of salt of tartar*, 1 *lb.*, and precipitate with a *solution of alum.* By adding the alum first, and precipitating the lake with the alkali, the colour will be slightly varied. Some persons use a solution of *cuttlefish-bone* in *dilute muriatic* or *nitric acid;* but this increases the expense, and yields an inferior product. All the above are sold as *carminated* or *Florence lake*, to which they are often superior.

LAKE (Green). Made by mixing *blue* and *yellow lake* together. Seldom kept in the shops, being generally prepared extemporaneously by the artist on his pallet.

LAKE (Lac). *Prep.* Boil *fresh stick-lac* in a *solution of carbonate of soda*, filter the solution, precipitate with a *solution of alum*, and proceed as before. A fine red.

LAKE (Lichen). See *Orceine.*

LAKE (Madder). Syn. *Lacca Rubiæ, L. Columbina,*—Lat. *Prep.* 1. (Sir H. C. Inglefield.) Take of *Dutch grappe* or *crop madder*, 2 *oz.;* tie it in a cloth, beat it well in *a pint of water* in a stone mortar, and repeat the process with *fresh water* (about 5 pints) until it ceases to yield colour; next boil the *mixed liquor* in an earthen vessel, pour it into a large basin, and add of *alum*, 1 *oz.*, previously dissolved in *boiling water*, 1 pint; stir well, and while stirring, pour in gradually of a strong *solution of carbonate of potash* (oil of tartar), 1½ *oz.;* let the whole stand until cold, then pour off the supernatant yellow liquor, drain, agitate the residue with *boiling water*, 1 quart (in separate portions), decant, drain, and dry. *Product*, ½ *oz.* The Society of Arts voted their gold medal to the author of the above formula.

2. Add a little *solution of acetate of lead* to a *decoction of madder*, to throw down the brown colouring matter, filter, add a *solution of tin* or *alum*, precipitate with a *solution of carbonate of soda* or of *potassa*, and otherwise proceed as before.

3. (Ure.) *Ground madder*, 2 *lb.; water*, 1 gall.; macerate with agitation for 10 minutes, strain off the water, and press the remainder quite dry; repeat the process a second and a third time; then add to the mixed liquors, *alum*, ½ *lb.*, dissolved in *water*, 3 quarts; and heat in a water-bath for 3 or 4 hours, adding water as it evaporates; next filter, *first* through flannel, and, when sufficiently cold, through paper; then add a solution of *carbonate of potassa*, as long as a precipitate falls, which must be washed until the water comes off colourless, and, lastly, dried. If the alkali be added in 3 successive doses, 3 different lakes will be obtained, successively diminishing in beauty.

LAKE (Orange). *Prep.* Take of the best *Spanish annotto*, 4 *oz.; pearlash*, ¾ *lb.; water*, 1 gall.; boil for half an hour, strain, precipitate with *alum*, 1 *lb.*, dissolved in *water*, 1 gall., observing not to add the latter solution when it ceases to produce an effervescence or a precipitate; strain, and dry the sediment in small squares, lozenges, or drops. The addition of some *solution of tin* turns this lake on the *lemon yellow;* acids *redden* it. See *Yellow Lake.*

LAKE (Red). *Prep.* Take of *pearlash*, 1 *lb.; clean shreds of scarlet cloth*, 3½ *lb.; water*, 5 gall.; boil till the cloth is decoloured, filter the decoction, and precipitate with a *solution of alum*, as before. See *Brazil-wood, Carminated, Cochineal*, and *Madder Lakes.*

LAKE (Yellow). *Prep.* 1. Boil *French berries, quercitron bark*, or *turmeric*, 1 *lb.*, and *salt of tartar*, 1 *oz.*, in *water*, 1 gall., until reduced to one-half, then strain the decoction, and precipitate with a *solution of alum.*

2. Boil 1 *lb.* of the *dye-stuff* (see *above*) with *alum*, ½ *lb.; water*, 1 gall., as before, and precipitate the decoction with a *solu-*

tion of carbonate of potash. See *Orange Lake.*

LAMB in its general qualities closely resembles mutton, of which, indeed, it is merely a younger and more delicate kind. It is well adapted as an occasional article of food for the convalescent and dyspeptic; but it is unequal, for frequent use, more especially for the healthy and robust, to the flesh of the adult animal.

"*Lamb* should be four or five months old, and weigh from thirty to forty pounds; the *fat* ought to be white and light in appearance; the flesh a faintish white, and smooth and firm to the touch." (Soyer.)

LAMINABILITY. That quality of bodies which permits of their extension in surface under a gradually increased pressure. As a property of matter its consideration belongs to *chemistry* and *physics;* whilst the process of *lamination* belongs to *metallurgy* and *engineering.* See *Metals.*

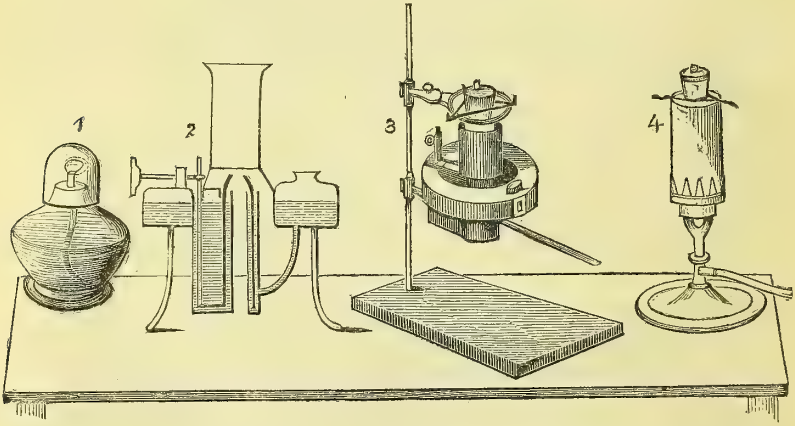
LAMP BLACK. See *Black Pigments.*

LAMPIC ACID. When the wick of a *spirit-lamp* is surrounded with a *spiral coil of platinum wire,* and after burning for a short time, is blown out, combustion still goes on, and a peculiar acid product results, which is called lampic acid by Prof. Daniell, who first observed it. It may be more easily collected by placing a small bottomless retort over a heated platinum capsule, and gradally dropping in, from time to time, a *little alcohol* or *ether.* (R. F. Marchand.) This substance consists of a mixture of acetic, formic, and aldehydic acids, in variable proportions. (MM. Stass and Marchand.) Its most remarkable property is its power of reducing certain metallic solutions. With the bases it forms salts called *lampates,* which may be prepared by saturating the acid with the hydrated oxides or carbonates. Recent researches have shown *lampic acid* (or at least its active portion) and *aldehydic* or *acetylous acid* to be identical.

LAMPREY. Syn. *Great Lamprey, Sea do.* This fish is the *petromyzon marinus* of Linnæus, of the order *pectobranchii.* Its flesh is soft and glutinous, and though esteemed a delicacy, is extremely difficult of digestion, if not otherwise unwholesome. *Potted lampreys* are usually so highly seasoned, as to become a dangerous article of food. Henry I is said to have lost his life by excessive indulgence in this dish.

LAMPS. *Oil lamps* as a source of artificial light, were employed among the nations of antiquity at the earliest period of which any information has been handed down to the present time. The Egyptians, Hebrews, Greeks, and Romans, vied with each other in the taste and elegance displayed in the external form of these useful instruments. The worker in metal made them of the choicest alloys, after patterns furnished by the most skilful artists, and the designs with which they were ornamented, were often equal in execution and beauty to the choicest productions of the modeller and sculptor in the other departments of arts. Strange, however, this care and expenditure was confined almost solely to the external embellishment of the lamp, which, in other respects, was simply a vessel to contain the oil, with a short depression or spout on the one side, on which the wick was laid. Lamps of this rude construction are still common in many countries at the present day; and we remember, that on our first visit to some of the remoter and least frequented parts of the West of England, during our early boyhood, that such lamps were common in the houses of the middle and lower classes. No important improvement in the principle and construction of lamps as a source of light occurred until a comparatively recent date; the smoke, dirt, and disagreeable odour of the common lamp having previously led to its disuse among the superior classes in favour of candles. At length, in 1780, M. Argand invented the well-known lamp which bears his name, and which was soon found capable of superseding even the best wax candles in the drawing-room, and producing a sufficient degree of heat to be available in a vast number of chemical operations. Since that time, numerous improvements have been made on this invention, referring, however, rather to detail than principle. In the Argand lamp, the wick is a thin hollow ring of woven cotton, instead of being a solid as before; and the whole is so arranged that the air passes through the centre of the hollow cylinder whilst the wick is burning, by which air is supplied to the centre of the flame. The whole is surmounted by a cylindrical glass chimney, open at the bottom, and surrounding the flame at a short distance from it, by which another current of air is made to act on the exterior portion of the flame. In this way a due supply of oxygen is secured and sufficient heat generated for the perfect combustion of the gaseous products of the oil, and the smoke and soot which escape from the ordinary lamp are converted into a brilliant and smokeless flame. The *sinumbra, French,* and *iris lamps* (now common as table-lamps), are mere modifications of the Argand lamp, so arranged as to avoid the shadow of the oil-reservoir falling on objects immediately beneath or around them. In the *Carcel*, *mechanical*, *meteor*, *moderator*, and other like lamps, the oil, instead of being sucked up by the wick, or descending to it by the force of gravity, is driven up by mechanical means from the oil-reservoir contained in the foot or pedestal, by which a more equable supply of oil to the wick is secured. In the *solar lamp*, and lamps fitted on the "*solar principle*," the wick is thicker than in the ordinary Argand lamp, and a greater quantity of oxygen than usual is supplied to the flame. This is effected by means of apertures in the sides of the lamp, and a cap with a deflector, so as to force the two currents of air to impinge on each other. Lamps so constructed will burn camphine, and give a brilliant light even with common fish oil. In the "*Economic hot-oil lamp*" of Mr. Sam. Parker, the oil-reservoir surrounds the upper part of the chimney, and is thus heated by its own flame.

The *Argand lamp* when intended as a source of heat for chemical purposes, is so modified as to adapt it to burn either oil, spirit of wine, or wood spirit, and the combustion is greatly aided by the chimney, which in this case is made of copper. (See *Engr.*, No. 2 and 3.) The lamp itself is also made of metal, and furnished with ground caps to the wick-holder and aperture by which the spirit is introduced, in order to prevent loss of spirit by evaporation when the lamp is not in use. When in use this aperture must always be left open, otherwise an accident is sure to happen; as the heat expands the air in the lamp, and the spirit is forced out in a state of inflammation. *Glass spirit-lamps*, fitted with ground-glass caps, are also very convenient for occasional use in chemical experiments. (See *Engr.* No. 1.)



In those situations in which *coal-gas* is cheap, it may be used with great economy and advantage as a source of heat in small chemical operations. Retorts, flasks, capsules, and other vessels, can be thus exposed to an easily regulated and constant temperature for many successive hours. Small platinum crucibles may be ignited to redness by placing them over the flame on a little wire triangle. The arrangement shown in the *Engraving* (No. 4), consisting of a common Argand gas burner fixed on a heavy and low foot, and connected with a flexible gas-tube of caoutchouc or other material, is found the most convenient in practice.

To *prevent* or *lessen* the *smoking of ordinary lamps* when common oil is burnt in them, the wicks should be well soaked, either in *dilute hydrochloric acid*, and then well washed in water, and dried; or in *strong vinegar*, when they will merely require drying. *Large lamps*, that emit much smoke, should be burnt under a funnel, to carry it off; or a large sponge, dipped in water, may be suspended over them. In all cases, the wicks should not be put up too high, which is in general the cause of their smoking and emitting a disagreeable odour. See *Illumination*, *Gas*, and *Light* (*Artificial*).

LAMP (Flameless). See *Lampic Acid.*

LAMP (Monochromatic). A lamp fed with a *mixture of a solution of common salt* and *spirit of wine.* It gives a yellow light, and makes every object illuminated by it appear either yellow or black. The human features are changed in a remarkable degree; the countenance appearing truly ghastly and unearthly. (Brewster.)

LAMP (Safety). The *safety lamp* of Sir H. Davy consists of a common oil lamp, surmounted with a cylinder of wire gauze, the apertures of which are not greater than the $\frac{1}{20}$th of an inch square, and the wire of which it is made, of the $\frac{1}{40}$th to the $\frac{1}{60}$th of an inch in diameter. The *fire damp* (carburetted hydrogen) of coal mines in passing through the meshes of such gauze, gets cooled by the conducting power of the wire below the point necessary to kindle it. When this lamp is taken into an explosive atmosphere, although the fire-damp may burn within the cage with such energy as sometimes to heat the metallic tissue to dull redness, the flame is not communicated to the mixture on the outside. These appearance are so remarkable, that the lamp becomes an admirable indicator of the state of the air in different parts of the mine, and if its admonitions are attended to, gives the miner time to withdraw before an explosion takes place.

LANA PHILOSOPHICA. See *Oxide of Zinc.*

LANDSCAPE GARDENING. The principles of this art are the same as those upon which a painter proceeds in composing a picture. “Let selected and beautiful nature be constantly your model, and success must follow.” (Loudon.)

LANTHANIUM. A rare metal, discovered by Mosander, associated with oxide of cerium. *Oxide of lanthanium* is a pale salmon-coloured powder, unaffected by ignition in open vessels. The *hydrated oxide* has an alkaline reaction, and forms salts which are colourless, astringent, sweet-tasted, and crystallizable. See *Cerium.*

LAPIS CAUSTICUS. See *Potassa.*

LAPIS DIVINUS. Syn. *Divine Stone; Lapis Ophthalmicus,*—Lat. *Pierre Divine,*—Fr. *Prep.* 1. (Beer.) *Verdigris, nitre,* and *alum,* equal parts, melted together.

2. (P. Cod.) *Alum, nitre,* and *blue vitriol,* of each, 3 oz.; *camphor,* 1 dr.; as last.

3. (Woolfuss.) *Blue vitriol, nitre, alum,* and *camphor,* equal parts, melted together, adding the *camphor* last. Astringent and detergent. 1 oz., dissolved in *water,* 1 pint, formed a once celebrated lotion. 1 dr., to *water,* 1 pint, is still used as a collyrium.

LAPIS HIBERNICUS. Irish slate.

LAPIS INFERNALIS. See *Nitrate of Silver.*

LAPIS LAZULI. See *Ultramarine.*

LAPIS LYDIUS. Syn. *Lydian Stone.* A silicious slate, used as a touchstone by jewellers.

LAPIS MEDICAMENTOSUS. Syn. *Medicinal Stone; Lapis Mirabilis,*—Lat. *Prep.* (Ph. L., 1746.) *Alum, litharge,* and *Armenium bole,* of each, 6 oz.; *colcothar of green vitriol,* 3 oz.; *vinegar,* 4 fl. oz.; mix, and evaporate to dryness. Formerly used to make an astringent and detergent lotion:—1 oz. to *water,* 1 pint. Once a popular application to ulcers, and in other cases; now disused.

LAPIS VULNERARIUS. As *lapis divinus* (nearly.)

LARD. Syn. *Hog's Lard, Axunge; Adeps,*—Ph. L. *Axungia,*—Ph. E. *Adeps Suillus,*—Ph. D. *Adeps Porci, A. Præparatus,*—Lat. var. The fat of the pig (*sus scrofa,*—Linn.) melted by a gentle heat, and strained through flannel or a hair sieve. The fat about the loins yields the whitest and hardest lard. “That which has been cured with chloride of sodium is not to be employed.” (Ph. L.) “It is not to be used without being first carefully washed with water.” (Ph. L. 1836.) *Used,* chiefly, to make ointments, and in cookery.

LARD (Magnetic). See *Magnetic Adeps.*

LARD (Oxygenated). See *Ointment of Nitric Acid.*

LARDING. By many this is regarded as belonging to the higher style of cookery only, and too troublesome and extravagant to be adapted to the kitchens of the middle classes and the poor. This, we are assured, is not the case. “On the contrary, it is an *economical process,* and will make lean meat go much farther than without it.” The *process* of *larding* is as follows:—“Get what is called a *larding needle,* that is, a piece of steel from six to nine inches long, pointed at one end, and having four slits at the other to hold a small strip of bacon when put between them. They will, perhaps, cost tenpence. Cut the *bacon* into pieces 2 or 3 inches long, and a

¼ to ½ an inch square; put each one after the other in the pin, insert it in the meat, and leave only about ½ an inch out; using eight pieces to each pound." (Soyer.)

LARICINE. The name given by Martius to the active principle of the larch agaric (*boletus laricis,*—Fries.) It is a white, amorphous, bitter-tasted powder; soluble in alcohol and oil of turpentine, and forming a paste with boiling water.

LARK. The *alauda arvensis* (skylark) and the *alauda cristata* (field-lark), with several other species of the same genus, form a light and nutritious article of food, by many esteemed a delicacy. The last, according to Galen and Dioscorides, eaten either roasted or boiled, " helps the colic." The heart, applied to the thigh, was also regarded to possess the same virtue.

LAUDANUM. This name is now understood to denote, exclusively, the common tincture of opium of the pharmacopœia; but formerly the term was applied to several preparations of opium differing greatly from each other, both in their strength and mode of preparation.

Dutchman's Laudanum. From the *flowers* of bull's hoof or Dutchman's laudanum (*passiflora merucuja,*—Linn.) infused in *rum.* Narcotic. *Used* as a substitute for tincture of opium in the West Indies.

Ford's Laudanum. This is merely the common tincture of opium aromatized with a little *cloves* and *cinnamon.*

Houlton's Laudanum. From *opium,* 2½ oz.; *distilled vinegar,* 1½ pint; digested together for a week, the filtered tincture gently evaporated nearly to dryness, and then redissolved in *weak spirit* (1 of rectified spirit to 7 of water), 1 quart. *Dose.* 10 to 60 drops.

Neumann's Laudanum. A fermented *infusion of opium* evaporated to the consistence of honey.

Quince Laudanum; Extractum Opii Cydoniatum, Laudanum Cydoniatum,—Lat. Extract of opium made with *quince juice;* a few drops of the *oils of cinnamon, cloves,* and *mace,* being added before the mass cools. Now seldom used.

Liquid Quince-laudanum; Laudanum Liquidum Cydoniatum, L. L. C. paratum fermentatione,—Lat. A fermented infusion of opium prepared with *quince juice,* aromatized with *cloves, cinnamon, aloeswood,* and *yellow sandal wood,* and evaporated so as to possess about twice the strength of the ordinary tincture. Now obsolete.

Rousseau's Laudanum. Wine of opium prepared by fermentation. See *Wines.*

Smith's Concentrated Laudanum. Resembles Battley's *liquor opii sedativus,* but possesses about 6 times its strength.

Swediaur's Laudanum. From *extract of opium,* 2 parts, dissolved in a mixture of *alcohol,* 1 part, distilled water, 8 parts. Every five drops contain 1 gr. of opium.

Sydenham's Liquid Laudanum; Laudanum Liquidum Sydenhami,—Lat. Similar to *wine of opium* (Ph. L.), but rather stronger, and aromatized with a little *cloves* and *cinnamon.* Wine of opium is now always sold for it.

Tartarized Laudanum; Laudanum Liquidum Tartarizatum,—Lat. A tincture of opium prepared with spirit alkalized with *salt of tartar,* and flavoured with aromatics. Obsolete.

LAUGHING GAS. See *Nitrous Oxide.*

LAUREL. See *Cherry Laurel* and *Sweet Bay.*

LAUREL FAT. See *Oils.*

LAURINE. Syn. *Bay-berry Camphor.* A fusible, volatile, crystallizable substance, extracted from the berries of the *sweet bay* (laurus nobilis,—*Linn.*) by *boiling strong alcohol* or *ether.* It has an acrid, bitter taste, and an odour resembling that of the expressed oil.

LAVA. The matter thrown out by volcanoes. The beautiful ornamental vases, jugs, and other objects sold under the name, are a superior sort of unglazed coloured porcelain.

LAVEMENTS. See *Enemas.*

LAVENDER. The flowers or flowering tops of *lavandula vera* (lavandula spica,—*Linn.*), or common *garden lavender.* An essential oil, spirit, and tincture, prepared from it, are officinal in the pharmacopœias.

LAVENDER (Red). See *Tinctures.*

LAVENDER (Smith's British). *Prep.* From *English oil of lavender, 2 oz.; essence of ambergris,* 1 *oz.; eau de Cologne,* 1 pint; *rectified spirit,* 1 quart. Very fragrant. See *Lavender Water.*

LAXATIVES. Syn. *Lenitives; Laxativa, Laxantia, Lenitiva,*—Lat. Mild purgatives or cathartics. The principal of these are—*almond oil, cassia pulp, castor oil, confection of senna, cream of tartar, figs, grapes, honey, phosphate of soda, prunes, salad oil, tamarinds, &c.*

LAYERS. Among *gardeners,* a mode of propagating plants, by laying down the shoots or young twigs, and covering a portion of them with the soil, without detaching them from the parent plant. To facilitate the *rooting* of such layers, the part beneath the soil is fractured by twisting or bruising it, or it is partly cut through with a sharp knife, immediately under a bud.

When the layer has taken root, it is divided from the parent stem, and transplanted or potted. In this way, with a little care, nearly all plants may be multiplied.

LEAD. Syn. *Plumbum,*—Lat. This metal, like gold, silver, and iron, appears to have been known in the most remote ages of antiquity. It is only prepared on the *large scale.* The ore from which it is almost exclusively extracted, being the only one found in abundance, is the native *sulphide* or *sulphuret of lead,* called by mineralogists, *galena.* This is roasted in a reverberatory furnace, and afterwards smelted along with coal and lime.

Prop., &c. The general properties of lead are too well known to require notice here. The sp. gr. of that of commerce is about 11·35; but in a state of absolute purity, its greatest density is 11·45. It melts at about 600° Fahr. (612°,—Crighton; 634°,—Kupfer;) and when very slowly cooled, crystallizes in octahedrons. At a white heat it boils, and is volatilized. When exposed to moist air, it soon becomes covered with a gray film, presumed to be the suroxide. It is scarcely acted on by the hydrochloric, sulphuric, and vegetable acids, unless in free contact with air, and then very slowly; but nitric acid rapidly oxidizes it, forming a solution of nitrate of lead. *Pure water,* put into a leaden vessel, and exposed to the air, soon corrodes it, and dissolves the newly-formed oxide; but *river* and *spring water* exert no such influence, the carbonates and sulphates in such water destroying its solvent power. Many other neutral salts act in the same way. Among these, the most certain preservatives are the *phosphates, sulphates, chlorides,* and *iodides;* their power being in proportion to the relative insolubility of the compound which their acid is capable of forming with lead. It has been found that 1-30,000th part of *phosphate of soda* or of *iodide of potassium,* dissolved in *distilled water,* prevents its corrosive action on this metal. (Christison.) The lead in contact with such water, gradually becomes covered with a superficial film of an insoluble salt of lead, which adheres tenaciously, and prevents further change. From this it appears that ordinary water (*hard water*), which abounds in mineral salts, may be safely kept in leaden cisterns; but *distilled water* and *rain water,* and all other varieties that contain scarcely any saline matter, speedily corrode, and dissolve a portion of lead, when kept in vessels of that metal. When, however, leaden cisterns, have *iron* or *zinc* fastenings or braces, a galvanic action is set up, the *preservative power of saline matter ceases,* and the water speedily becomes contaminated with lead, and unfit for consumption as a beverage. *Water* containing *free carbonic acid* also acts on lead; and this is the reason why the water of some springs, (although loaded with saline matter,) when kept in *leaden cisterns,* or raised by *leaden pumps,* possesses unwholesome properties. Free carbonic acid is evolved during the fermentation or decay of vegetable matter, and hence the *absolute necessity* of preventing the leaves of trees falling into water-cisterns formed of lead. The neglect of this precaution gave rise to the violent ravages of colic that are recorded to have visited Amsterdam about the middle of the last century. (Dr. Frouchin.) The *eau de rose* and the *eau d'orange* of commerce, which are pure distilled water holding in solution small quantities of essential oil, and are imported in leaden canisters, always contain a small quantity of lead, and deposit a sediment, which is not the case when they are kept in glass or incorrodible vessels. *Lead* and *all* its *preparations* are *highly poisonous;* and whether imbibed in almost infinitesimal quantities with our daily beverages and food, or swallowed in larger and appreciable doses, is alike productive of the most disastrous consequences, the real cause, in the former case, being, unfortunately, seldom suspected.

Tests. 1. The *oxides* and *salts of lead,* mixed with a little carbonate of soda, and exposed on a charcoal support to the *reducing flame* of the blowpipe, readily yield a soft and ductile globule of metallic lead, and the charcoal, at the same time, becomes covered with a yellowish incrustation of oxide of lead.—2. Both *metallic lead* and its *oxides* are soluble in nitric acid, furnishing a solution which may be examined by the usual tests.—3. *Solutions of the salts of lead* may be recognized by their behaviour with the following reagents:—*a.* Sulphuretted hydrogen, hydrosulphuret of ammonia, and the alkaline sulphurets, give *black* precipitates, insoluble in the cold dilute acids, alkalies, alkaline sulphurets, and cyanide of potassium.—*b.* Caustic potassa and soda give a *white* precipitate, *soluble* in excess. —*c.* Ammonia (except with the acetate) gives a *white* precipitate, insoluble in excess.—*d.* The carbonates of potassa, soda, and ammonia, give a *white* precipitate, insoluble in excess.—*e.* Dilute sulphuric acid (in excess) and solutions of the sulphates, give a *white* precipitate, *insoluble* in nitric acid, and *soluble* in solution of potassa.—*f.* Chromate of potassa gives a *yellow* precipitate, insoluble in dilute nitric acid, and soluble in solution of potassa.—*g.* Iodide of potassium gives a *yellow* precipitate, soluble in acetic acid, solution of potassa, alcohol, and boiling water; from the solution in the last, it is deposited in small, brilliant, golden-yellow scales, as the liquid cools.—*h.* A piece of polished zinc precipitates metallic lead in an arborescent form, hence called the "*leaden tree.*"—*Obs.* A solid supposed to contain lead should be digested in nitric acid, when the solution, evaporated to dryness, and redissolved in water, may be tested as above. *The susceptibility of sulphuretted hydrogen* as a test for lead, ceases when the dilution reaches 500,000 times;—*chromate of potassa,* at 100,000 times;—*carbonates of soda* and *potassa,* at 60,000 times;—*potassa,* at 20,000 times;—*ferrocyanide of potassium,* at 18,000 times;—*iodide of potassium,* at 10,000 times;—and *sulphate of soda* at 5,000 times. (Devergie, *Méd. Lég.*, ii, 779.)

Estim. This has been already referred to under the heads *Brass* and *German silver.* The ores of lead (*galena*) may be digested in *nitric acid,* when the solution may be treated in the manner described at page 514. This is called an assay in the "*wet way.*" The method adopted by practical mineralogists is an assay in the "*dry way,*" and is conducted as follows:—*a.* A small but powerful air-furnace, charged with coak, is brought to as high a temperature as possible, and a conical wrought-iron crucible plunged into the midst of it; as soon as the crucible has attained a dull-red heat, 1000 gr. of the galena, reduced to powder, are thrown into it, and stirred gently with a long piece of stiff iron wire flattened at the one end, in order to expose as large a surface of the powdered ore to the air, as possible, observing now and then to withdraw the wire, to prevent it becoming red-hot, in which case some of the ore would permanently adhere to it, and be reduced before the intended time; the roasting is completed in 3 or 4 minutes, and any portion of the ore adhering to the stirrer being detached by a knife, and returned into the crucible, the latter is covered up, and allowed to attain a full cherry-red heat, when about 2 to 3 spoonfuls of *reducing flux* are added, and the whole brought to a full white heat; in 12 to 15 minutes, the portion of metal and scoria adhering to the sides of the crucible, are scraped down into the melted mass with a small stick of *moist green wood,* after which the crucible is again covered, and the heat urged for 2 or 3 minutes longer, so as to keep the mass in a perfectly liquid state during the whole time; the crucible is then removed from the fire with the *crucible-tongs,* and adroitly "tilted" so as to discharge its contents into a small ingot-mould of brass, observing to rake the scoria from the surface to the sides of the crucible, so as to allow the molten lead to be poured out without it; the scoria is then reheated in the crucible with about ½ spoonful of flux, and after being cleansed with a piece of *green wood,* as before, is at once poured out into a second mould, which is instantly inverted; the little button of lead thus obtained is added to the lead in the other mould, and the whole is accurately weighed. The *weight,* divided by 10, gives the *per centage* of *pure lead* in the ore examined.

b. One-half of the *lead* thus obtained is put into a dry *cupel of bone ash,* and placed in the cupelling furnace, and treated as described in the article on *Assaying;* the *metallic button* left on the cupel is then detached and weighed. The *weight,* divided by 5, gives the *per centage* of PURE SILVER.

Obs. The flux commonly employed in the above assay is composed of *red argol,* 6 parts; *nitre,* 4 parts; *borax,* 2 parts; *fluor spar,* 1 part; well pulverized and thoroughly mixed together. When the ore is very refractory, about a spoonful of *potash* should be added for each 1000 grains of ore, in which case the *roasting* may then be dispensed with. The *quantity* of *silver* in argentiferous galena varies from $\frac{3}{10000}$ to $\frac{1}{5}$ part of the whole. Whenever this ore contains above 2 parts of silver in the 1000, it is found to be profitable to extract the latter.

Uses. The uses of lead in the arts are well known. It enters into the composition of many important alloys, it furnishes us with several valuable pigments, and it is extensively used in dyeing. Some of its preparations are employed in *medicine.*

Ant., &c. Administer an *emetic* of *sulphate of zinc* or *sulphate of copper,* and, if necessary, tickle the fauces with the finger or a feather to induce vomiting. Should this not succeed, the stomach-pump may be had recourse to. *Epsom* or *glauber salts,* or *alum, dissolved in water,* or *water acidulated with sulphuric acid,* followed by tea, water gruel, or barley water, are the proper antidotes, and should be taken as soon after the poison has been swallowed as possible. In poisoning by *white lead,* Dr. Alfred Taylor recommends the administration of a mixture of *sulphate of magnesia* and *vine-*

gar, as preferable to the sulphate *alone.* When the *symptoms* are those of *lead colic*, the treatment recommended at *page* 275 should be adopted. In *paralysis arising from lead*, small doses of *strychnia, brucia*, and their preparations, may be *cautiously* administered. A *symptom* of *poisoning by lead* is the formation of a narrow leaden blue line, from $\frac{1}{20}$th to $\frac{1}{6}$th of an inch wide, bordering the edges of the gums, attached to the neck of two or more teeth of either jaw. (Dr. Burton.) This discoloration may often be detected or rendered more conspicuous by rinsing the mouth out with *water holding a little sulphuretted hydrogen* or *hydrosulphuret of ammonia in solution.* Chevallier and Rayer recommend the use of sulphurous or hepatic mineral waters, or of artificial solutions of sulphuretted hydrogen or alkaline sulphurets in water, both in cases of *acute* and *chronic poisoning* by lead; but the practical success of this plan does not appear to have been in proportion to theoretical anticipations. The *hydrated sulphurets of iron* are said by their advocates to be infallible, if taken sufficiently early. (See *p.* 648.)

LEAD (Acetate of). Syn. *Sugar of Lead, Neutral Acetate of Lead; Goulard's Powder; Plumbi Acetas,*—Ph. L. E. & D. *Plumbi Superacetas,*—Ph. L. 1809. *Cerussa Acetata,*—Ph. L. 1788. *Saccharum Saturni,*—Ph. L. 1746. *Prep.* 1. (Ph. L. 1836.) *Oxide of lead* (litharge, in powder), 4 ℔ 2 oz.; *acetic acid* (Ph. L.) and *distilled water*, of each, 4 pints; mix, dissolve by a gentle heat and agitation, strain, evaporate, and crystallize. In the present Ph. L. this preparation is included in the Materia Medica.

2. (Ph. E.) *Litharge*, 14 oz.; *pyroligneous acid* (sp. gr. 1·034), 1 quart; *water*, 1 pint; as above.

3. (Ph. D. 1826.) *Carbonate of lead*, 1 part: *distilled vinegar*, 10 parts; as before.

4. (*Wholesale.*)—*a. Acetic acid* (sp. gr. 1·0843), 23 parts, is gently heated in a copper boiler rendered *electro-negative* by means of a large flat piece of lead soldered within it, and *litharge* (pure, and in fine powder), 13 parts, is sprinkled in; the heat is then continued, with constant stirring, until the acid is saturated, when the mother-waters of a former process (if any) are added, and the whole is heated to the boiling point, and allowed to settle until cold; the clear portion is now decanted, and evaporated in a similar vessel until the liquor has the sp. gr. 1·266 or 1·267, when it is run into salt-glazed stoneware vessels (the edges of which have been well smeared with candle grease), and allowed to crystallize. The *product* is 38 to 38½ parts of *crystallized sugar of lead.* It is found to be advantageous to preserve a very slight excess of acid in the liquid during the boiling and crystallization, to prevent the formation of any basic acetate, the presence of which impedes the formation of regular crystals.

5. From *litharge*, 112 *lb.; acetic acid* (sp. gr. 1·057), 128 *lb.* (or its *equiv.*); *Prod.* 180 to 184 *lb.*

Prop. Pure acetate of lead forms colourless, transparent, prismatic crystals, slightly efflorescent in dry air; it is soluble in 8 parts of alcohol, and in 1½ parts of cold water; the aqueous solution has a sweet astringent taste, and feebly reddens litmus, but turns turmeric and the juice of violets green; when gently heated, it melts in its water of crystallization; by continuing the heat, the whole of the water is expelled, and the dry acetate obtained; at a higher temperature the salt suffers decomposition, and acetic acid, acetone, &c., is given off. *Commercial acetate of lead* is in general a confused crystalline mass, somewhat resembling broken lump-sugar. It is powerfully astringent and poisonous.

Pur. Acetate of lead is completely soluble in distilled water acidulated with acetic acid, forming a transparent solution; and when the lead is exactly precipitated with dilute sulphuric acid, or by sulphuretted hydrogen, the clear supernatant liquid is wholly volatilized by heat without residue. "Carbonate of soda throws down a white precipitate; iodide of potassium, a yellow one; by sulphuretted hydrogen it is blackened. Sulphuric acid disengages from it acetic vapours. If to 100 gr. dissolved in water, sulphate of soda be added, 80 gr. of sulphate of lead are precipitated." (Ph. L.)

Uses, &c. Acetate of lead is extensively employed in dyeing and calico-printing. In *medicine* it is used as an astringent, styptic, and hæmostatic; in pulmonary, uterine, and intestinal hæmorrhage, colliquative diarrhœa, phthisical sweats, &c. It is usually combined with morphia or opium, and with acetic acid to prevent it passing into the state of the poisonous carbonate in the stomach. *Dose.* ½ gr. to 2 gr. (Collier); 1 or 2 gr. to 8 or 10 grs., twice or thrice a day (Pereira); 3 gr. to 10 gr. every 6 or 8 hours (A. T. Thomson). *Externally*, as a COLLYRIUM, 10 gr. to water, 8 fl. oz. (A. T. Thomson.); as a LOTION, 20 gr. (A. T. Thomson), 1 dr. (Collier) to water, 8 or 10 fl. oz.; as an INJECTION, 40 gr. to rose water, ½ pint. The lotion is cooling and sedative; and is commonly used in excoriations, local inflammations, &c.

LEAD (Subacetate of). Four *basic acetates of lead* have been examined by chemists, viz., the *hexabasic acetate* (hexacetate), *tribasic acetate* (trisacetate), *bibasic acetate* (diacetate), and the *sesquibasic acetate* (sesquiacetate), having respectively 6, 3, 2, and 1½ equivalents of lead to 1 equiv. of acetic acid. Of these the *diacetate* only is directly employed either in medicine or the arts. The solutions of the whole of them exhibit a strong alkaline reaction, and absorb carbonic acid with great avidity, becoming turbid from the precipitation of basic carbonate. According to some authorities, *Goulard water* (liquor plumbi diacetatis,—Ph. L.) is a solution of *diacetate of lead;* according to others, of *tribasic acetate of lead.* (See *below.*)

Subacetate of Lead, Diacetate of do., Trisacetate of do.; Plumbi Diacetas, P. Subacetas, &c.,—Lat. This is formed—1. When a *cold saturated solution of neutral acetate of lead* is mixed with about ⅙th of its volume of *concentrated liquor of ammonia,* and set aside in a covered vessel. After a time minute, anhydrous, crystalline needles are deposited.

2. *Litharge* (in fine powder), 7 parts; *acetate of lead,* 6 parts; *water,* 30 parts; digest at a moderate heat for some time, with constant agitation. By evaporation out of contact with air, small crystals may be obtained. The crystals from both the above formulæ appear to be those of the *tribasic acetate.* Dr. Thomson (*First Prin. of Chem.*) says, however, that the solid crystalline subacetate obtained from Goulard water is *hydrated diacetate of lead.* See *Solutions.*

LEAD (Arseniate of). Syn. *Plumbi Arsenias,*—Lat. *Prep.* Gradually add a *solution of acetate of lead* to another of *arseniate of soda.* A white insoluble powder. Proposed as an external application in certain forms of cancer.

LEAD (Benzoate of). Syn. *Plumbi Benzoas,*—Lat. A *neutral* and a *basic benzoate of lead* have been formed. Both are freely soluble in cold water. See *Benzoates.*

LEAD (Bromide of). Syn. *Plumbi Bromidum,*—Lat. A white crystalline powder, sparingly soluble in water, formed by precipitating a *solution of neutral acetate* or *nitrate of lead,* with a *solution of bromide of potassium.* It fuses by heat into a red liquid, which turns yellow when cold. It has been used in the same cases as *iodide of lead.*

LEAD (Carbonates of). *Prep.* 1. *Carbonate of Lead, Neutral do.; Plumbi Carbonas,*—Lat. By precipitating a *solution* of either *acetate* or *nitrate of lead* with a *solution of an alkaline carbonate,* observing to well-wash the precipitate and dry it in the shade. This preparation is seldom employed, the *commercial* carbonate (*white lead*) being substituted for it.

2. *Subcarbonate of Lead, Ceruse; Plumbi Carbonas Venalis,*—Lat. See *White Lead.*

LEAD (Chloride of). Syn. *Muriate of Lead; Plumbi Murias; Plumbi Chloridum,* —Ph. L. 1836. *Prep.* 1. (Ph. L. 1836.) Dissolve *acetate of lead,* 19 oz., in *boiling water,* 3 pints; next dissolve *chloride of sodium,* 6 oz., in *boiling water,* 1 pint; mix the two solutions, and when *cold,* wash and dry the precipitate. A white, crystalline powder.

2. Dissolve *finely-powdered litharge* in *boiling dilute hydrochloric acid,* and set aside the filtered solution to cool. Brilliant colourless needles.

Prop. Soluble in 135 parts of cold, and in 22 parts of boiling water; it melts when heated, and solidifies on cooling, forming a horn-like substance (*horn lead; plumbi corneum*). "It is totally dissolved by boiling water, the chloride concreting almost entirely into crystals as the solution cools. On the addition of hydrosulphuric acid it turns black, and by heat yellow." (Ph. L. 1836.)

Uses, &c. In the Ph. L. 1836, chloride of lead was ordered to be employed in the preparation of hydrochlorate of morphia. Mr. Tuson highly recommends it in cancerous affections, to allay pain and restrain morbid action, either in the form of a *lotion* or *ointment.* (*Lancet,* 1844.) *Patent Yellow* is a fused crude chloride of lead.

LEAD (Oxichloride of). Syn. *Plumbi Oxychloridum,* — Lat. According to Mr. H. L. Pattinson's Specification, a *solution of chloride of lead* in *boiling-hot water,* is precipitated by *instantaneous* admixture with an equal volume of *pure lime-water,* by means of two "tumbling boxes" charged with the liquid, and simultaneously upset into a cistern or receiver. *Used* as a white pigment, and said by the patentee to be superior to white lead. The experiments of Mr. Lewis Thompson, lead us, however, to think that such cannot be the case.

LEAD (Chromate of). Syn. *Plumbi Chromas,*—Lat. *Prep.* By adding a filtered solution of *acetate* or *nitrate of lead* to a like *solution of chromate of potassa*, as long as a precipitate forms, which is collected, washed with water, and dried. The manufacture of this substance on the *large scale*, as a colouring substance (*chrome yellow*), is fully explained under the head, "*Yellow Pigments*."

LEAD (Dichromate of). See *Red Pigments.*

LEAD (Cyanide of). Syn. *Plumbi Cyanidum, P. Cyanuretum*,—Lat. *Prep.* By adding *hydrocyanic acid* to a solution of *acetate of lead*, as long as a precipitate forms, which after being washed with *distilled water*, is dried by a very gentle heat, and preserved from the light and air. Sometimes used as a source of medicinal hydrocyanic acid.

LEAD (Ferrocyanide of). Syn. *Plumbi Ferrocyanidum*,—Lat. *Prep.* From a *soluble salt of lead* by the addition of a *solution of ferrocyanide of potassium.* A yellowish-white powder.

LEAD (Fluoride of). Syn. *Plumbi Fluoridum*,—Lat. A white powder formed by precipitating a *solution of neutral acetate of lead* with *hydrofluoric acid.* It is very sparingly soluble in water.

LEAD (Gallate of). Syn. *Plumbi Gallas*,—Lat. This salt has been recommended in internal hæmorrhages, &c. See *Gallate.*

LEAD (Iodide of). Syn. *Plumbi Ioduretum; Plumbi Iodidum*,—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Acetate of lead*, 8 oz.; *water*, 6 pints; dissolve, and add to the solution, *iodide of potassium*, 7 oz., dissolved in *water*, 1 quart; wash the precipitate with *cold distilled water*, dry it, and keep it *without* the *access of light.*

2. (Ph. E.) *Iodide of potassium* and *nitrate of lead*, of each, 1 oz.; dissolve each separately in *water*, ¾ pint; mix the solutions, collect the precipitate on a calico or linen filter, and wash it with water; then boil it in *water*, 3 gall., previously soured with *pyroligneous* (acetic) *acid*, 3 fl. oz.; let the solution settle (still keeping it near the boiling point), and decant the clear portion; as the liquid cools, the iodide subsides in brilliant golden yellow lamellæ, or minute crystals.

Prop., &c. A rich yellow-coloured powder, soluble in acetic acid, alcohol, and boiling water, and in solutions of the alkaline iodides forming *alkaline iodoplumbates* or *plumbo-iodides;* when heated it fuses and volatilizes in yellow vapour, but with a higher degree of heat, violet vapours of iodine are evolved, leaving a residuum (*lead*) which is wholly soluble in nitric acid. "If sulphate of soda be added to 100 gr. of the iodide of lead dissolved in nitric acid diluted with twice its weight of boiling water, after the iodine has been expelled, 66 gr. of sulphate of lead are thrown down." (Ph. L.) "5 grs. of iodide of lead are entirely soluble (by boiling) in 1 fl. dr. of pyroligneous acid, diluted with 1½ fl. oz. of water; and golden crystals are abundantly deposited as the solution cools." (Ph. E.) *Dose.* ¼ gr. to 4 gr. or more, made into a pill, as a deobstruent and resolvent, in enlargements of the cervical, axillary, and mesenteric glands, and in scrofulous affections, and schirrous tumours. See *Ointments.*

LEAD (Oxiodide of). Syn. *Plumbi Oxyiodidum*,—Lat. Prepared by precipitating *subacetate of lead* by *iodide of potassium.*

LEAD (Magistery of). Syn. *Plumbi Magisterium*,—Lat. The old name for precipitated carbonate of lead.

LEAD (Nitrate of). Syn. *Plumbi Nitras*,—Ph. E. & D. *Nitrum Saturninum, Plumbum Nitricum*,—Lat. obs. *Prep.* 1. (Ph. E.) *Litharge*, 4½ oz.; *diluted nitric acid*, 1 pint; dissolve by a gentle heat, and set the solution aside to crystallize.

2. (Ph. D.) *Litharge* (in fine powder), 5 *oz.; pure nitric acid*, 2 fl. oz., diluted with *water*, ½ pint; mix, apply a sand-heat, and evaporate to dryness, occasionally stirring; boil the residuum in *water*, 2½ pints, filter, acidulate with a *few drops* of *nitric acid*, evaporate to a pellicle, and set the liquid aside to cool; lastly, dry the deposited crystals on bibulous paper, and preserve them in a well-closed bottle.

Use, &c. This salt was formerly much esteemed in asthmas, hæmorrhages, and epilepsy. It is now chiefly employed as an external application in cancer, ulcers, wounds, and various cutaneous affections. It is also employed in the preparation of the iodide and other salts of lead. It is the basis of Liebert's celebrated "*Cosmétique infallible*," and of Ledoyen's "*Disinfecting fluid.*" A very weak solution is an excellent application to chapped nipples, lips, hands, &c. *Dose.* ⅛ to 1 gr.; in the form of pill or solution, washed down with a table-spoonful of water *very slightly* acidulated with nitric acid.

LEAD (Oxides of). There are four oxides of lead, of which one only (the protoxide) possesses basic properties and is capable of forming true salts with the acids.

1. *Suboxide of lead, Dioxide of do., Gray Oxide of do.* Prepared by heating *carbonate of lead* or *dry oxalate of lead* to dull redness in a glass tube out of contact with the air. It is also formed on the surface of

metallic lead by long exposure to the air. (Berzelius.) It is a dark gray powder; acids resolve it into the protoxide, which they dissolve, and metallic lead, which remains behind in a pulverulent state. It absorbs oxygen with great rapidity when heated, and also when moistened with water and freely exposed to the air.

2. *Oxide of Lead, Protoxide of do., Yellow Oxide of do., Plumbeous Acid; Plumbi Oxydum, P. Protoxydum,*—Lat. This substance is obtained *perfectly pure* by expelling the acid from *nitrate of lead*, by exposing it to heat in a platinum crucible; or, still better, by adding *ammonia* to a *cold solution of nitrate of lead* until the liquid becomes faintly alkaline, washing the precipitate with *cold water*, drying it, and heating it to moderate redness for 1 hour, as above. It may be obtained in a *crystalline state* by exposing a *concentrated solution of it* in *caustic soda* to the air for some months (M. Houton Labadilliere); or, *still easier*, by mixing an *aqueous solution* of *neutral acetate of lead* with a great excess of *liquor of ammonia*, filtering, and exposing the liquid for a few hours in a well-corked bottle to the sun's rays. If the same solution is kept in the *dark* for some days, stellated crystals of basic acetate of lead, with five atoms of base, are deposited instead of oxide. (W. Behrens.)

Prop., &c. Pure protoxide of lead has a lemon-yellow colour, and is the base of all the salts of lead. It is very heavy, slightly soluble in water, and freely so in acids, particularly when in the hydrated state; the aqueous solution has an alkaline reaction; at a red heat it melts, and assumes a semi-crystalline form on cooling; in the melted state it rapidly attacks and dissolves silicious matter, with which it unites to form glass (*flint glass*); when heated along with organic substances of any kind, it is easily reduced to the metallic state. On the *commercial scale* this oxide is prepared by heating the gray film or dross that forms on the surface of melted lead when freely exposed to the air. When the process is arrested as soon as the oxide acquires a uniform yellow colour, it is called "*massicot;*" when the heat is still further increased until it fuses or partially vitrifies, it forms "*litharge,*" of which there are several varieties. See *Litharge, Massicot,* and *below*.

3. *Red Oxide of Lead, Deutoxide of do., Plumbate of Oxide of do., Plumbeous Suroxide of do.; Plumbi Oxydum Rubrum,* —Lat. This is *prepared* by exposing *unfused protoxide of lead* to a dull red heat. It is a very heavy powder, of a fine red colour, decomposed by a strong heat into protoxide of lead, and oxygen gas, which is evolved. It is probably a mixture of protoxide and binoxide of lead in variable proportions. This substance, manufactured on the *large scale*, forms the *minium* or *red lead* of *commerce* (which see).

4. *Binoxide of lead, Peroxide of do., Puce Oxide of do., Brown do. do., Plumbic Suroxide.* Obtained by putting *red oxide of lead* into *chlorine*, or *dilute nitric acid;* or by fusing a mixture of *protoxide of lead* and *chlorate of potassa*, at a heat a little below redness, and washing the powdered mass in water; or by transmitting a current of *chlorine gas* through a solution of *neutral acetate of lead.* This oxide gives up half its oxygen at a red heat; acids also decompose it. Its chief use is in chemical analysis, to separate sulphurous acid from certain gaseous mixtures, which it converts into sulphuric acid, which it at the same time absorbs, forming sulphate of lead.

Obs. Besides the above compounds of lead and oxygen, a *sesquioxide* of doubtful existence has been named by some writers. This is an insoluble reddish-yellow powder, formed by adding a solution of *hypochlorite of soda* to another of *protoxide of lead in liquor of potassa.* (Winkelblech.)

LEAD (Hydrated Oxide of). Syn. *Plumbi Oxydum Hydratum,*—Ph. L. 1836. *Prep.* (Ph. L. 1836.) *Solution of diacetate of lead,* 6 pints; *distilled water,* 3 gall.; mix, and add *liquor of potassa* as long as a precipitate forms, avoiding excess; wash with water what is precipitated until nothing alkaline remains.

Obs. This is *dihydrated oxide of lead.* (Mitscherlich.) It is a white powder, and is *used* in preparing disulphate of quinine. "It is totally soluble in dilute nitric acid" (Ph. L.), and in a considerable excess of liquor of potassa.

LEAD (Pyrolignite of). Sugar of lead may be made with rough pyroligneous acid. *Used* in dyeing, chiefly for the preparation of acetate of alumina.

LEAD (Saccharate of). Syn. *Plumbi Saccharas,*—Lat. *Prep.* 1. (Dr. S. E. Hoskins.) *Nitric acid,* 2 parts; *water,* 10 parts; mix in a porcelain capsule, add of *sugar,* 1 part; and apply heat until reaction ceases; then dilute the liquid with *distilled water,* neutralize it with *powdered chalk,* filter, and add to the filtrate a *solution of acetate of lead* as long as a precipitate (*saccharate of lead*) forms; lastly, collect the precipitate on a filter, wash and dry it.

2. Saturate an *aqueous solution of saccharic acid* with moist *hydrated carbonate* or *oxide of lead*, added gradually, and in small portions at a time. *Used* to make the following compound :—

LEAD (Nitrosaccharate of). Syn. *Plumbi Nitrosaccharas*,—Lat. *Prep.* (Dr. S. E. Hoskins.) *Nitric acid*, 1 part; *water*, 19 parts; mix; in this dilute acid, *saccharate of lead* (in fine powder) is to be dissolved, and the solution evaporated by a gentle heat, and set aside that crystals may form, which are to be dried by pressure between the folds of bibulous paper. A weak solution of this salt acidulated with saccharic acid, has been employed by Dr. Hoskins as a solvent for phosphatic calculi, with apparent success. See *Injection* (Lithontriptic).

LEAD (Tannate of). Syn. *Plumbi Tannas, Plumbum Scytodepsicum*, — Lat. *Prep.* Precipitate a *solution of acetate of lead* with an *infusion of galls*, and wash and dry the precipitate. Astringent, sedative, and hæmostatic. *Dose.* 1 gr. and upwards made into a pill. It has been highly recommended in the form of ointment and cataplasms, in bedsores, chronic ulcers of the feet, white swellings, &c.

LEAD (Black). See *Plumbago.*

LEAD (Granulated). *Prep.* By melting *new lead*, and pouring it in a small stream, from an iron ladle with a hole drilled in its bottom, into a pail of water. *Used* to make solutions and alloys.

LEAD (Horn). See *Chloride of Lead.*

LEAD (Red). See *Oxides of Lead* and *Minium.*

LEAD (Sheet). The Chinese employ large quanties of sheet-lead in packing their tea, which they make in the following way:—*Melted lead* is poured from a crucible upon a large flat stone, placed upon the ground, and immediately another stone is dashed upon the fluid metal, which is thus pressed out into a very thin plate or leaf. This is instantly removed, and the operation repeated as rapidly as possible. The rough edges of the plates are afterwards cut off, and then soldered together for use. A similar method has been adopted for some years in England, to form the *plates of zinc* for galvanic batteries.

LEAD (White). See *White Pigments.*

LEAD DUST. Syn. *Pulvis Plumbi, Plumbum Divisum*,—Lat. *Prep.* By melting *new lead*, adding *bruised charcoal*, mixing by violent agitation, which must be continued until the metal "sets," and then pounding and washing away the charcoal. *Used* by potters.

LEATHER. Syn. *Corium, Corius*,—Lat. Leather is the skin of animals which has been prepared by one or other of several processes adopted for the purpose, having the common object of preventing its spontaneous destruction by putrefaction, besides other objects, which are more or less peculiar to each variety of this useful substance.

Leather is only *prepared* on the *large scale*, and primarily, either by the process of "*tanning*" or "*tawing*," in the manner briefly described under those heads.

Curried leather is leather which has been tanned, and sold to the *currier*, who after soaking it in water, and rubbing it to soften it, pares it even with a broad sharp knife, rubs it with a piece of polished stone or wood, and whilst still wet, besmears it with oil or grease (*dubbing*), which gradually penetrates the leather as the moisture evaporates. It next undergoes the operation of "*waxing*," which consists of first rubbing it on the flesh side with a *mixture* of *oil and lamp black;* it is then "*black-sized*" with a brush or sponge, and when dry, is lastly, *tallowed* with a proper cloth, and "slicked" upon the flesh side with a broad and polished lump of glass. *Leather* curried on the *hair* or *grain side*, termed "*black on the grain*," is blackened by wetting it with *iron liquor*, and rubbing it with an iron "slicker" before applying the oil or grease. The grain is finally raised by the "pommel" or "graining board" passed over it in various directions.

Leather is *dyed* or *stained* by the application, with an ordinary brush, of any of the *strong liquid dyes*, in the cold or only gently heated, to the surface of the skin previously stretched on a board. The surface when dry, is commonly finished off with *white of egg* and the pommel or smoothing stick. *Bookbinders* generally employ copperas water as a *black stain* or *sprinkle;* a solution of indigo as a *blue one;* and a solution of salt of tartar or common soda, as a *brown one.* See *Chemic Blue* and *Shoemaker's Black.*

Leather before being *japanned* or *varnished*, as in the preparation of what is called "*enamelled*" and "*patent leather*," is carefully freed from grease by the application of absorbent substances or hard pressure between rollers, and the surface is nicely shaved, smoothed, and polished by appropriate tools; the varnish is then applied to the *grain side* for the former, and the *flesh side* of the skin for the latter, which is previously stretched out tight on a board to receive it. The whole is lastly, submitted to a gentle stove-heat to harden the varnish; and the process is repeated, if necessary. See *Japanning* and *Varnishes.*

Uses, &c. These are well-known, and are all but universal. The leather manufacture of Great Britain is equal in importance and utility to any other department of our industry, and inferior in point of value and extent only to those of cotton, wool, and iron. "If we look abroad on the instruments of husbandry, on the implements used in most of the mechanic trades, on the structure of a multitude of engines and machines; or if we contemplate at home the necessary parts of our clothing — breeches, shoes, boots, gloves, — or the furniture of our houses, the books on our shelves, the harness of our horses, or even the substance of our carriages; what do we see but instances of human industry exerted upon leather? What an aptitude has this *single* material in a variety of circumstances for the relief of our necessities, and supplying conveniences in every state and stage of life? Without it, or even without it in the plenty we have it, to what difficulties should we be exposed?" (Dr. Campbell, *Polit. State of G. B.*) Leather is a kind of *natural felt*, but of much closer and firmer texture than that of artificial origin. "The thinner and softer kinds of leather are sometimes used as body-clothing; but its special and proper purpose is the manufacture of coverings for the feet, to protect them from cold and wet." (Eras. Wilson.)

LEATHER (Mountain). See *Asbestos.*

LEAVEN. Dough which has become sour or run into a state of incipient putrefaction. When a small quantity of it is added to recent dough, it excites fermentation, but is apt to produce a disagreeable taste and odour in the bread. It is now superseded by yeast. Both these substances are used in the same way.

LEAVES (Medicated). Syn. *Folio Medicata,*—Lat. On the Continent several preparations of this kind are in use. In many cases the leaves of tobacco deprived of nicotine by soaking them in water, are dried, and then moistened or steeped in a tincture or infusion of the medicinal substance. In this way *belladonna, camphor,* and *henbane* are often administered. Cruveillier recommends *opiated belladonna leaves* for smoking in troublesome coughs, phthisis, spasmodic asthmas, &c., to be prepared as follows:—*Belladonna leaves,* 1 oz., are steeped in an *infusion of opium,* 10 gr., in *water,* 1 fl. oz. (or less), and are then carefully dried in the shade. See *Cigars* (Medicinal), and *Vegetable Substances.*

LECANORIC ACID. See *Orsellinic Acid.*

LECANORINE. See *Orsellinic Acid.*

LEECH (Medicinal). Syn. *Bdella; Hirudo,*—Ph. L. &. D. The officinal leech of the Pharmacopœias is the *sanguisuga medicinalis* (Savigny; *hirudo medicinalis,* —Cuv. & Linn.), familiarly known as the *old English* or *speckled leech.* It is also occasionally called the *Hamburg gray* or *Russian leech,* from being imported from those parts. Its *characteristics* are—*Back,* greenish or olive-green, sometimes almost black or intense brown, with 6 rusty-red or yellowish longitudinal stripes, which are mostly spotted with black.—*Belly,* dirty yellow or light olive green, spotted more or less with black. The spots are very variable in size and number; in some cases few, in others so numerous as to form the prevailing tint of the belly. This variety, which is the most valuable of the commercial leeches, is chiefly imported from Hamburg.

Another variety of leech, the *sanguisuga officinalis* (Savigny; *hirudo provincialis,*—Carena; *h. officinalis,*—Geiger.), familiarly known as the *Hamburg* and *French green leech,* are imported from Bordeaux, Lisbon, and Hamburg. Its characteristics are—*Back,* brownish olive-green, with 6 reddish or rusty-yellow longitudinal bands.—*Belly,* light dirty pea-green, or yellowish-green, free from spots, but exhibiting two lateral stripes. This leech is vastly inferior to the preceding variety, and some of those imported from France and Portugal are absolutely useless, from their indisposition to bite, arising from the fraud practised by the collectors and dealers, of gorging them with blood to improve their appearance before sending them to market.

The above are the only species of leech employed in medicine in this country. Other varieties are noticed by writers on the subject, of which the best known is the *hæmopis sanguisorba* (Savigny; *hirudo sanguisuga,*—Linn.), the common horse-leech of our ponds, which although bearing a bad character among the vulgar for producing troublesome wounds, has been shown by a committee of the Council de Salubrité, of Paris, appointed for the purpose, to possess no teeth capable of penetrating the human skin.

Leeches are best *preserved* in water obtained from a pond, and occasionally changed; when kept in spring water, they soon die. The introduction of a hand to which an ill-flavoured medicine or odour adheres into the water in which they are kept, is often sufficient to poison them. The application of saline matter to the skin of leeches, even in very small quantities, immediately occasions the expulsion of the contents of the stomach: hence a *few grains* of common salt are frequently sprinkled over them to make them disgorge the blood which they have swallowed. The frequent changing of the water in which leeches are kept is injudicious. Once a *month* in winter, and once a *week* in summer, is deemed sufficiently often by the large dealers, unless the water becomes discoloured or bloody, when it should be changed every day, or every other day. When *clean pond water* cannot be obtained, clean rain water that has been well exposed to the air should alone be employed. Mr. J. R. Kenworthy recommends placing in the water a few balls or irregular lumps of *pure clay*, about 2½ inches in diameter; a method which we can recommend as both simple and successful. The *plan* adopted by M. Fée, is as follows:—Place 7 inches of a mixture of *moss*, *turf*, and *charcoal* in a marble or stone trough, over which sprinkle some *small pebbles*. At one end of the trough, and about half way up, place a thin shelf of stone or marble, pierced with small holes, on which put first some *moss*, or portions of *marsh horse-tail* (equisetum palustre, — *Linn.*), and on this a *layer of pebbles* to keep it down; then pour in water sufficiently high just to moisten the moss and pebbles, put in the leeches, and tie over the mouth of the trough with a cloth.

Propag. According to Dr. Wagner, an annual feast on living blood is necessary to render leeches able to grow and propagate. These conditions can only be fulfilled by restoring to the breeding cisterns those which have been already employed. All artificial methods of feeding them by bladders or sponges of blood, have been found to fail. He recommends the employment of *two tanks*, with the bottom formed of *loam*, *clay*, or *turf*, surrounded by an inner border of a similiar substance, and an outer one of sand,—the *one* for leeches fit for medical use,—and the other for *breeding*, or for such leeches as have been applied. No leeches are to be taken from the breeding tank until a year has elapsed after their having been applied and fed with human blood; and their removal to the first tank should take place in September or October, as by this time the breeding season is over. By this plan all leeches that have been applied are to be carefully restored to the breeding tank, without making them disgorge the blood they have swallowed.

LEECHING. This consists in the application of leeches to any vascular part of the body, for the purpose of withdrawing blood from it, and thus allaying local inflammation, distension of vessels, &c. *Leeches* are most conveniently *applied* by means of a common pill-box or a wine-glass. The part should be previously washed perfectly clean, and if covered with hair should be closely shaved. Sometimes leeches are indisposed to bite; in such cases, allowing them to crawl over a piece of dry linen or calico, rolling them in porter, moistening the part with a little milk or sweetened milk, or drawing a little blood by a slight puncture or scratch, will usually make them bite freely. To *stop* the *bleeding* from *leech-bites*, various plans are adopted, among which the application of *nitrate of silver* or *creasote*, or gentle pressure for some hours with the finger, are the most successful. Of late years a piece of *matico leaf* or *soldier's herb*, applied in the same manner as a piece of lint, has been commonly adopted to stop the bleeding of leech bites.

LEEK. Syn. *Porrum*,— Lat. The *allium porrum* (Linn.) Its general properties are intermediate between those of the onion and garlic. The juice is said to be powerfully diuretic, and capable of dissolving phosphatic calculi.

LEGUMINE. Vegetable caseine.

LEMON. Syn. *Limo*,—Lat. The fruit of the *citrus limonum* or *lemon tree*. The *juice*, *peel*, and *essential oil* are officinal. (See *below*.)

LEMON ACID. See *Citric Acid.*

LEMON FLAVOUR. See *Culinary Essences.*

LEMON JUICE. Syn. *Succus Limonum*, —Ph. L. Lemon juice is refrigerant and antiscorbutic, and has long been extensively employed in the preparation of cooling drinks and effervescing draughts, which are justly esteemed as wholesome summer beverages, as well as palliatives in fevers, nausea, &c. In scurvy, there is no remedy equal to *freshly expressed* lemon juice; and in acute rheumatism and gout, according to the united testimony of Dr. Owen Rees, Dr. Babington, and numerous Continental practitioners, it has been exhibited with considerable success. In agues, dysentery, English cholera, nausea and vomiting, heartburn, putrid sore-throat, hospital gangrene, syphilis, and numerous skin diseases, it has proved most serviceable. Its action in most of these cases, especially in scurvy and gout, probably depends on the large quantity of potassa which it contains united to an acid which has only a feeble affinity for the base; and which hence, readily parts with it in the body, whilst the acid undergoes a change in the organism, by which the formation of uric acid is lessened or prevented. Lemon juice, taken for several days, in very large quantities, is capable of rendering the urine alkaline. Of this no less than three cases have occurred within our knowledge; whilst in others in which the urine was unaffected, no relief was afforded by the juice. See *Citric Acid, Gout, &c*,

LEMON JUICE (Factitious). Syn. *Solutio Acidi Citrici, Succus Limonum Factitius*,—Lat. *Prep.* 1. *Citric acid*, 1¼ *oz.; carbonate of potassa*, 45 *gr.; white sugar*, 2½ *oz.; cold water*, 1 pint; dissolve, add the *yellow peel of a lemon*, and in 24 hours, strain through a hair-sieve or a piece of muslin.

2. As the last, but using 15 or 16 drops of *oil of lemon*, to flavour, instead of the lemon peel.

Obs. The above is an excellent substitute for lemon juice, and keeps well in a cool place. Tartaric acid, and even vinegar, are sometimes used instead of citric acid; but it is evident that it then loses all claim to being considered as an imitation of lemon juice, and to employ it in lieu of which would be absurd.

LEMON PEEL. Syn. *Cortex Limonum*,—Ph. L. "The *fresh* and the *dried* exterior rind of the fruit;" the latter dried "in the month of April or May." (Ph. L.) *Candied lemon peel* (*cortex limonum conditus*) is employed as a dessert, and as a flavouring ingredient by cooks and confectioners. It is reputed stomachic. See *Candies*.

LEMON PICKLE. See *Sauces, &c*.

LEMONADE. Syn. *Lemon Sherbet, King's Cup; Limonadum*,—Lat. *Prep.* 1. *Lemons* (sliced), 2 in no.; *sugar*, 2½ oz.; *boiling water*, 1½ pint; mix, cover up the vessel, and let it stand with occasional stirring until cold, then pour off the clear through a piece of muslin or a clean hair sieve.

2. *Juice of* 3 *lemons: yellow peel* of 1 lemon; *sugar*, ¼ *lb.; cold water*, 1 quart; digest for 5 or 6 hours, or all night, and decant or strain as before.

3. *Citric acid*, 1 to 1½ dr.; *essence of lemon*, 10 drops; *sugar*, 2 *oz.; cold water*, 1 pint; agitate together until dissolved.

Obs. Lemonade is a pleasant cooling summer beverage, and when made as above, may be drank in large quantities with perfect safety. It also forms an excellent refrigerant and antiseptic drink in fevers and putrid diseases generally. *Tartaric acid* is commonly substituted for citric acid from being cheaper. *Oxalic acid* has been used in the same way, but the liquor is thus rendered poisonous. *Lemonade* for *icing* is prepared as above, only using a little more sugar. *Orange Sherbet* or *Orangeade for Icing*, is made in a similar way from oranges.

LEMONADE (Aerated). Syn. *Limonadum Aeratum*,—Lat. *Limonade Gazeuse*,—Fr. *Prep.* 1. (P. Cod.) *Water*, charged with 5 times its volume of carbonic acid gas, 1 pint; *syrup of lemon*, 2 oz.; mix.

2. (*Without a bottling machine.*)—*a.* Into each bottle put *lemon syrup*, 1 to 1½ oz; *essence of lemon*, 3 drops; *sesquicarbonate of soda*, ½ dr.; *water*, q. s. to *nearly* fill the bottle; have the cork fitted and ready at hand, then add of *tartaric acid* (cryst.), 1 dr., *instantly* close the bottle, and wire down the cork; it should be kept inverted in a cool place, and preferably, immersed in a vessel of ice-cold water.

b. As the last, but substituting *lump sugar*, ¾ *oz.*, for the lemon syrup.

c. From *lump sugar*, 1 *oz.; essence of lemon*, 3 drops; *bicarbonate of potassa*, 25 gr.; *water*, q. s., as No. 1; then add *citric acid* (cryst.), 45 gr., and cork, &c., as before. The last is most wholesome, especially for the scorbutic, dyspeptic, gouty, and rheumatic.

Obs. The best aerated lemonade of the London makers is prepared by putting 1½ fl. oz. of rich *lemon syrup* into each bottle, which is then filled up with *aerated water* at the bottling machine.

LEMONADE (Antimoniated). Syn. *Limonadum Antimoniatum*,—Lat. *Prep.* By adding *tartar emetic*, 1 gr., to each pint of ordinary lemonade. *Dose.* A wine-glassful, every ½ hour or hour, as a diaphoretic and expectorant. See *Potassio-tartrate of Antimony*.

LEMONADE (Aperient). Syn. *Limonadum Laxativum*,—Lat. *Prep.* 1. *Sugar*, 1 *oz.; lemon juice*, ¾ *fl. oz.; sulphate of soda*, 3 dr.; *water*, 8 fl. oz.; put them into a soda-water bottle without shaking, have the cork ready fitted, add of *sesquicarbonate of soda* (in cryst.), ½ dr., and instantly cork the bottle, wire it down, and keep it in a cool place inverted. For a *dose*.

2. *Heavy carbonate of magnesia*, 1½ dr.; *refined sugar*, 1 *oz.; essence of lemon*, 5 or 6 drops; *water*, 8 fl. oz.; bottle as last, then add of *citric acid* (cryst.), 3 dr., and instantly cork, &c., as before. For a *dose*. It should be kept for at least 24 hours before being taken.

LEMONADE (Lactic). Syn. *Limonadum Lacticum*,—Lat. *Prep.* (Magendie.) *Lactic acid*, 1 to 4 dr.; *syrup*, 2 oz.; *water*, 1 pint; mix. Recommended in dyspepsia, &c.

LEMONADE (Milk). Syn. *Limonadum Lactis.* Take of *sugar*, ½ *lb.; water*, 1 pint; dissolve, add the *juice of* 3 *lemons; milk* or *whey*, ½ pint; stir the whole together and strain through a hair sieve. Some persons add a *glassful of sherry.*

LEMONADE (Mineral). On the Continent, under the name of *limonade minerale*, is included *water* acidulated with the *mineral acids* and sweetened with *sugar.* Thus we have *limonade chlorhydric, nitrique, phosphorique, sulphurique, &c.*, all of which are used as cooling drinks in fevers, inflammations, skin diseases, &c.

LEMONADE (Portable). See *Powders* and *Lemon Sugar.*

LEMONADE POWDERS. See *Powders, &c.*

LEMONATED KALI. See *Citrate of Potassa.*

LENITIVES. See *Laxatives.*

LENSES. A description of these articles belongs to a work on optics. It may, however, be useful to the chemical student to remark here, that the Coddington and Stanhope lenses, which may now be bought at any of the opticians, neatly mounted and of great power, for a few shillings, will be found of the greatest service in examining minute crystals, precipitates, &c.; and for all ordinary purposes offer a cheap and efficient substitute for more complicated microscopes. An extemporaneous instrument, possessing considerable power, may be made by simply piercing a small circular hole in a slip of metal, and introducing into it a drop of water, which then assumes a spherical form on each side of the metal while the latter is held in a horizontal position. The ingenious little *toy microscopes* sold about the streets of London under the form of a perforated pill-box, at one penny each, consist of such a lens made with *Canada balsam*, instead of water, which has the property of hardening without losing its transparency after exposure for a few hours to the air. A *still simpler substitute* for a lens, is a piece of *blackened card-paper* with the smallest possible needle-hole pierced through it. Any very small object held in a *strong light*, and viewed through this hole at the distance of about an inch, will appear quite distinct, and from 10 to 12 times larger than its usual size. We have often found this little instrument of incalculable service in situations and under circumstances in which a more powerful or complicated apparatus was unattainable or could not be applied.

LENTILS Syn. *Massoor; Lens Vulgaris.* The seeds of the *ervum lens* (Linn.; *lens esculenta*,—Mönch.), a plant of the natural order *leguminosæ.* Lentils resemble beans in their general properties, but are vastly inferior, and are reputed difficult of digestion, apt to disorder the bowels, and injurious to the eyes. They are chiefly cultivated as food for domestic animals. Such is the character of lentil seeds, yet, strange to say, the public have been now for years gulled with pretended preparations of them, vended at enormous prices as cures for dyspepsia, constipation, &c., and indeed, as *panaceas* that are capable of shortly removing disease and suffering from the world, and establishing a golden era in which the physician's vocation would be like "Othello's occupation"—"gone." *Nevill's Lentil Powder* is said to consist of *lentil flour*, 3½ *lb.; curry powder*, 1 *oz.* According to the 'Lancet,' the advertised article contains fully 1-3rd of its weight of *barley flour*, and in many cases consists entirely of *pea* or *bean flour*, mixed with ½ of its weight of the *flour of Indian corn*, with about 1 *oz.* of *common salt* to each *lb.* of the composition. See *Ervalenta* and *Revalenta.*

LEPROSY. Syn. *Lepra*,—Lat. A scaly eruption of the skin, characterized by patches of a circular form, and distinguished from the rashes and pimples by the alteration of the scarf-skin which covers the inflamed part. The cuticle becomes reddish and scaly; at first upon one spot, often the knee, and thence gradually spreads over the body, the parts attacked becoming stiff and uncomfortable, and generally, most disagreeable in appearance. By the time the patches reach the size of a shilling or half-a-crown, the scales usually fall off, and very frequently the surface looks red and angry, and remains bare until the eruption declines altogether. This variety is the "*lepra vulgaris*" of medical writers. The "*lepra alphos*," another variety, and one not uncommon in this country, is so named, because the patches when they cease to enlarge, after attaining a size about that of a sixpenny-piece, become depressed in the centre, and within the depression minute white powdery scales may be observed, whilst the surrounding border continues raised, and of the same red colour as at first. This variety usually commences at the elbow, but soon involves the fore-arm, and often the back of the hand. In the "*lepra* *nigricans*," the colour of the patches is dark and livid, and their central portion is not depressed, as in lepra alphos. In other respects it resembles lepra vulgaris. In "*lepra guttata*" the appearance of the eruption is that of a number of drops of water hanging to the skin. The little scale increases in thickness by the addition of fresh layers to its under surface, and has a bright, silvery lustre, which is due to the extreme thinness of the layers of scarf-skin, and the sponginess of its texture. "The eruption does not, however, constantly retain its early spotted character; more frequently, the spots increase in dimensions, and spread out into the form of circular patches, having the size of a shilling, half-a-crown, or crown-piece. This enlarged growth naturally requires time; and in proportion to the period occupied in growth is the thickness of the laminated scale; the latter, however, never exceeds in thickness a piece of moderately thick paper, and always preserves its beautiful silvery aspect. There are no humours, no irregular unsightly crusts, no excoriated surfaces in this eruption; in fact, there is nothing repulsive; but, on the contrary, if it were the general, instead of being the exceptional, it would be thought very beautiful, and would become highly fashionable." (Eras. Wilson.)

The *treatment of leprosy* consists chiefly of frictions, and warm vapour or sulphur baths, followed by the use of slightly stimulating ointments or liniments, with a light but nutritious diet of fresh meat, vegetables, and fruit, and entire abstinence from wine, spirits, and internal stimulants generally. A course of sulphureous mineral waters is generally sufficient of itself to remove ordinary cases.

The administration of *solution of potassa*, or of *arsenite of potassa*, or *bichloride of mercury*, has also been recommended, and is often useful. Sir Alex. Crichton employed the decoction of the leaves and twigs of solanum dulcamara (*bitter sweet* or *woody nightshade*), in doses of 2 or 3 fl. oz. thrice a day, gradually increased until at least a pint a day was taken. This is declared by the editors of the Lexicon Medicum to be "one of the most effectual remedies for lepra, under all its varieties." In delicate and relaxed habits, especially in females, chalybeates have often been given with much advantage. Perhaps, however, of all others, the most active and certain remedy is Donovan's solution of hydriodate of arsenic and mercury (*liq. hydriod. arsen. et hydrarg.*)

Leprosy appears to have been of much more frequent occurrence in ancient than in modern times. It is often spoken of in Holy Writ, and it occupied the particular attention of the Jewish lawgiver. But it is generally believed that the lepers mentioned by both the sacred and profane historians, were afflicted with a disease more nearly resembling the *elephantiasis* of modern writers, than leprosy.

LEROY'S VOMITIF-PURGATIF. *Prep.* Take of *tartar emetic* (in fine powder), 1 dr.; *white wine*, ½ pint; *sugar candy*, q. s. to colour; dissolve, and label the bottle "*Vomitif.*" Next dissolve of *resin of jalap*, 7 dr., in *rectified spirit*, ½ pint; and label the bottle "*Purgatif.*" A popular nostrum in France, but its use requires caution.

LETHARGY. Syn. *Lethargus*,—Lat. A heavy unnatural sleep, sometimes bordering upon apoplexy, with scarcely any intervals of waking, from which the patient is with difficulty aroused, and into which he again sinks as soon as the excitement is withdrawn. It frequently arises from plethora, in which case depletion is indicated; or from the suppression of some usual discharge or secretion, which it should then be our business to re-establish. It also often arises from over mental fatigue, and nervous debility, when relaxation from business, the use of a liberal diet, and ammoniacal stimulants and antispasmodics, are found useful. When depending on a determination of blood to the head, cupping may be had recourse to, and all sources of excitement avoided. In all cases the bowels should be moved as soon as possible by means of mild purgatives.

LETTUCE. Syn. *Lactuca*,—Lat. The early leaves or head of the *lactuca sativa* (Linn.) or *garden lettuce*, form a common and wholesome salad. They are reputed slightly anodyne, laxative, hypnotic, and antaphrodisiac, and have been recommended to be eaten at supper by those troubled by watchfulness, and in whom there exists no tendency to apoplexy. The "flowering herb" (*lactuca*) is officinal in the Ph. L.; the "inspissated juice," in the Ph. E.; and the "inspissated juice" and "leaves," in the Ph. D. The "inspissated juice" of *lactuca virosa* (Linn.) or *strong-scented wild lettuce*, is also officinal in the Ph. E.; and both the "leaves" and "inspissated juice" of the same variety are ordered in the Ph. D. The last species is more powerful than the cultivated lettuce. See *Extracts* and *Lactucarium.*

LEUCINE. M. Braconnot has given this name to a white pulverulent substance, obtained by the action of *dilute sulphuric* *acid* on *muscular fibre.* It is also obtained when *albumen, fibrine,* or *caseine,* are boiled in a *concentrated solution of potassa* as long as ammoniacal vapours are evolved; the liquid neutralized with *ammonia,* gently evaporated to dryness, and the residuum exhausted by *boiling alcohol,* furnishes a mixed solution of *protide, erythroprotide,* and *leucine.* The last is a crystallizable substance, forming small scales or lamellæ, which are colourless, tasteless, odourless, volatile when heated, soluble in both water and alcohol, and in oil of vitriol without decomposition. With nitric acid, it forms *nitroleucic acid.*

LEUCOLINE. See *Chinoleine.*

LEUCORRHŒA. Syn. *Fluor Albus,*—Lat. The *symptoms* of this disease, popularly called the "*whites,*" are well known to most adult females. The common *causes* are debility, a poor diet, excessive use of hot tea, profuse menstruation or purgation, late hours, immoderate indulgence of the passions, frequent miscarriages, protracted or difficult labours, or local relaxation. Occasionally it is symptomatic of other affections. The *treatment,* must be directed to the restoration of the general health, and imparting tonicity to the parts affected. Tepid or sea bathing, or shower baths; bark, chalybeates, and other tonics; with *local affusions* of *cold water,* and *mild astringent injections,* as those of *black tea* or *oak bark,* are generally found successful in ordinary cases.

LEUKOL. A substance, accompanied by *kyanol,* separated from *coal-oil* by agitating large quantities of that liquid with *hydrochloric* or *dilute sulphuric acid,* and then distilling the acid along with *caustic potassa* or *quicklime,* in excess. The mixed product is separated into its component substances by distillation. Recent researches have shown leukol to be identical with *chinoleine.*

LEVANT NUT. See *Cocculus Indicus.*

LEVIGATION. Syn. *Levigatio,*—Lat. The process of reducing substances to *fine* powder, by making them into a paste with water, and grinding the mass upon a hard smooth stone or slab, with a conical piece of stone having a flat, smooth, under-surface, called a "*muller.*" Levigation is resorted to in the preparation of paints on the small scale, and in the elutriation of powders. The term is also, sometimes, incorrectly applied to the lengthened trituration of a substance in a marble or wedgewood-ware mortar.

LEVORACEMIC ACID. See *Racemic Acid.*

LIBAVIUS'S LIQUOR. See *Bichloride of Tin.*

LICHEN. A dry papulous or pimply eruption of the skin, terminating in scurfy exfoliations. "*Lichen* exhibits great variety in its outward characters in different individuals; in *one,* the pimples are brightly red; in *another,* of debilitated constitution, they are bluish and livid; in a *third,* they are developed around the base of hairs; in a *fourth,* they appear as circular groups, and increase by their circumference, while they fade in the centre, forming so many rings of various size; in a *fifth,* a modification of the preceding, they have the appearance of flexuous bands; while in a *sixth,* they are remarkable for producing intensity of suffering, or unusual disorganization of the skin. They are all *occasioned* by constitutional disturbance, sometimes referable to the *digestive,* and sometimes to the *nervous system.* In some instances, however, they depend upon a *local cause.* I have had a crop of lichenous pimples on the backs of my hands from rowing in hot weather; and in hot climates that annoying disorder called *prickly heat* is a lichen." (Eras. Wilson.) The *treatment* of this affection is noticed under "*Eruptions* (Papular)."

LICHEN GUM. A strained *infusion* or *decoction* of several species of *lichen,* evaporated to dryness. It closely resembles gum arabic. 1 cwt. of *lichen coralloides* yields 14 *lb.;* of *lichen esculentus,* about 13 *lb.* (Gray.) See *Gum.*

LICHENIC ACID. An acid compound first noticed by Pfaff in Iceland moss. According to Brande it is identical with malic acid; but others who have examined it represent it as fumaric acid.

LICHENINE. Syn. *Lichen Starch.* A species of starch extracted from Iceland moss.

LICHENS. *Lichenes,*—Juss. *Lichenales,*—Lind. These are *cryhtogamous plants* which appear under the form of thin, flat crusts, covering rocks and the barks of trees. Some of them, like Iceland moss, are esculent and medicinal, and employed either as medicine or food; and others, when exposed in a moistened state to the action of *ammonia,* yield purple or blue colouring principles, which, like indigo, do not pre-exist in the plant. Thus, the *rocella tinctoria,* the *variolaria orcina,* the *lecanora tartarea,* &c., when ground to a paste with water, mixed with putrid urine or solution of carbonate of ammonia, and left for some time freely exposed to the air, furnish the *archil, litmus,* and *cudbear* of commerce, very similar substances, differing chiefly in the details of their preparation. From these the colouring matter is easily extracted by water or very dilute solution of ammonia. See *Archil*, *Cudbear*, and *Litmus*.

LIFE. Syn. *Vita*,—Lat. Life is only a general term expressive of the power by which the vital phenomena are produced. Treviranus, following in the footsteps of Needham and Buffon, asserts that there is in nature a matter which is ever moving, by which all living beings, animal and vegetable, possess life, and which, though immutable in its essence, is notwithstanding, variable in its form, and is incessantly changing it: that this matter or essence is deprived of form itself, but nevertheless ready to take that which we denominate *life;* that it maintains a determinate form under the influence of external causes; that it only continues in that form so long as these causes are active, and it takes another as soon as new causes influence it: that the matter capable of life, and the living principle, exist reciprocally, and that death is only a passage of certain forms of this matter or essence to certain others, which may resemble it in character, or be absolutely different. The researches of De Blainville and Tiedemann, demonstrate that life, as far as our limited knowledge extends, is a power of reaction, modified in every part according to its texture, and called into operation in each texture by appropriate and peculiar stimuli. The consideration of these questions belongs to physiology and philosophy, and their solution is a task which will probably never be accomplished by man.

LIGATURE. A small waxed piece of cord or string formed of silk or thread, employed for the purpose of tying arteries, veins, and other parts, to prevent hæmorrhage, or to cause their extirpation. To be safe and useful, they should be round, smooth, and sufficiently strong to permit of being tied with security without incurring the danger of breaking or slipping. There are many cases recorded in which emigrants, soldiers, and travellers have lost their lives, from the simple inability of those around them to apply a ligature.

LIGHT. Syn. *Lumen*, *Lux*, — Lat. Light acts as a vivifying or vital stimulus on organized beings; just as privation of light, or darkness, disposes to inactivity and sleep. "In maladies characterised by imperfect nutrition and sanguinification, as scrofula, rickets, and anæmia, and in weakly subjects with œdematous (dropsical) limbs, &c., free exposure to solar light is sometimes attended with very happy results. Open and elevated situations probably owe part of their healthy qualities to their position with regard to it." On the contrary, "in diseases of the eye attended with local vascular or nervous excitement, in inflammatory conditions of the brain, in fever, and in mental irritation, whether attended or not with vascular excitement, the stimulus of light proves injurious, and, in such cases, darkness of the chamber should be enjoined. After parturition, severe wounds, and surgical operations, and in all inflammatory conditions, exclusion of strong light contributes to the well-doing of the patient." (Pereira, *Elem. Mat. Med.*, *&c.*, i, 8-9.)

LIGHT (Artificial). Some interesting matter connected with this important subject will be found under the heads, *Gas*, *Illumination*, *Lamp*, *Photometry*, *&c.* Dr. Ure asserts that "by *narrowing* the top of a long glass chimney over an argand flame either from oil or coal gas, the light could be doubled, at the same cost of material. The very tall chimneys used by the Parisian lampists are very wasteful. I find that with a narrow chimney of *half* the length of theirs, I can have as good a light, and save 30 per cent. of the oil." A few years since Faraday demonstrated the fact, that by *widening* the *top* of a lamp chimney, a similar result was obtained.

TABLE *showing the relative cost of the same amount of light obtained from different sources referred to a common standard. Prepared expressly for this work.*

Source of Light.	Relative cost.
CANDLES.	
Palmer's lamp candles	13
Price's cocoa-nut stearine do.	15
Spermaceti do.	21
Stearine mould do.	12
Tallow do. (*dips*)	10
„ (*moulds*)	9
Wax do.	23
„ (factitious) do.	19
GAS.	
Good coal gas	1
Common do.	$2\frac{1}{3}$
LAMPS.	
Camphine (*old flat-wick'd*)	$1\frac{3}{4}$
Carcel or mechanical lamp (*sperm oil*)	5

TABLE *showing the relative cost of light, &c.* (*continued*).

Source of Light.	Relative cost.
French argand (*refined vegetable oil*) . . .	6
„ moderator (*do.*) .	6½
Parker's hot-oil lamp (*pale whale oil*) . . .	2
„ „ (*Price's cocoa-nut oil*) . .	4
„ „ (*sperm oil*)	5
Rayner & Carter's paragon camphine lamp . .	2
Young's vesta . . .	2

It appears from calculation, that two wax candles in burning vitiate the atmosphere of a room to an equal degree with the respiration of an averaged-sized man. The effect of tallow candles affording the same light is rather greater; whilst gas, from the impurities it is commonly loaded with, may be regarded to vitiate the air fully *four* times as fast as wax candles. According to Dr. Ure, "when a *tallow candle* of 6 to the *lb.* is not snuffed, it loses in intensity, in 30 minutes, 80$\frac{0}{0}$; and in 39 minutes, 86$\frac{0}{0}$; in which *dim state* it remains *stationary*, yet still consuming nearly the same proportion of tallow."

LIGHT (Bude). This name was originally given to a *gas* or *oil lamp*, supplied with a current of *oxygen gas*. It has since been applied to the concentric argand burner patented by Mr. Gurney.

LIGHT (Drummond). This is produced by directing a stream of *oxygen gas*, passing through the flame of a *spirit lamp*, upon a small *ball* of *quicklime* of about ¼ inch in diameter. Such is the intensity of this light, that when placed in the focus of a parabolic mirror, it has been distinctly seen at the distance of 60 miles.

LIGHT (Instantaneous). See *Matches, &c.*

LIGHT (Oxyhydrogen). This resembles the last in intensity. It is produced by directing the flame of the *oxyhydrogen blowpipe* on a piece of *quicklime.*

LIGNINE. Syn. *Cellulose.* This is woody fibre deprived of all foreign matter. It forms about 95$\frac{0}{0}$ of baked wood, and constitutes the woody portion of all vegetable substances. Fine linen and cotton are almost entirely composed of lignine, the associated vegetable principles having been removed by the treatment the fibres have been subjected to during the process of their manufacture.

Pure lignine is tasteless, inodorous, insoluble in water and alcohol, and absolutely innutritious; dilute acids and alkaline solutions scarcely affect it, even when hot; oil of vitriol converts it into dextrine or grape sugar, according to the mode of treatment. When *concentrated sulphuric acid* is added *very gradually* to about half its weight of *lint, linen rag, old cordage,* or any similar substance shreded small, and contained in a glass vessel, with constant trituration, the fibres gradually swell up and disappear, without the disengagement of any gas, and a tenacious mucilage is formed, which is entirely soluble in water. If, after a few hours, the mixture be diluted with *water*, the acid neutralized by the addition of *chalk*, and, after filtration, any excess of lime thrown down by the cautious addition of a *solution of oxalic acid*, the liquid yields, after a second filtration, and the addition of *alcohol*, in considerable excess, a gummy mass, which possesses all the characters of *pure dextrine.* If, instead of at once saturating the diluted acid solution with chalk, we boil it for 4 or 5 hours, the dextrine is entirely converted into *grape sugar*, which, by the addition of *chalk* and filtration, as before, and evaporation by a gentle heat to the consistence of a syrup, will, after repose for a few days, furnish a concrete mass of crystallized sugar. By strong pressure between folds of porous paper or linen, redissolving it in *water*, agitation with *animal charcoal*, and recrystallization, brilliant colourless crystals of *grape sugar* may be obtained. Hemp, linen, or cotton, thus treated, yield fully their own weight of gum, and 1⅙ of their weight of grape sugar. During the above transformation, the sulphuric acid is converted into *ligno-sulphuric acid*, and may be procured in a separate state. Strong nitric acid dissolves *sawdust*, and when the solution is diluted with *water*, a white insoluble powder (*xyloidine*) is deposited, which explodes when heated. (Robiquet.)

LIGNONE. Syn. *Xylite.* A light inflammable fluid, obtained with other products during the destructive distillation of wood. According to Berzelius, it is a mixture of pyroxilic spirit and acetate of methyle.

LIGNO-SULPHURIC ACID. Syn. *Sulpholignic Acid.* See *Lignine.*

LIGNUM VITÆ. See *Guaiacum Wood.*

LILAC DYES. These are modifications of violets or purples. See *Dyeing, &c.*

LILACINE. Syn. *Lilacina, Syringine.* A bitter crystallizable principle obtained from the *syringa vulgaris* (Linn.) or *common lilac.*

Prep. (M. Meillet.) The *leaves*, or, preferably, the *seed-vessels of syringa vulgaris*, are bruised, boiled twice with *water*, the mixed decoction is evaporated to one-half, and *basic acetate of lead* is added; the liquor is next evaporated to a syrup, and treated with *calcined magnesia*, in excess; the whole is then dried, pulverized along with a little *carbonate of magnesia*, digested in water at about 100° Fahr., and the undissolved portion treated with *boiling rectified spirit.* The solution thus obtained is decoloured with *animal charcoal*, filtered, evaporated to one-half, and placed aside; the *lilacine* crystallizes out as the spirit cools.

Prop., &c. Lilacine forms white fasciculi of acicular crystals, or prisms; it has a bitter taste, and is insoluble in water and many acids. (Jour. de Pharm. 1842.) It is tonic and febrifuge, and has been proposed as a substitute for quinine.

LIME. Syn. *Oxide of Calcium, Protoxide of do.; Calcii Oxydum, &c.*—Lat. *Calx*, —Ph. L. E. & D. An oxide of calcium, obtained by exposing limestone or chalk, which are carbonates of lime, to a red heat. The substance thus obtained is called *quicklime, caustic lime, burnt lime*, or "*stone lime*," (*calx viva, c. usta, c. u. recens.*) When water is sprinkled on quicklime it becomes very hot, and crumbles down into a dry white powder, which is "*hydrate of lime*," (*calcis hydras, calx extincta*,) popularly known as "*slaked*" or "*slacked lime.*" Oyster-shells, and other fish-shells, are also converted into quicklime by burning, which are then called "*shell lime*," (*calx è testis*,—Ph. L. 1824.) *Milk of lime* is slaked lime mixed up with water, as in the preparation of common "*whitewash.*"

Prep. Lime is included in the Materia Medica of the present Ph. L.; by which we should infer the quicklime of commerce is intended, did not the college add "*freshly prepared from chalk.*" In the Ph. L. 1836, both commercial lime, and lime prepared by burning *chalk*, broken into small pieces, for 1 hour, in a "very strong fire," are ordered. The Ph. E. directs small fragments of *white marble* to be placed "in a covered crucible, and kept at a full red-heat for 3 hours, or until the residuum, when slaked and suspended in water, no longer effervesces on the addition of muriatic acid." *Iceland spar, white Carrara marble*, and the *black bituminous marble* of Derbyshire or Kilkenny, yield nearly pure lime by calcination. *Perfectly pure lime* can only be obtained by heating to whiteness, in a platinum crucible, a *carbonate of lime* prepared by precipitating *nitrate of lime* with *carbonate of ammonia.*

Prop. Pure lime has a sp. gr. of about 2·3; it is highly acrid, alkaline, and caustic, and rapidly destroys organic matter in the presence of moisture; it is soluble in 635 parts of water at 32°, but requires 778 parts at 60°, 972 parts at 130°, and 1270 parts at 212° Fahr. for its solution, (Wollaston); a pint of water at 32° dissolves 13·25 gr.; at 60°, 11·6 gr.; and at 212°, 6·7 gr. (Phillips); hence, the propriety of employing *cold water* for the solution of lime; exposed to the air, it rapidly attracts carbonic acid, and passes into the state of carbonate (*chalk*); when strongly heated it becomes phosphorescent, and emits a brilliant light; and on this account is sometimes employed for illumination, as in the *Gurney*, or *Lime Light.* Lime readily unites with the acids, and forms salts, nearly all of which may be made by directly neutralizing the acid with *hydrate* or *carbonate of lime.* They may also be made by double decomposition.

Pur. "Water being added, it crumbles into powder. It is (entirely) dissolved by dilute hydrochloric acid, without effervescence. Ammonia being added to this solution, in excess, throws down nothing." (Ph. L.)

Tests. 1. The alkaline carbonates, phosphates, oxalates, and sulphates occasion white precipitates in solutions of lime. The precipitates produced by the *first three* tests are soluble in dilute nitric and hydrochloric acid; that by the *last* is insoluble in those menstrua, but soluble in a solution of common salt, and is not reprecipitated by dilute sulphuric acid. (Wackenroder.) *Oxalate of ammonia* is the most delicate test for lime. If the substance under examination is a solid, it must be dissolved by digestion in hydrochloric acid, the resulting solution filtered, evaporated to dryness, the residuum redissolved in water, and the new solution tested as above.—2. Caustic potassa and ammonia, perfectly free from carbonic acid, do not disturb solutions of the salts of lime.—3. All the soluble salts of lime tinge the flame of alcohol of an orange colour; but this may be confounded with the colour produced by the salts of strontia.

Lime, in solution, is distinguished from *baryta* by *not* being precipitated by hydrofluosilicic acid;—from *strontia*, by not being precipitated by neutral chromate of potassa;—from *alumina* and *magnesia*, by the comparative insolubility of its sulphate; and from both baryta and strontia, by the liquid being unaffected by a solution of sulphate of lime, and yielding, in weak solutions, a white precipitate with oxalate of ammonia, after the removal of those earths (if present) by the cautious addition of a solution of sulphate of potassa.

Estim.—1. The lime may be thrown down by *oxalate* or *carbonate of ammonia*, and the precipitate washed, dried, calcined, and weighed. Each grain is equivalent to 0·5629 gr. of pure lime.—2. The washed precipitated as last, is calcined with excess of sulphuric acid, which converts it into sulphate of lime. In this case each gr. represents 0·41176 gr. of lime.—3. When mixed with alumina, baryta, or magnesia, the plan noticed under Glass (see *p.* 525) must be had recourse to.

Uses. Lime is corrosive, antacid, and depilatory. It is employed in *surgery* as a caustic, and in *chemistry* and *pharmacy* to make lime water, to render the alkalies caustic, to make several calcareous salts, abstract water from various substances, &c. It is largely used to make mortars and cements, and as a manure in *farming, &c.* In large doses it is poisonous. The *antidotes* are, water acidulated with vinegar or lemon juice, and demulcents.

LIME (Acetate of). Syn. *Calcis Acetas*,—Lat. *Prep.* 1. *Acetic acid* is neutralized by *prepared chalk*, and the filtered solution, evaporated by a gentle heat, and allowed to crystallize. Very soluble. *Dose.* 10 to 20 gr.; as a diuretic in dropsies, &c.

2. See *Pyrolignite of Lime.*

LIME (Carbonate of). A white powder, insoluble in water, but freely soluble in water holding carbonic acid in solution, which thus becomes temporarily hard. By boiling, the carbonic acid is expelled, and the carbonate again precipitated. See *Chalk, Limestone, Marble, &c.*

LIME (Chloride of). See *Hypochlorite of Lime.*

LIME (Chromate of). Syn. *Calcis Chromas*,—Lat. This salt is now used in large quantities as a source of chromic acid.

Prep. (Chas. Watt, jun.) The *residual liquor of the process of bleaching with chromic acid*, which is rich in oxide of chromium, is placed in a wooden vessel, and *slaked lime* is cautiously added until the sulphuric or hydrochloric acid present is saturated, carefully avoiding excess, as oxide of chromium would be then precipitated; after an hour's repose the clear portion is decanted, and finely *slaked lime* added, with constant agitation, until all the oxide is thrown down; known by the liquor becoming clear when allowed to settle; after sufficient repose, the liquid portion is decanted, the precipitate is washed with *clean water*, and drained; the residual mixture of *oxide of chromium* and *lime* is then placed about 2 inches thick upon a large flat iron plate set evenly over a fire, and turned every half hour until the process of roasting is completed, and the whole is converted into *chromate of lime*, which is known by the mass assuming a yellow colour, instead of the grayish one which it previously possessed; during the operation, care must be taken not to employ too much heat, as the product is readily decomposed, and assumes a green colour, in which case it is rendered useless. See *Chromic Acid.*

LIME (Hydrate of). See *above.*

LIME (Hydrochlorate of). See *Chloride of Calcium.*

LIME (Hypochlorite of). Syn. *Bleaching Powder, Chlorinated Lime, Chloride of do., Chlorite of do.; Calcis Hypochloris; Calx Chlorinata*,—Ph. L. & E. *Chloruret of Lime, Oxymuriate of do., Calcis Oxymurias, Calcaria Hypochlorosa, Subchloris Calcicus*,—Obs. The precise constitution of this compound is still undetermined, but it is now generally conceived that the characteristic properties of this substance, as well as of the corresponding preparations of potassa and soda, depend on the presence of hypochlorous acid, a substance as remarkable for its bleaching powers and chemical activity as chlorine itself. This opinion is borne out by the discovery of M. Gay-Lussac, that when the bleaching chlorides are distilled along with sulphuric or nitric acid, in quantity insufficient to decompose the whole, *hypochlorous acid* is evolved; but where the acid is added in excess, chlorine alone is disengaged. (*Ann. Chim. et Phys.*)

Prep. 1. (Ph. L. 1836.) *Hydrate of lime* is thinly spread out in a proper vessel and exposed to an *atmosphere* of *chlorine gas* until it is saturated. In the present Ph. L., it is included in the Materia Medica.

2. (M. Labarraque.) *Hydrate of lime* (fresh), 20 parts; *common salt*, 1 part; are mixed together and the powder placed in long earthenware vessels into which *chlorine* is passed until the mixture begins to grow damp, or until one part of it dissolved in 130 parts of *water*, is capable of

decolouring 4½ parts of *sulphate of indigo*, when the whole is transferred to dry bottles.

3. (*Wholesale.*) The *chlorine* is generated from the usual materials mixed in *leaden vessels*, heated by steam, and the gas, after passing through *water*, is conveyed by a *leaden tube*, into an apartment built of *silicious sandstone*, and arranged with *shelves* or *trays*, containing dry *fresh slaked lime*, placed one above another, about an inch asunder. The process, to produce a *first-class article*, is continued for 4 or 5 days. During this time the lime is occasionally agitated by means of iron rakes, the handles of which pass through *boxes of lime* placed in the walls of the chamber, which thus act as valves.

Prop., &c. "It is soluble in dilute hydrochloric acid, emitting chlorine." (Ph. L.) "Pale grayish white; dry; 50 gr. are nearly all soluble in 2 fl. oz. of water, forming a solution of the density of 1·027, and of which 100 measures, treated with an excess of oxalic acid, give off much chlorine, and if then boiled, and allowed to rest for 24 hours, yield a precipitate which occupies 19 measures of the liquid." (Ph. E.) Good chloride of lime contains on the average from 32% to 36% by weight of chlorine, of which, however, not more than 25% to 30% are available or capable of being easily liberated by an acid.

Tests. It is recognized by the above properties, and by its power of destroying vegetable colours. When heated it evolves oxygen gas, together with a little chlorine.

Estim. See *Chlorimetry.*

Uses. Chloride of lime is employed in *medicine* as an antiseptic and disinfectant. An ointment of chloride of lime has been used in scrofula (Cima), and a lotion or bath, moderately dilute, is one of the cleanest and readiest ways of removing the *itch*, and several other skin diseases. As a *disinfectant*, it may be used either in substance or solution. A small quantity of the powder spread on a flat dish or plate, and placed on the chimney piece, and a like quantity in an opposite part of the room, will continue to evolve sufficient chlorine or hypochlorous acid to disinfect the air of an apartment for several days. The evolution of chlorine is promoted by occasionally renewing the exposed surface, by stirring it with a piece of stick, and after it becomes scentless, by the addition of a little acid, as *strong vinegar*, or *spirits of salts* or *oil of vitriol*, largely diluted with *water*. The most extensive consumption of chloride of lime is, however, for bleaching textile fabrics. When employed for this purpose, the goods are first immersed in a *dilute solution* of this compound, and then transferred to a vat containing *dilute sulphuric acid*. The chlorine thus disengaged in contact with the cloth, causes the destruction of the colouring matter. This process is generally repeated several times, it being unsafe to use strong solutions. *White patterns* may thus be imprinted upon coloured cloth; the figures being stamped with *tartaric acid thickened with gum-water*, the stuff is immersed in the chloride bath, when the parts to which no acid has been applied remain unaltered, while the printed portions are bleached white.

Concluding Remarks. Chloride of lime is now scarcely ever made on the *small scale*, as it can be purchased of the large manufacturer of better quality and cheaper than it could possibly be made by the druggist. Messrs. Tennants, of Glasgow, are the largest manufacturers of this article in the United Kingdom. Berzelius and Balard, the two best authorities on the subject, regard this substance as consisting of *hypochlorite of lime*, *chloride of calcium*, and *water*. The only *secret* in the manufacture of good bleaching powder is maintaining the temperature of the ingredients rather low.

Keller has proposed chloride of lime as a source of oxygen gas. 1 *oz.* of this substance boiled in about 4 fl. oz. of *water*, furnish about 340 cubic inches of OXYGEN; and with the addition of ½ its weight of *black oxide of manganese*, considerably above 500 cubic inches, by the same treatment. The gas is contaminated with some chlorine, from which, however, it is easily freed.

LIME (Lactate of). Syn. *Calcis Lactas*, —Lat. See *Lactic Acid.* It has been recommended in stomach affections, accompanied with heartburn and acidity.

LIME (Muriate of). See *Chloride of Calcium.*

LIME (Oil of). See *Chloride of Calcium.*

LIME (Oxalate of). Syn. *Calcis Oxalas*, —Lat. A white powder, *insoluble* in acetic acid, *easily* soluble in nitric acid. A red heat converts it into carbonate of lime. See *Oxalic Acid.*

LIME (Oxymuriate of). See *Hypochlorite of Lime.*

LIME (Phosphates of). There are several distinct compounds of lime and phosphoric acid, but only two are of any practical importance. They are all insoluble in water, but dissolve readily in dilute acids, even the acetic.

1. *Bone Phosphate of Lime, Tribasic do., Subphosphate of do.; Calcis Subphosphas, C. Triphosphas, &c.*, Lat.—*a.* (*Bone ash, bone earth; terra ossium, ossa calcinata,*—Lat.) From *bones* calcined in contact with the air, until the whole of the carbonaceous matter is destroyed. It consists of tribasic phosphate of lime, mixed with a little carbonate and a trace of sulphate of lime. (See *page* 148.)

b. Precipitated phosphate of lime; calcis phosphas præcipitatum,—Ph. D. *Bone ash* (in powder), 4 *oz.; hydrochloric acid,* 6 fl. oz.; diluted with *water,* 1 pint; digest 12 hours, filter, add to the filtrate, *water,* 1 pint, and precipitate the solution with *solution of ammonia,* 11 fl. oz., or q. s. to render the liquid slightly alkaline; lastly, collect the precipitate on a calico filter, well wash it, and dry it by exposure to a warm atmosphere. *Dose.* 10 to 30 gr., twice or thrice a day, either alone or combined with saccharine carbonate or sesquioxide of iron; in rickets, ulcers, fractures, &c.

2. *Superphosphate of Lime, Biphosphate and Sulphate of do.; Calcis Superphosphas,* —Lat. *Prep.* From *burnt bones* (crushed small), 2 parts; *oil of vitriol,* 1 part; *water,* 3 parts; mix, and macerate together for some days, frequently stirring. Mixed with water, dry earth, or sand, it forms an excellent manure. See *Bone Dust* and *Manures.*

LIME (Pyrolignite of). This is impure *acetate of lime* made with *crude pyroligneous acid.* By exposing it to a heat insufficient for its decomposition, much of the tar and empyreumatic matter is destroyed or rendered insoluble. It is used to make *crude acetic* or *pyroligneous acid,* and *acetate* or *pyrolignite of lead.*

LIME (Sulphate of). Syn. *Calcis Sulphas,*—Lat. This compound exists native in *gypsum* and *selenite,* and when baked or deprived of water by roasting, forms the substance popularly known as *plaster of Paris.* Its applications in this form are well known. It is soluble in about 500 parts of water, and in a much less quantity of water holding chloride of sodium, sal ammoniac, or nitre in solution. The solution, in all cases, is precipitated by alcohol. It is this substance which imparts *permanent hardness* to *spring* and *river water.*

LIME (Sulphuret of). See *Sulphuret of Calcium.*

LIME (Tartrate of). Syn. *Calcis Tartras,* —Lat. Insoluble in water. See *Tartaric Acid.*

LIMES. The *fruit* of *citrus acida* (Roxburgh; *C. lima,*—Macfadyen) or *lime tree.* For the most part they resemble lemons. The juice (*lime juice, limetta do.,*) is, however, much more acid, and when undiluted, is said to be even acrid.

LIMESTONE. The value of *chalk, limestone, marble, &c.,* for hydraulic mortars and cements may be determined as follows:—

1. A given weight (say 100 gr.) of the sample is reduced to powder and digested in *hydrochloric acid* diluted with about an equal weight of *water,* with frequent agitation for an hour or longer; the mixture is then diluted with thrice its volume of *water,* thrown upon a filter, and the undissolved portion washed, dried, ignited, and weighed. This *weight* indicates the *per centage* of CLAY and SILICA or SAND; and the *loss* that of the LIME, MAGNESIA, and IRON present in the substance examined. In most cases these results will be sufficient to show the quality of the limestone for the purpose of making mortar or cement.

2. The *filtrate* and the *washings* are mixed together, and *ammonia* is added in excess; the bulky, reddish-brown precipitate, is collected, washed, dried, ignited, and weighed. This gives the *per centage* of SESQUIOXIDE OF IRON.

3. The *filtrate, &c.,* from (2) is then treated with *oxalate of ammonia,* and the quantity of LIME determined in the manner described at *page* 693.

4. The *liquid filtered* from the precipitate in (3) is boiled for some time with *carbonate of potassa* until ammoniacal fumes are no longer evolved; the precipitate is then collected on a filter, washed with hot water, dried, and *strongly* ignited for 3 or 4 hours, and lastly, weighed. This gives the *per centage* of MAGNESIA.

5. The respective proportions of *caustic lime* and *carbonate of lime* or *chalk* in a mixture of the two, are determined as follows:—

a. 100 gr. of the *sample for examination* are mixed with 200 gr. of *sal ammoniac,* both in fine powder, and the mixture is treated as described under *Guano* (p. 548, 2 *a*, or 2 *b*). The weight of *ammonia,* thus found, multiplied by 1·65, the product deducted from 100, and the difference multiplied by 2·273, gives the *per centage* of CHALK (nearly). Or—

b. 100 gr. of the sample are tested in the *alkalimeter* of Fresenius and Will, described at *page* 42, and figured at *p.* 19. The carbonic acid evolved, in grains, multiplied by 2·273, gives the *per centage* of CHALK, as before. The difference between this *weight* and 100, indicates the *per centage* of QUICKLIME.

LINCTUS. Syn. *Looch, Lohoch, Lincture, Lambative; Elegma, Illinctus, &c.* A medicine of the consistence of honey, intended to be licked off a spoon. This form of medicine is well adapted to females and children, but is not much used in England at the present time. Those employed in modern pharmacy and prescribing are included under the heads *Confections, Conserves,* or *Electuaries.* The *dose,* when it is not otherwise stated, is a tea-spoonful occasionally.

LINCTUS (Cacao). Syn. *Linctus Cacao, Lohoch C.,*—Lat. *Crême de Tronchin,*—Fr. *Prep.* From *cocoa-nut butter,* 2 oz ; *white sugar* (in powder), *syrup of capillaire,* and *syrup of tolu,* of each, 1 oz.; mix. Demulcent and pectoral; in coughs, sore throats, hoarseness, &c.

LINCTUS (Common). Syn. *Lohoch Commune,*—Ph. E. 1744. *Prep.* From *oil of almonds* and *syrup of tolu,* of each, 1 oz.; *powdered white sugar,* 2 dr. As the last.

LINCTUS (Cough). Syn. *Linctus Pectoralis,*—Lat. *Prep.* (Dr. Latham.) *Compound ipecacuanha powder* (Dover's powder), ½ dr.; *compound tragacanth powder,* 2 dr.; *syrup of tolu, confection of hips,* and *simple oxymel,* of each, 1 oz. *Dose.* 1 teaspoonful, 3 or 4 times a day. "This linctus has been extensively used, as a remedy for coughs, in the West-end of London, having been found to be a safe and generally efficacious remedy." (Redwood.) The preceding as well as the following are also useful preparations.

LINCTUS (Demulcent). Syn. *Linctus Demulcens,*—Lat. *Lohoch de Tronchin,*—Fr. *Prep.* From *oil of almonds, syrup of capillaire, manna,* and *cassia pulp,* of each, 2 oz.; *powdered gum tragacanth,* 20 gr.; *orange-flower water,* 2 fl. oz. As the last. The above is the quantity for two days, which is as long as it will keep.

LINCTUS (Emollient). Syn. *Oily Emulsion; Lohoch Oleosum, Emulsio Oleosa,*—Lat. *Looch Huileux,*—Fr. *Prep.* (P. Cod.) *Oil of almonds, powdered gum,* and *orange-flower water,* of each, 4 dr.; *syrup of marshmallow,* 1 oz.; *water,* 3 fl. oz. or q. s.; for an emulsion. In troublesome coughs.

LINCTUS (Expectorant). Syn. *Linctus Expectorans, Lohoch E.,*—Lat. *Prep.* 1. *Oxymel of squills, confection of hips, syrup of marshmallows,* and *mucilage of gum arabic* (thick), equal parts. Demulcent and expectorant.

2. (Dr. Copland.) *Oil of almonds* and *syrup of lemons,* of each, 1 fl. oz.; *powdered ipecacuanha,* 6 gr.; *confection of hips,* 1 oz.; *compound powder of tragacanth,* 3 dr.

3. (Zanetti.) *Kermes mineral,* 4 gr.; *manna,* 6 oz.; *oil of almonds, syrup of squills,* and *syrup of senega,* of each, 2 dr. Laxative, demulcent, and expectorant. The above are useful in hoarseness, tickling coughs, sore throats, &c.

LINCTUS (Pectoral). Syn. *Fox Lungs; Linctus Pectoralis, Lohoch e pulmone Vulpium,*—Lat. *Prep.* From *spermaceti* and *Spanish juice,* of each, 8 *oz.; water,* q. s. to soften the liquorice; make a thin electuary, and add of *honey,* 3 *lb.; oil of aniseed,* 1 *oz.;* mix well. A popular and excellent demulcent in coughs. It formerly contained the herb *fox lungs,* but spermaceti is now substituted for that article.

LINCTUS (Turpentine). Syn. *Linctus Stimulans, L. Terebinthinæ, Lohoch Anthelminticum,*—Lat. *Prep.* (Recambier.) *Oil of turpentine,* 2 dr.; *honey of roses,* 3 oz.; mix. *Dose.* A tea-spoonful, night and morning, followed by a draught of any weak liquid; in worms, more especially tape-worm.

LINCTUS (White). Syn. *Linctus Albus, Mistura Alba, Lohoch Album,*—Lat. *Looch Blanc,*—Fr. *Prep.* (P. Cod.) *Jordan almonds,* 4½ dr.; *bitter almonds,* ½ dr.; blanch them by steeping them in *hot water* and removing the skins, add of *white sugar,* ½ oz.; *gum tragacanth,* 20 gr.; beat to a smooth paste, and further add of *oil of almonds* and *orange-flower water,* of each, 4 dr.; *pure water,* 4 fl. oz. A pleasant demulcent in tickling coughs.

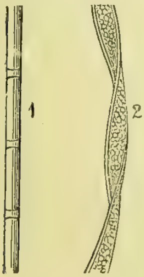
LINEN. Syn. *Linteum,*—Lat. Linen is a textile fabric made of the fibrous portions of the *bark* of the *linum usitatissimum* (Linn.) or *common flax,* a plant which from time immemorial has been cultivated for this purpose. It is remarkable for the smoothness and softness of its texture, and is hence highly esteemed in temperate climates as an elegant and agreeable article of clothing to be worn next the skin. Its fibres are better conductors of heat, more porous, and more attractive of moisture than those of cotton, which render it less adapted for body linen in cold weather as well as in hot weather and hot climates, than calico. The latter, however, lacks the luxurious softness and freshness of linen, whilst the peculiar twisted and jagged character of its fibres render it apt to excite irritation in extremely delicate skins. The common prejudice in favour of old linen and flax lint for dressing wounds is thus shown to have reason on its side, and like many other vulgar prejudices, to be supported by the investigations of science.

Identif. Linen fabrics are commonly sophisticated with cotton, which is a much less costly, and a more easily wrought material. Various plans have been proposed to detect this fraud, many of which are too complicated and difficult for practical purposes. The following commend themselves for their simplicity and ease of application:—

1. (Dr. Boettger.) A *small strip* (a square inch for instance) of the *suspected cloth* is immersed for 2 or 3 minutes in a *boiling mixture* of about equal parts of *hydrate of potassa* and *water*, contained in a vessel of silver, porcelain, or hard glass; after which it is taken out and pressed between the folds of *white blotting paper* or *porous calico*. By separating 8 or 10 threads in each direction, their colour may be readily seen. The *dark* yellow threads are LINEN, the *white* or *pale yellow* ones are COTTON.

2. (M. Kindt.) A *small strip of the cloth* previously well washed, dried, and *weighed*, is immersed for 1 to 2 minutes in *oil of vitriol;* it is then withdrawn, boiled for a few minutes in *water* to dissolve out the gummy portion, and then washed, *first* with *water holding a little salt of tartar in solution*, and *next* with *pure water;* the strip is lastly, dried and weighed. The *loss of weight* indicates the quantity of cotton which was originally present in the sample. The number of fibres or threads so lost may be readily determined by simple inspection.

3. (*By the microscope.*) The indications afforded by both the previous tests, although quite visible to the naked eye, are rendered still more palpable by the use of a magnifying glass of small power, as the common pocket lens. Under a good *microscope* the presence of *cotton* in a *linen tissue* is very perceptible. The *fibres of cotton* present a distinctly flat, and shrivelled appearance, not unlike that of a narrow, twisted ribbon, with only occasional joints; whilst those of *flax* are round, straight, and jointed. The fibres of cotton after being exposed to the action of strong alkaline lyes (*alkalized cotton, mercurized do.*) untwist themselves, contract in length, and assume a rounded form, but still continue distinct in appearance from the fibres of linen. The *engraving* represents a fibre of *linen* and *cotton* as they appear when magnified 155 diameters. The difference between the two may be perceived, although less distinctly, through a good Stanhope or Coddington lens, provided the object be well illuminated.



Dyeing. Linen and cotton from the similarity of their behaviour with dye-stuffs are treated in nearly the same manner. The affinity of their fibres for colouring matter is very much weaker than that of the fibres of silk and woollen. On this account they are dyed with greater difficulty than those substances, and the colours so imparted are, in general, less brilliant and permanent under similar conditions. The yarn or cloth after being *scoured* and *bleached* in the usual manner, requires to have an additional tendency given to it, by chemical means, to condense and retain the materials of the dye-bath in its pores. This is effected by steeping the goods in solutions (*mordants*) which have at once an affinity for both the fibres of the cloth and the colouring matter. A similar process is employed in dyeing most other substances; but with cotton and linen, attention to this point is essential to the permanency of the dye. These matters are more fully explained under the heads, *Dyeing* and *Mordants.*

The *domestic management* of *linen* may here receive a few moments' attention. *Fruit stains, iron-moulds*, and other spots on linen, may, in general, be removed by applying to the part, previously washed clean, a *weak solution* of *chlorine, chloride of lime, spirits of salts, oxalic acid*, or *salts of lemons*, in *warm water*, and frequently by merely using a little *lemon juice.* When the stain is removed, the part should be thoroughly rinsed in clear *warm water* (without soap) and dried. *Recent iron-moulds* or *ink spots* on starched linen, as the front of a shirt, may be conveniently removed by allowing a drop or two of *melted tallow* from a *common candle* to fall upon them before sending the articles to the laundress. The oxide of iron combines with the grease, and the two are washed out together. If the spot is not *entirely* removed the first time, the process should be repeated. *Linen* that has acquired a *yellow* or *bad colour* by careless washing, may be restored to its former whiteness by working it well in water to which some *strained* solution of *chloride of lime* has been added, observing to *well rinse* it in *clean water*, both before and after the immersion in the bleaching liquor. The attempt to bleach *unwashed* linen should be avoided, as also using the liquor too strong, as in that case the linen will be rendered rotten. See *Chlorometry*, *Bleaching*, *Hypochlorite of Lime*, *&c.*

LING. The *gadus molua* (Linn.), an inferior species of the cod-fish tribe, common in the Northern seas, and used as a coarse article of food by the poor.

LINIMENT. Syn. *Linimentum*,—Lat. A semifluid ointment, or soapy application to painful joints, swellings, burns, &c. The term is also occasionally extended to various spirituous and stimulating external applications. A medicine of a thinner consistence, but similarly employed, is called an "*embrocation*." These terms are, however, frequently confounded together, and misapplied. *Liniments* are generally *administered* by friction with the hand or fingers, or with some substance (as a *piece of flannel*) capable of producing a certain amount of irritation of the skin. Sometimes a piece of linen rag dipped in them is simply laid on the part. In most cases in which liniments are found beneficial, the advantage obtained from them is attributable rather to the friction or local irritation, than to any medicinal power in the preparation itself. The greater number of *cerates* and *ointments* may be converted into *liniments* by simply reducing their consistence with *almond* or *olive oil*, or *oil of turpentine*.

LINIMENT (Acid). Syn. *Linimentum Acidum*, *L. Acidi Sulphurici*,—Lat. *Prep.* 1. (Sir B. Brodie.) *Salad oil*, 3 oz.; *oil of vitriol*, 1 dr.; mix, then add of *oil of turpentine*, 1 oz., and agitate the whole well together. As a counter-irritant, in rheumatism, stiff joints, &c. It closely resembles the "*Guestonian Embrocation*."

2. (Hosp. F.) *Olive oil*, 3 oz.; *oil of turpentine*, 2 oz.; *sulphuric acid*, 1 fl. dr. An excellent alterative, stimulant, discutient, and counter-irritant, in chronic rheumatism, stiff joints, indolent tumours, and various chronic diseases of the skin.

LINIMENT (Amber-oil). Syn. *Linimentum Succini*,—Lat. *Prep.* From *olive oil*, 3 parts; *oils of amber* and *cloves*, of each, 1 part. Resembles *Roche's Embrocation*.

LINIMENT (Amber,—Opiated). Syn. *Linimentum Succini Opiatum*,—Lat. *Prep.* From *rectified oil of amber* and *tincture of opium*, of each, 2 fl. oz.; *lard*, 1 oz. Anodyne, antispasmodic, and stimulant. A once popular remedy in cramp, stiff joints, &c.

LINIMENT (Ammonia). Syn. *Volatile Liniment*, *Ammoniacal do.*, *Oil and Hartshorn*; *Linimentum Ammoniæ*,—Ph. L. E. & D. *Lin. A. Fortius*, — Ph. L. 1824. *Oleum Ammoniatum*,—Ph. E. 1839. *Prep.* 1. (Ph. L. & E.) *Liquor of ammonia* (sp. gr. 0·960), 1 fl. oz.; *olive oil*, 2 fl. oz.; shake them together until they are mixed.

2. (Ph. D.) To the last add of *olive oil*, 1 fl. oz. Stimulant and rubefacient. *Used* in rheumatism, lumbago, neuralgia, sore throat, spasms, bruises, &c. When the skin is irritable more oil should be added, or it should be diluted with a little water.

LINIMENT (Ammonia,—Camphorated). Syn. *Linimentum Ammoniæ Camphoratum*, *Embrocatio Amm. Camphorata*, — Lat. *Prep.* 1. (Hosp. F.) *Olive oil*, 3 oz.; *camphor*, ½ oz.; dissolve by a gentle heat, and when cold, add of *liquor of ammonia*, 1 fl. oz.

2. *Soap liniment*, 2 oz.; *olive oil* and *liquor of ammonia*, of each, 2 dr. As the last; more especially for sprains, bruises, chilblains, &c.

LINIMENT (Ammonia, — Compound). Syn. *Dr. Granville's Counter-irritant* or *Antidynous Lotion*; *Linimentum Ammoniæ Compositum*,—Ph. E. *Prep.* (Ph. E.) —*a.* (*Stronger.*) From *liquor of ammonia* (sp. gr. 0·880), 5 fl. oz.; *tincture of camphor*, 2 fl. oz.; *spirit of rosemary*, 1 fl. oz.; mix. It should be kept in a well-stoppered bottle and in a cool situation.

b. (*Weaker.*) *Liquor of ammonia* (0·880), 5 fl. oz.; *tincture of camphor*, 3 fl. oz.; *spirit of rosemary*, 2 fl. oz.

Obs. The above formulæ are nearly identical with the original ones of Dr. Granville; the principal difference being in his ordering liquor of ammonia of the sp. gr. 0·872, instead of 0·880. They are counter-irritant, rubefacient, vesicant, and cauterizing, according to the mode and length of their application. The *milder lotion* is sufficiently powerful to produce considerable rubefaction and irritation in from 1 to 5 or 6 minutes; vesication, in 8 or 10 minutes; and cauterization, in 4 or 5 minutes longer. For the latter purpose the *stronger lotion* is generally employed. According to Dr. Granville, these lotions are prompt and powerful remedies in rheumatism, lumbago, cramp, neuralgia, sprains, swollen and painful joints, headache, sore throat, and numerous other affections in which the use of a powerful counter-irritant has been recommended. They are ordered to be *applied* by means of a piece of linen, 6 or 7 times folded, or a piece of thick, coarse flannel wetted with the lotion, the whole being covered with a thick towel, and firmly pressed against the part with the hand. The *stronger lotion* is only intended to be employed in apoplexy, and to produce cauterization. See *Counter-irritants.*

LINIMENT (Sesquicarbonate of Ammonia). Syn. *Linimentum Ammoniæ Sesquicarbonatis,*—Ph. L. *Lin. Amm. Subcarbonatis,*—Ph. L. 1824. *Lin. A. Carbonatis,*—Ph. L. 1809. *Lin. Ammoniæ,*—Ph. L. 1788. *Lin. Volatile,*—Ph. L. 1746. *Prep.* (Ph. L.) *Solution of sesquicarbonate of ammonia,* 1 fl. oz.; *olive oil,* 3 fl. oz.; shake them together until mixed. This preparation resembles *liniment of ammonia* in its general properties, but it is much less active, owing to the alkali being carbonated. It is the "*oil and hartshorn*" and the "*volatile liniment*" of the shops.

LINIMENT (Anodyne). See *Liniments of Belladonna, Morphia, Opium, Soap, &c.*

LINIMENT (Antispasmodic). Syn. *Linimentum Antispasmodicum, Lin. Cajeputi Compositum,* — Lat. *Prep.* (Hufeland.) *Oils of cajeput* and *mint,* of each, 1 part; *tincture of opium,* 3 parts; *compound camphor liniment,* 24 parts. Anodyne, stimulant, and rubefacient.

LINIMENT (Arceus's). Compound elemi ointment.

LINIMENT (Belladonna). Syn. *Linimentum Belladonnæ,* — Lat. *Prep.* 1. (Cazenave.) *Extract of belladonna,* 1 dr.; *oil of almonds,* 2 oz.; *lime water,* 4 fl. oz. In eczema, and some other cutaneous affections, to allay irritation, &c.

2. (Cutan. Hosp.) *Extract of belladonna,* 4 dr.; *glycerine,* 1 oz.; *soap liniment,* 6 oz. As the last.

3. (Guy's Hosp.) *Extract of belladonna,* 1 oz.; *soap liniment,* 8 fl. oz.

4. (Phœbus.) *Extract of belladonna,* 40 gr.; *rectified ether,* 1 dr.; *cherry-laurel water,* 2 fl. oz. As a friction to the abdomen in lead colic.

Obs. The above are reputed excellent stimulants, anodynes, antispasmodics, and resolvents, in various diseases, as rheumatism, neuralgia, painful affections of the skin and joints, tumours, &c. &c.

LINIMENT (Cajeput Oil). Syn. *Linimentum Olei Cajuputi,* — Lat. *Prep.* 1. (Dr. Copland.) *Compound camphor liniment* and *soap liniment,* of each, 1½ fl. oz.; *oil of cajeput,* 1 fl. oz.

2. (Dr. Williams.) *Oil of cajeput,* ½ fl. dr.; *castor oil,* 1 fl. dr.; *olive oil,* 4½ fl. dr. A warm antispasmodic diffusible stimulant and rubefacient; in spasmodic asthma, colic, chronic rheumatism, spasms, chest affections, &c.

LINIMENT (Camphor). Syn. *Camphorated Oil, Camphor Embrocation; Linimentum Camphoræ,*—Ph. L. E. & D. *Oleum Camphoratum,*—Ph. E. 1839, & Ph. D. 1826. *Prep.* (Ph. L. & E.) *Camphor,* 1 oz.; *olive oil,* 4 fl. oz.; gently heat the oil, add the camphor (cut small), and agitate until dissolved. The Dublin College orders only ½ the above camphor. Stimulant, anodyne, and resolvent; in sprains, bruises, rheumatic pains, glandular enlargements, &c.

LINIMENT (Camphor, — Compound). Syn. *Linimentum Camphoræ Compositum,* —Ph. L. & D. *Lin. Camphoræ,*—Ph. L. 1788. *Prep.* 1. (Ph. L.) *Camphor,* 2½ oz.; *oil of lavender,* 1 fl. dr.; *rectified spirit,* 17 fl. oz.; dissolve, then add of *stronger liquor of ammonia,* 3 fl. oz.; and shake them together until they are mixed.

2. (Ph. L. 1836.) *Liquor of ammonia,* 7½ fl. oz.; *spirit of lavender,* 1 pint; distil off 1 pint, and dissolve in it, *camphor,* 2½ oz. The formula of the Ph. D. 1826, was nearly similar.

3. (*Wholesale.*) *Camphor* (clean), 21 *oz.; English oil of lavender,* 3¾ *oz.; liquor of ammonia,* 2¾ *lb.; rectified spirit,* 7 pints; mix, close the vessel, and agitate occasionally until the camphor is dissolved. Powerfully stimulant and rubefacient. It closely resembles, and is now almost universally sold for *Ward's "Essence for the Headache."*

LINIMENT (Cantharides). Syn. *Liniment of Spanish Flies; Linimentum Lyttæ; Lin. Cantharidis,*—Ph. D. & U. S. *Prep.* 1. (Dr. Collier.) *Tincture of cantharides* and *soap liniment,* equal parts.

2. (Ph. D.) *Cantharides* (in fine powder), 3 *oz.; olive oil,* 12 fl. oz.; digest for 3 hours over a water bath, and strain through flannel, with expression.

3. (Ph. U. S.) *Spanish flies,* 1 oz.; *oil of turpentine,* 8 fl. oz.; proceed as last. The above are irritant, and rubefacient; but should be used cautiously, lest they produce strangury.

LINIMENT (Chloride of Lime). Syn. *Linimentum Calcis Chlorinatæ,* — Lat. *Prep.* 1. *Chloride of lime,* 1 dr.; *water,* (added gradually), 3 fl. oz.; triturate together in a glass mortar for 10 minutes, pour off the liquid portion, and add of *oil of almonds,* 2 fl. oz.

2. (Kopp.) *Solution of chloride of lime* (ordinary), 1 part; *olive oil,* 2 parts.

3. (Waller.) *Chloride of lime* (in fine powder), 1 part; *soft soap,* 2 parts; *soft water,* q. s. to make a liniment.

Obs. The above are cleanly and excellent applications in itch, scald head, herpes, lepra, foul ulcers, &c.

LINIMENT (Chloroform). Syn. *Linimentum Chloroformi*, — Lat. *Prep.* 1. *Chloroform*, 1 fl. dr.; *almond oil*, 7 fl. dr.; mix in a phial, and agitate it until the two unite.

2. (Tuson.) *Chloroform*, 1 fl. dr.; *soap liniment*, 2 fl. oz.; as the last. *Used* as an application in neuralgic pains, rheumatism, &c.

LINIMENT (Cod-liver Oil). Syn. *Linimentum Olei Morrhuæ, Lin. O. Jecoris Aselli*,—Lat. *Prep.* (Dr. Brach.) *Cod-liver oil*, 2 fl. oz.; *liquor of ammonia*, 1 fl. oz.; mix. Resolvent, dispersive; applied to glandular tumours, scrofulous enlargements, &c.

LINIMENT (Croton Oil). Syn. *Linimentum Crotonis*,—Ph. D. *Lin. Olei Crotonis, L. O. Tiglii*,—Lat. var. This article is now introduced into the Irish Pharmacopœia.

Prep. 1. (Ph. D.) *Croton oil*, 1 fl. oz.; *oil of turpentine*, 7 fl. oz.; mix by agitation.

2. (J. Allen.) *Croton oil* and *liquor of potassa*, of each, 1 fl. dr.; agitate until mixed, then add of *rose water*, 2 fl. oz.

3. (Pereira.) *Croton oil*, 1 part; *olive oil*, 5 parts.

Obs. The above are used as counter-irritants; in rheumatism, neuralgia, bronchial and pulmonary affections, &c. When rubbed on the skin, redness and a pustular eruption ensue, and in general the bowels are acted on.

LINIMENT (Diuretic). Syn. *Linimentum Diureticum*,—Lat. *Prep.* 1. (Dr. Calini.) *Squills* (in fine powder), 1 dr.; *gastric juice of a calf*, 2 oz.; mix.

2. (Dr. Christison.) *Soap liniment, tincture of foxglove*, and *tincture of squills*, equal parts. In dropsies; rubbed over the abdomen or loins, twice or thrice a day.

LINIMENT (Emollient.) Syn. *Linimentum Album, Lin. Emolliens*,—Lat. *Prep.* From *camphor*, 1 dr.; *Peruvian balsam*, ½ dr.; *oil of almonds*, 1 fl. oz.; dissolve by heat, add of *glycerine*, ½ fl. oz., agitate well, and when cold, further add of *oil of nutmeg*, 15 drops. Excellent for chopped hands, lips, nipples, &c.

LINIMENT (Garlic). Syn. *Linimentum Allii*,—Lat. *Prep.* From *juice of garlic*, 2 parts; *olive oil*, 3 parts; mix. In hooping-cough, infantile convulsions, &c.

LINIMENT (Ginger). Syn. *Linimentum Zingiberis*,—Lat. *Prep.* (Dr. Turnbull.) *Ginger*, 1 part; *rectified spirit*, 2 parts; make a tincture or essence. For *short-sightedness.* A few drops are occasionally rubbed on the forehead for 8 or 10 minutes at a time. How this *tincture* came to be called a *liniment* we are at a loss to determine.

LINIMENT (Hungarian.) Syn. *Linimentum Hungaricum*,—Lat. *Prep.* (Soubeiran.) *Powdered cantharides* and *sliced garlic*, of each, 1 dr.; *camphor, bruised mustard seed*, and *black pepper*, of each, 4 dr.; *strong vinegar*, 6 fl. oz.; *rectified spirit*, 12 fl. oz,; macerate a week, and filter. An excellent rubefacient and counter-irritant.

LINIMENT (Hydrochloric Acid). Syn. *Linimentum Muriaticum, Lin. Acidi Muriatici, L. A. Hydrochlorici*,—Lat. *Prep.* 1. (Hosp. F.) *Olive oil*, 2 oz.; *white wax*, 2 dr.; dissolve by a gentle heat, add of *balsam of Peru*, 1 dr.; *hydrochloric acid*, 2 dr.; mix well. An excellent application to chilblains before they break.

2. (W. Cooley.) *Olive oil*, ¼ pint; *white spermaceti* (pure) and *camphor*, of each, ½ oz.; mix with heat, add of *hydrochloric acid*, ½ fl. oz., and proceed as before. Equal to the last, and cheaper. This was extensively employed among the seamen of the Royal Navy, by the Editor's father during the long war, with uniform success.

LINIMENT (Iodide of Potassium.) Syn. *Linimentum Ioduretum Gelatinosum*,—Lat. *Gelée pour le Goître*,—Fr. *Prep.* (Foy.) *Iodide of potassium*, 4 dr.; *proof spirit*, 2 oz.; dissolve, and add the liquid to a solution of *curd soap*, 6 dr., in *proof spirit*, 2 oz., both being at the time gently warm; lastly, aromatise with *rose* or *neroli*, pour it into wide-mouthed bottles, and keep them closely corked. In goitre, &c.

LINIMENT (Iodine). Syn. *Ioduretted Liniment; Linimentum Iodinii, L. Ioduretum*,—Lat. *Prep.* 1. (Cutan. Hosp.) *Compound tincture of iodine* and *laudanum*, equal parts.

2. (Dr. Copland.) *Soap liniment*, 1 oz.; *iodine*, 8 to 10 gr.

3. (Guibourt.) *Iodide of potassium*, 1 dr.; *water*, 1 fl. dr.; dissolve, and add it to *white soap* (in shavings) and *oil of almonds*, of each, 10 dr., previously melted together. Some perfume may be added. In scrofula, glandular enlargements, rheumatism, &c.

LINIMENT (Lead). Syn. *Linimentum Plumbi*,—Lat. *Prep.* (Gaozey.) *Acetate of lead*, 40 gr.; *soft water*, 12 fl. oz.; *olive oil*, 6 oz.; mix, and agitate well. Astringent and refrigerant. Useful in excoriations; especially when accompanied with inflammation.

LINIMENT (Lime-water). Syn. *Lini-*

ment for Burns, Carron Oil; Linimentum Calcis,—Ph. L. E. & D. *Lin. Aquæ Calcis* or *Oleum Lini cum Calce*,—Ph. E. 1839. *Prep.* From *olive oil* (linseed oil,—Ph. E.) and *lime water*, equal parts, shaken together until they are mixed. Very useful in burns and scalds.

LINIMENT (Lime,—Compound). Syn. *Linimentum Calcis Compositum*, — Lat. *Prep.* 1. (*Camphorated*, — W. Cooley.) *Camphor liniment* and *lime water*, equal parts.

2. (*Opiated*,—W. Cooley.) *Lime-water* and *camphor liniment*, of each, 1 oz.; *extract of opium*, 5 gr.; mix. Both the above are used as anodynes to allay pain and irritation in severe burns, chilblains, &c., for which purpose they are excellent. All the above liniments with lime water should be used as soon as possible after being prepared, as the ingredients separate by keeping.

LINIMENT (Mercurial). Syn. *Liniment of Mercury; Linimentum Hydrargyri*,—Ph. L. *Lin. H. Compositum*,—Ph. L. 1836. *Prep.* (Ph. L.) *Camphor*, 1 oz.; *spirit of wine*, 1 fl. dr.; sprinkle the latter on the former, powder, add of *lard* and *mercurial ointment* (stronger), of each, 4 oz.; rub them well together, then gradually add of *liquor of ammonia*, 4 fl. oz.; and mix well. Stimulant and discutient. It resembles mercurial ointment in its effects; but though milder in its operation, it more quickly produces salivation.

LINIMENT (Morphia). Syn. *Linimentum Morphiæ*,—Lat. *Prep.* (W. Cooley.) *Pure morphia*, 3 gr.; put it into a warm mortar, add very gradually, of *oil of almonds* (warm), 1 fl. oz., and triturate until the morphia is dissolved, then add of *camphor liniment*, 1 oz. An excellent topical anodyne and antispasmodic, which often allays pain when other means have failed.

LINIMENT (Mustard). Syn. *Linimentum Sinapis*,—Lat. *Prep.* 1. *Flour of mustard* (best), 1 *oz.; water* (tepid), 2 fl. oz.; mix and add of *glycerine, liquor of ammonia*, and *olive oil*, of each, 1 fl. oz.

2. (Béral.) *Carbonate of ammonia* (in fine powder), 1 part; *camphor* (in powder), 2 parts; *oil of lavender*, 4 parts; *tincture of mustard*, 6 parts; mix, dissolve by agitation, add of *simple liniment* (warm), 56 parts; and again agitate until the whole is perfectly incorporated.

3. *Black mustard seed* (ground in a pepper-mill or otherwise well bruised), ½ *lb.; oil of turpentine*, 1 pint; digest, express the liquid, filter, and dissolve in it, *camphor*, ¼ *lb.* Stimulant and rubefacient. A popular and useful remedy in rheumatic pains, lumbago, colic, chilblains, &c. The last is a close imitation of *Whitehead's "Essence of Mustard."* See *Essences.*

4. (*Lin. Olei Volatilis Sinapis.*)—*a.* From *volatile oil of black mustard seed*, ½ dr.; *oil of almonds*, 1 fl. oz. As a rubefacient.

b. From *volatile oil*, 1 part; *alcohol* (sp. gr. 0·815), 1 to 2 parts. As a vesicant.

LINIMENT (Nitrate of Mercury). Syn. *Citrine Liniment; Linimentum Hydrargyri Nitratis*,—Lat. *Prep.* (Sir H. Halford.) *Ointment of nitrate of mercury* and *olive oil*, equal parts, triturated together in a glass mortar, or mixed by a gentle heat. This liniment is stimulant, discutient, and alterative, and in its general properties resembles the ointment of the same name. For most purposes the quantity of oil should be at least doubled.

LINIMENT (Nux Vomica). Syn. *Linimentum Nucis Vomicæ*, — Lat. *Prep.* (Magendie.) *Tincture of nux vomica*, 1 fl. oz.; *liquor of ammonia*, 2 fl. dr.; mix. As a stimulating application to paralysed limbs. The addition of 1 fl. dr. each, of *glycerine* and *salad oil* renders it an excellent application in chronic rheumatism and neuralgia.

LINIMENT (Opium). Syn. *Anodyne Liniment; Linimentum Opii*,—Ph. L. & E. *Lin. Opii* or *Lin. Anodynum*,—Ph. D. *Lin. Saponis cum Opio*,—Ph. D., 1826. *Prep.* 1. (Ph. L.) *Tincture of opium*, 2 fl. oz.; *soap liniment*, 6 fl. oz.; mix.

2. (Ph. E.) *Castile soap*, 6 oz.; *opium*, 1½ oz.; *rectified spirit*, 1 quart; digest for three days, then filter, add of *camphor*, 3 oz., *oil of rosemary*, 6 fl. dr., and agitate briskly.

3. (Ph. D.) *Soap liniment* and *tincture of opium*, equal parts.

4. (*Wholesale.*) *Soft soap*, 1¼ *lb.; powdered opium* and *camphor*, of each, ¼ *lb.; rectified spirit*, 1 gall.; digest a week.

Obs. This preparation is an excellent anodyne in local pains, rheumatism, neuralgia, sprains, &c.

LINIMENT (Phosphorus). Syn. *Linimentum Phosphoratum*,—Lat. *Prep.* (Augustin.) *Phosphorus*, 6 gr.; *camphor*, 12 gr.; *oil of almonds*, 1 oz.; dissolve by heat; when cold, decant the clear portion, and add of *strongest liquor of ammonia*, 10 drops. A useful friction in gout, chronic rheumatism, certain obstinate cutaneous affections, &c.

LINIMENT (Simple). Syn. *Linimentum Simplex*,—Ph. E. *Prep.* (Ph. E.) *White wax*, 1 oz.; *olive oil*, 4 fl. oz.; melt together and stir the mixture until it is cold. Emollient; resembles spermaceti ointment in all except its consistence.

LINIMENT (Soap). Syn. *Opodeldoc, Camphorated Tincture of Soap, Balsam of do.; Linimentum Saponis,*—Ph. L. E. & D. *Lin. S. Compositum,*—Ph. L. 1824. *Lin. Saponaceum,*—Ph. E. 1839, and Ph. L. 1745. *Tinctura Saponis Camphorata,*—Ph. E. 1839. *Tinct. S. Composita, Balsamum Saponis,*—Lat. var. *Prep.* 1. (Ph. L.) *Castile soap* (cut small), 2½ oz.; *camphor* small), 10 dr.; *spirit of rosemary,* 18 fl. oz.; *water,* 2 fl. oz.; digest with frequent agitation until the solid substances are dissolved.

2. (Ph. E.) *Castile soap,* 5 oz.; *camphor,* 2½ oz.; *oil of rosemary,* 6 fl. dr.; *rectified spirit,* 1 quart.

3. (Ph. D.) *Castile soap* (in powder), 2 *oz.; camphor,* 1 *oz.; proof spirit,* 16 fl. oz.

4. (*Liniment Savonneau,*—P. Cod). *Tincture of soap* (P. Cod.) and *rectified spirit* (·863 or 41 *o. p.*), of each, 8 parts; *olive oil,* 1 part.

Obs. This article, prepared according to the directions of the pharmacopœia, from "soap made of olive oil, and soda" (*Castile soap*), is apt to gelatinize in cold weather, and to deposit crystals of elaidate and stearate of lime. This may be avoided, when expense is not an objection, by first well drying the soap, employing a spirit of at least 85%, and keeping the preparation in well-closed bottles. A cheaper and better plan is to substitute the *soft soap* of the Ph. L. ("soap made with *olive oil* and *potassa*") for the Castile soap ordered by the College. The *soft soap of commerce* imparts to the liniment an unpleasant smell. The following formula, one of those commonly adopted by the *wholesale druggists,* produces a very good article, though much weaker than that of the pharmacopœia:—*Camphor* (cut small), 1½ *lb.; soft soap,* 7 *lb.; oil of rosemary,* 3 fl. oz.; *rectified spirit of wine* and *water,* of each, 3½ gall.; digest with occasional agitation for a week, and filter. This is the "*opodeldoc*" or "*soap liniment*" of the shops.

Uses. Soap liniment is stimulant, discutient, and lubricating, and is a popular remedy in rheumatism, local pains, swellings, bruises, sprains, &c.

LINIMENT (Soap,—with Opium). See *Liniment of Opium.*

LINIMENT (Soap,—Sulphuretted). Syn. *Linimentum Saponis Sulphuretum, Lin. Sulphuro-saponaceum,*—Lat. *Prep.* (Jadelot.) *Sulphuret of potassium,* 3 oz.; *soap,* 12 oz.; *water,* q. s.; melt together, and add of *olive oil,* 12 oz.; *oil of origanum,* 1 fl. dr.; mix well. An excellent remedy for the itch and some allied skin diseases.

LINIMENT (St. John Long's). Syn. *Linimentum Terebinthinæ Aceticum,*—Lat. *Prep.* (Dr. Stokes.) *Oil of turpentine,* 3 oz.; *rose water,* 2½ fl. oz.; *acetic acid,* 5 dr.; *oil of lemons,* 1 dr.; *yelk* of 1 egg; make an emulsion. As a counter-irritant, in phthisis, &c.

LINIMENT (Sulphuret of Carbon.) Syn. *Linimentum Carbonis Bisulphureti,*—Lat. *Prep.* 1. From *bisulphuret of carbon,* 1 dr.; *camphorated oil,* 1 oz.; mix.

2. (Lampadius.) *Camphor,* 2 dr.; *bisulphuret of carbon,* 4 fl. dr.; dissolve, and add of *rectified spirit,* 1 fl. oz. In rheumatism, gouty nodes, &c.

LINIMENT (Sulphuric Acid). See *Acid Liniment.*

LINIMENT (Tripharmic). Syn. *Linimentum Tripharmicum,*—Ph. L. 1746. *Prep.* Take of *lead plaster* and *olive oil,* of each, 4 oz.; melt, add of *strong vinegar,* 1 fl. oz., and stir until cold. Cooling and desiccative; in excoriations, burns, &c.

LINIMENT (Turpentine). Syn. *Kentish's Liniment; Linimentum Terebinthinæ,*—Ph. L. & D. *Lin. Terebinthinatum,*—Ph. E. *Prep.* 1. (Ph. L.) *Soft soap,* 2 oz.; *camphor,* 1 oz.; *oil of turpentine,* 16 fl. oz.; shake them together until mixed. Stimulant; in lumbago, cholera, colic, &c.

2. (Ph. L. 1824.) *Resin cerate,* 6 oz.; *oil of turpentine,* 4 fl. oz.; mix. An excellent application to burns.

3. (Ph. E.) *Resin ointment,* 4 oz.; *camphor,* 4 dr.; dissolve by a gentle heat, and stir in *oil of turpentine,* 5 fl. oz.

4. (Ph. D.) *Oil of turpentine,* 5 fl. oz.; *resin ointment,* 8 *oz.;* mix by a gentle heat. This forms Dr. Kentish's celebrated application to burns and scalds. The parts are first bathed with warm oil of turpentine or brandy, and then covered with pledgets of lint smeared with the liniment.

LINIMENT (Turpentine,—Compound). Syn. *Linimentum Terebinthinæ Compositum*—Lat. *Prep.* 1. (*Acetic.*) See *St. John Long's Liniment.* In phthisis.

2. (*Ammoniated,*—Debreyne.) *Lard,* 3 oz.; melt, and add of *oil of turpentine* and *olive oil,* of each, 1 oz.; when cold, further add of *camphorated spirit,* 4 fl. dr.; *liquor of ammonia,* 1 fl. dr. In sciatica, lumbago, &c.

3. (*Opiated,*—Recamier.) *Oil of turpentine,* 1 fl. oz.; *oil of chamomile,* 2 fl. oz.;

tincture of opium, 1 fl. dr. In neuralgia, &c.

4. (*Sulphuric,* — Ph. Castr. Ruthena.) *Oil of turpentine,* 2 oz.; *olive oil,* 5 oz.; mix, and add of *dilute sulphuric acid,* 1½ dr. See *Acid Liniment.*

LINIMENT (Veratria). Syn. *Linimentum Veratriæ,*—Lat. *Prep.* (Brande.) *Veratria,* 8 gr.; *alcohol,* ½ fl. oz.; dissolve, and add of *soap liniment,* ½ fl. oz. In neuralgic and rheumatic pains, gout, &c.

LINIMENT (Verdigris). Syn. *Oxymel of Verdigris; Linimentum Æruginis,* — Ph. L. *Oxymel Æruginis,*—Ph. L. 1788, & Ph. D. 1807. *Mel Ægyptiacum,*—Ph. L. 1746. *Unguentum Æ.,* — Ph. L. 1720. *Oxymel Cupri Subacetatis,*—Ph. D. 1826. *Prep.* (Ph. L.) *Verdigris* (in powder), 1 oz.; *vinegar,* 7 fl. oz.; dissolve, filter through linen, add of *honey,* 14 oz., and evaporate to a proper consistence.

Obs. This preparation is wrongly named a liniment. The College, after "beating about the bush" for nearly a century, found a right name for it in 1788; but, as in many other cases, soon abandoned it for another less appropriate.

Oxymel of verdigris is stimulant, detergent, and escharotic. It is applied to indolent ulcers, especially of the throat, by means of a camel-hair pencil; and, diluted with water, it is used as a gargle. Care must be taken to avoid swallowing it, as it occasions vomiting and excessive purging. This application of it, although sanctioned by centuries, is unworthy of medical science.

LINIMENT (Vermifuge). Syn. *Linimentum Anthelminticum, Lin. Vermifugum,* —Lat. *Prep. Castor oil,* 1 oz.; *essential oils of wormwood* and *tansy,* of each, ½ oz.; *Dr. Peschier's ethereal tincture of pennyroyal buds,* 20 drops; mix. Employed in frictions on the abdomen in cases of worms in children. Its activity may be still further increased by the addition of a little *garlic juice.* (Journ. de Méd.) An excellent medicine.

LINIMENT (Ware's). *Prep.* From *camphor liniment,* 1 oz.; *solution of carbonate of potassa,* 1 dr. In amaurosis.

LINIMENT (White). The old name for *spermaceti ointment.*

LINIMENT (Wilkinson's). *Prep.* (Phœbus.) *Prepared chalk,* 20 gr.; *sulphur, lard,* and *tar,* of each, ½ oz.; mix, and add of *Boyle's fuming liquor,* 10 or 15 drops. In certain chronic skin diseases, neuralgia, &c.

LININE. A bitter principle obtained from the *linum catharticum* or *purging flax.*

LINSEED. Syn. *Flax Seed; Lini Semina,* — Lat. "The seed" of "*linum usitatissimum* (Linn.) or *common flax.*" (Ph. L.) Oily, emollient, demulcent, and nutritive. Ground to powder (*linseed meal; farina lini,*) it is used for poultices. The cake left after expressing the oil (*linseed cake; lini placenta,*) is used for feeding cattle. Under the form of *tea* or *infusion,* it is used as a diluent, and to allay irritation in bronchial, urinary, and other like affections. See *Infusions, Linen, &c.*

LINT. Syn. *Linteum,*—Lat. Old *white linen-cloth* scraped by hand or machinery, so as to render it soft and woolly. It is used for dressing ulcers, either alone, or smeared with some suitable ointment or cerate.

LINT (Medicated). Syn. *Linteum Medicatum, L. Nigrum, L. Infernale,*—Lat. *Prep.* 1. *Nitrate of silver,* 20 to 30 gr.; *distilled water,* 1 fl. oz.; dissolve, saturate *dry lint,* ½ oz., with the solution, and expose it in a saucer or capsule to the light and air, until it has become black and dry.

2. From *nitrate of silver* and *nitrate of copper,* of each, ½ dr.; *lint,* 1 oz.; *water,* 1½ fl. oz.; as the last. *Used* to dress old and indolent ulcers.

LIPAROLES. Liparolés (*graisses médicamenteuses,*— P. Cod.) are preparations of a fatty nature, destitute of resinous matter, and generally aromatized. See *Pommades.*

LIPIC ACID. One of a series of new acids, discovered by Laurent, and obtained by the action of *nitric acid* on *oleic acid.* See *Adipic Acid.*

LIPS (The). See *Lip Salves, &c.*

LIQUATION. The process of "sweating out" by heat the more fusible metals of an alloy. *Metallurgists* avail themselves of this method in *assaying* and *refining* the *precious metals,* and procuring *antimony* and some other metals from their ores.

LIQUEFACIENTS. Syn. *Resolvents; Liquefacientia, Resolventia,*—Lat. A term applied to substances or agents which promote secretion and exhalation, soften and loosen textures, and promote the absorption or removal of enlargements, indurations, &c. To this class belong the *alkalies, antimony, bromine, chlorine, iodine, mercury, sulphur, &c.,* and their preparations.

LIQUEFACTION. The assumption of the liquid form. It is usually applied to the conversion of a solid into the liquid state, which may arise from increase of temperature (*fusion*), absorption of water from the atmosphere (*deliquescence*), or the action of a body already fluid (*solution*).

The *liquefaction* of *gases* and *vapours* is effected by pressure and cold.

LIQUEUR DE LA MOTTE. See *Drops* and *Tinctures.*

LIQUEUR DOREE. *Prep.* Take of *cinnamon*, *bitter orange peel*, and *Peruvian bark*, of each, ½ *oz.*; *hay saffron*, ¼ *oz.*; *brandy* and *Malaga wine*, of each, 3 quarts; digest for a week, strain, and add of *lump sugar*, 2 *lb.* Tonic, stomachic, and stimulant; chiefly used as an agreeable alcoholic dram.

LIQUEUR DE PRESSAVIN. *Prep.* From *oxide of mercury* (freshly precipitated), and *cream of tartar*, of each, 1 oz.; *hot water*, 1 quart; dissolve and filter. For *use*, 2 spoonfuls of *this liquor* are added to 1 quart of *water*. *Dose.* A wine-glassful 3 or 4 times a day, avoiding the use of common salt. This is simply a *solution* of *potassio-tartrate of mercury*, and may be taken in the usual cases in which mercury is administered.

LIQUEURS. Syn. *Cordials.* Stimulating beverages, formed of weak spirit, aromatized and sweetened. Their manufacture constitutes the trade of the "compounder," "rectifier," or "liquoriste."

The *materials* employed in the preparation of liqueurs or cordials, are *rain* or *distilled water*, *white sugar*, and *clean*, *flavourless spirit.* To these may be added the substances employed as "*finings*," when artificial clarification is had recourse to.

The *utensils* and *apparatus* required in the business, are those ordinarily found in the wine and spirit cellar; together with a copper-still, furnished with a *pewter* head and a *pewter* worm or condenser, when the method "by distillation" is pursued. A barrel, hogshead, or rum puncheon, sawn in two, or simply "unheaded," as the case may demand, forms an excellent vessel for the solution of the sugar; and 2 or 3 *fluted funnels*, with some good *woollen filtering paper*, are occasionally found useful for filtering the aromatic essences used for flavouring. Great care is taken to ensure the whole of the utensils, &c., being *perfectly* clean and "sweet," and well "seasoned," in order that they may neither stain nor flavour the substances placed in contact with them.

In the *preparation* or *compounding of liqueurs*, one of the first objects which engages the operator's attention, is the production of an alcoholic solution of the aromatic principles which are to give them their peculiar aroma and flavour. This is done, either by simple *solution* or *maceration*, as in the manufacture of tinctures and medicated spirits; or by *maceration* and subsequent *distillation.* The products, in this country, are called *essences* or *spirits*, and by the French, *infusions*, and are added to the solution of sugar (*syrup* or *capillaire*) or to the *dulcified spirit*, in the proportions required. *Malt* or *molasses spirit* is the kind usually employed for this purpose in England. As before observed, it should be of the best quality; as, if this is not the case, the raw flavour of the spirit is perceptible in the liquor. *Rectified spirit of wine* is generally very free from flavour, and when reduced to a proper strength with *clear soft water*, forms a spirit admirably adapted for the preparation of cordial liquors. Spirit weaker than about 45 o.p., which has been freed from its own essential oil, by careful rectification, is known in trade under the title of "*pure*," "*flavourless*," "*plain*," or "*silent spirit.*" Before macerating the ingredients, if they possess the solid form, they are coarsely pounded, bruised, sliced, or ground, as the peculiar character of the substance may indicate. This is not done until shortly before submitting them to the action of the menstruum; as, after they are bruised, they rapidly lose their aromatic properties by exposure to the air. When it is intended to keep them for any time in the divided state, they should be preserved in well-corked bottles or jars. The practice of *drying* the ingredients before pounding them, frequently adopted by ignorant and lazy workmen, for the sake of lessening the labour, is, of course, even more destructive to their most valuable qualities than mere exposure to the air. The length of time the ingredients should be digested in the spirit should never be less than 5 or 6 days, but a longer period is preferable when distillation is not employed. In either case the time may be advantageously extended to 10 days or a fortnight, and frequent agitation should be had recourse to during the whole period. When *essential oils* are employed to convey the flavour, they are first dissolved in a little of the *strongest rectified spirit of wine*, in the manner explained under "*Essences;*" and when added to the spirit, they are mixed up with the whole mass as rapidly and as perfectly as possible, by laborious and long-continued agitation ("*rummaging.*") In *managing the still*, the *fire* is proportioned to the ponderosity of the oil or flavouring substance, and the receiver is changed before the faints come over; as these are unfitted to be mixed with the cordial. In many cases the addition of a few pounds of *common salt* to the liquor in the still facilitates the process and improves the product. Ingredients which are *not volatile*, are, of course, *always* added after distillation. The *stronger spirit* is reduced to the desired strength by means of either *clear soft water*, or the *clarified syrup* used for sweetening. The *sugar* employed should be of the finest quality, and is preferably made into *capillaire* or *syrup* before adding it to the aromatized spirit; and not until this last has been rendered *perfectly "fine"* or transparent, by filtration or clarification, as the case may demand. Some *spirits* or *infusions*, as those of aniseed, caraway, &c., more particularly require this treatment, which is best performed by running them through a *clean wine bag*, made of rather fine cloth, having previously mixed them with a spoonful or two of *magnesia;* but in all cases clarification by simple repose should be preferred, and first attempted. Under proper management, liqueurs or cordials prepared of good materials, will be found perfectly "clear" or "bright" as soon as made, or will become so after being allowed a few days for defecation; but in the hands of the inexperienced operator, and when the spirit employed is insufficient in strength or quantity, it often happens that they turn out "foul" or "milky." When this is the case, the liquid may be *"fined down"* with the *whites* of 12 to 20 *eggs* per hogshead; or a little *alum*, either alone or followed by a little *carbonate of soda* or *potassa*, both dissolved in water, may be added, in the manner described at *page* 463.

An *excellent* and *easy way* of *manufacturing cordial liquors*, especially when it is inconvenient to keep a large stock on hand, is by simply *aromatizing* and *colouring*, as circumstances or business may demand, *spirit of the strength of* 60 *or* 64 *u.p.*, kept *ready sweetened* for the purpose. To do this to the best advantage, *two* descriptions of sweetened spirit should be provided, containing respectively 1 *lb.* and 3 *lb.* of *sugar* to the gallon. From these, spirit of any *intermediate sweetness* may be made, which may be flavoured with any *essential oil dissolved in alcohol*, or any *aromatized spirit* or "*infusion*," prepared either by digestion or distillation. As a general rule, the *concentrated essences*, made by dissolving 1 *oz.* of the *essential oil* in 1 pint of the *strongest rectified spirit of wine*, will be found admirably adapted for this purpose. These essences, which should be kept in well-corked bottles, are employed by *dropping* them *cautiously* into the *sweetened spirit* until the desired flavour is produced. During this operation, the liquor should be frequently and violently shaken to produce complete admixture. If by any accident the essence is added in too large a quantity, the resulting "*milkiness*" or *excess of flavour* may be removed by the addition of a little more spirit, or by clarification. In this way the majority of the *cordial liqueurs* in common use may be produced *extemporaneously*, of nearly equal quality to those prepared by distillation. For those which are *coloured*, simple digestion of the ingredients is almost universally adopted. The "process by distillation" should, however, be always employed to impart the flavour and aroma of volatile aromatics to the spirit, when expense, labour, and time, are of less importance than the production of a superior article.

The *French liquoristes* are proverbial for the superior quality, cream-like smoothness, and delicate flavour of their cordials. This chiefly arises from the employment of *very pure spirit* and *sugar* (the former in a larger proportion than that adopted by the English compounder), and in the judicious application of the flavouring ingredients. The French liquoristes distinguish their cordials into two classes; viz.,—*eaux* and *extraits* (waters, extracts), or liqueurs which though sweetened are entirely devoid of viscidity; and—*baumes*, *crêmes*, and *huiles* (balms, creams, oils), which contain sufficient sugar to impart to them a considerable degree of consistence. The greatest possible attention is given to the preparation of the aromatized or flavouring essences, in France called "*infusions*." These are generally made by macerating the aromatic ingredients in spirit at about 2 to 4 u. p. (sp. gr. 0·922 to 0·925), placed in well-corked glass carboys, or stoneware jars or bottles. The maceration is continued, with occasional agitation, for 3, 4, or even 5 weeks, when the aromatized spirit is either distilled or filtered; generally the former. The *outer peel* of *cedrats*, *lemons*, *oranges*, *limettes*, *bergamottes*, *&c.*, are alone used by our Continental neighbours, and is obtained either by carefully peeling the fruit with a knife, or by converting it into an *oleosaccharum*, by rubbing it off with a lump of hard white sugar. *Aromatic seeds* and *woods* are bruised by pounding, before being submitted to infusion. The substances employed in France to *colour liqueurs* are, for—BLUE, *soluble Prussian blue*, *sulphate of indigo* (nearly neutralized with chalk), and the *juice* of *blue flowers* and *berries;*

—AMBER, FAWN, and BRANDY COLOUR, *burnt sugar* or *spirit colouring;*—GREEN, *spinach* or *parsley leaves* (digested in spirit), and mixtures of *blue* and *yellow;*—RED, *powdered cochineal* or *brazil wood*, either alone or mixed with a *little* alum;—VIOLET, *blue violet petals*, *litmus*, or *extract of logwood;*—PURPLE, the same as *violet*, only deeper;—YELLOW, an *aqueous infusion* of *safflowers* or of *French berries*, and the *tinctures* of *saffron* and *turmeric.*

A frequent cause of *failure* in the *manufacture* of *liqueurs* and *cordials* is the addition of *too much flavouring* matter. Persons unaccustomed to the use of strong aromatic essences and essential oils, seldom sufficiently estimate their power, and, consequently, are very apt to add *too much of them*, by which the liquor is rendered not only disagreeably high flavoured, but from the *excess* of oil present, also "*milky*," or "*foul*," either at once, or what is nearly as bad, on the addition of water. This source of annoyance, arising entirely from bad manipulation, frequently discourages the tyro, and cuts short his career as a manufacturer. From the consistence or viscidity of cordials, they are less readily "*fined down*" than unsweetened liquor, and often give much trouble to clumsy and inexperienced operators. The most certain way to prevent disappointment in this respect is to use *too little*, rather than *too much* flavouring; for if the quantity proves insufficient, it is readily "*brought up*" at any time; but the contrary is not effected without some trouble and delay.

A careful attention to the previous remarks will render this branch of the rectifier's art far more perfect and easy of performance than it is at present, and will, in most cases, produce at *once* a satisfactory article, "*fine*, *sweet*, and *pleasant.*"

The *cordials* of respectable British "*compounders*" contain fully 3 *lb.* of *white lump sugar* per gallon, and are of the *strength* of 60 to 64 u. p. The *baumes*, *crêmes*, and *huiles* imported from the Continent, are richer both in spirit and sugar than ours; and to this may be referred much of their superiority. Mere *sweetened* or *cordialized spirits* (*eaux*, of the Fr.) contain only from 1 to 1½ *lb.* of *sugar* per gallon.

The *purity* of *liqueurs* is determined in the manner noticed under *Brandy*, *Spirits*, *Wines*, *&c.*

The following list embraces nearly all the *cordials* and *liqueurs*, both native and imported, met with in trade in this country:—

Alkermes. This liquor is highly esteemed in some parts of the South of Europe.

Prep. 1. *Bay leaves* and *mace*, of each, 1 *lb.; nutmegs* and *cinnamon*, of each, 2 *oz.; cloves*, 1 *oz.*, all bruised; *cognac brandy*, 3½ gall.; macerate for 3 weeks, frequently shaking, then distil over 3 gall., and add of *clarified syrup of kermes*, 18 *lb.; orange flower water*, 1 pint; mix well and bottle. This is the original formula for the *alkermes de Santa Maria Novella*, which is much valued.

2. *Spice*, as last; *British brandy*, 4 gall.; *water*, 1 gall.; macerate as before, and draw over 4 gall., to which add of *capillaire*, 2 gall., and *sweet spirit of nitre*, ¼ pint. Cassia is often used for cinnamon. Inferior to the last.

Aniseed Cordial. From *aniseed*, 2 *oz.*, (or *essential oil*, 1½ dr.), and *sugar*, 3 *lb.* per gallon. It should not be made weaker than about 45 u. p., as at lower strengths it is impossible to produce a full-flavoured article without its being milky or liable to become so. See *Peppermint Cordial.*

Anisette de Bourdeaux. This is merely a variety of aniseed cordial.

Prep. 1. (Foreign.) *Aniseed*, 4 *oz.; coriander* and *sweet fennel seeds*, of each, 1 *oz.;* (bruised); *rectified spirit*, ½ gall.; *water*, 3 quarts; macerate for 5 or 6 days, then draw over 7 pints, and add of *lump sugar*, 2½ *lb.*

2. (English.) *Oil of aniseed*, 15 drops; *oils of cassia* and *caraway*, of each, 6 drops; rub them with a *little sugar*, and then dissolve it in *spirit* (45 u. p.), 3 quarts, by well shaking them together; filter, if necessary, and dissolve in the clear liquor, *sugar*, 1½ *lb.*

Balm of Molucca. From *mace*, 1 *dr.; cloves*, ½ *oz.; clean spirit*, (22 u. p.), 1 gall.; infuse for a week in a well-corked carboy or jar, frequently shaking, colour with *burnt sugar*, q. s., and to the *clear tincture* add of *lump sugar*, 4½ *lb.*, dissolved in *pure soft water*, ½ gall. On the Continent this takes the place of the "*cloves*" of the English retailer.

Bitters. These have generally from 1 to 1½ *lb.* of *sugar* per gallon. (See *page* 135.)

Caraway Cordial. Generally from the *essential oil*, with only 2½ *lb.* of *sugar* per gall. 1 fl. dr. of the *oil* is commonly reckoned equal to ¼ *lb.* of the *seed.* The addition of a *very little oil of cassia*, and about half as much of *essence of lemon* or of *orange*, improves it. See *Caraway Brandy.*

Cedrat Cordial. From *essence* (oil) *of cedrat*, ¼ *oz.; pure spirit* (at proof), 1 gall.; dissolve, add of *water*, 3 pints, agitate well; distil 3 quarts, and add an equal measure of *clarified syrup.* A delicious liqueur.

Cinnamon Cordial. This is seldom made with cinnamon, owing to its high price, but with either the *essential oil* or *bark of cassia*, with about 2 *lb.* of *sugar* to the gall. It is preferred coloured, and therefore may be very well prepared by simple digestion. The addition of 5 or 6 drops, each, of *essence of lemon* and *orange peel*, with about a spoonful of *essence of cardamoms* per gallon improves it. 1 *oz.* of *oil of cassia* is considered equal to 8 *lb.* of the *buds*, or *bark*, 1 *fl. dr.* of the *oil* is enough for 2½ gall. It is coloured with *burnt sugar.*

Citron Cordial. From the *oil* or *peel*, with 3 *lb.* of *sugar* per gall. as above. (See *below.*)

Citronelle; Eau de Barbades. 1. From *fresh orange peel*, 2 *oz.; fresh lemon peel*, 4 *oz.; cloves*, ½ *dr.; corianders* and *cinnamon*, of each, 1 dr.; *proof spirit*, 4 pints; digest for 10 days, then add of *water*, 1 quart, and distil ½ gall.; to the *distilled essence* add of *white sugar*, 2 *lb.*, dissolved in *water*, 1 quart.

2. *Essence of orange*, ½ dr.; *essence of lemon*, 1 dr.; *oil of cloves*, and *cassia*, of each, 10 drops; *oil of coriander*, 20 drops; *spirit* (58 o. p.), 5 pints; agitate until dissolved, then add of *distilled* or *clear soft water*, 3 pints; well mix, and filter it through blotting paper, if necessary; *lastly* add of *sugar* (dissolved), q. s.

Clairet; Rossalis des six graines. From *aniseed, fennel seed, coriander seed, caraway seed, dill seed*, and *seeds of daucus creticus*, (athamanta cretensis, — *Linn.*), of each, bruised, 1 *oz.; proof spirit*, ½ gall.; digest for 1 week, strain, and add of *loaf sugar*, 1 *lb.*, dissolved in *water*, q. s.

Cloves, Clove Cordial. From *bruised cloves*, 1 *oz.*, or *essential oil*, 1 fl. dr. to every 3 gall. of *proof spirit.* If distilled, some *common salt* should be added, and it should be drawn over with a pretty quick fire. It requires fully 3 *lb.* of *sugar* per gall., and is generally coloured with *poppy-flowers* or *burnt sugar.* The addition of 1 dr. of *bruised pimento*, or 5 drops of the *oil* for every *oz.* of *cloves*, improves this cordial.

Coriander Cordial. From *corianders*, as the last. A few *sliced oranges* improve it.

Crême d'Anise. As *aniseed cordial*, only richer.

Crême des Barbades. As *citronelle*, adding some of the *juice* of the *oranges*, and an additional *lb.* of *sugar* per gall.

Crême de Cacao. Infuse *roasted caracca cacao nuts* (cut small), 1 *lb.*, and *vanilla*, ½ *oz.*, in *brandy*, 1 gall., for 8 days; strain, and add of *thick syrup*, 3 quarts.

Crême de Cedrat, Huile de Cedrat. From *spirit of citron*, 1 pint; *spirit of cedrat*, 1 quart; *proof spirit*, 3 quarts; *white sugar*, 16 *lb.*, dissolved in *pure soft water*, 2 gall.

Crême de Macarons. 1. From *cloves, cinnamon*, and *mace*, of each, bruised, 1 dr.; *bitter almonds* (blanched and beaten to a paste), 7 *oz.; spirit* (17 u. p.), 1 gall.; digest a week, filter, and add of *white sugar*, 6 *lb.*, dissolved in *pure water*, 2 quarts.

2. *Clean spirit* at 24 u. p. (sp. gr. 0·945), 2 gall.; *bitter almonds*, ¾ *lb.; cloves, cinnamon*, and *mace*, of each, in coarse powder, 1½ dr.; infuse for 10 days, filter, and add of *white sugar*, 8 *lb.*, dissolved in *pure water*, 1 gall.; lastly, give the liqueur a *violet tint* with *infusion* or *tincture of litmus* and *cochineal.* An agreeable nutty flavoured cordial; but from containing so much bitter almonds, should be only drank in small quantities at a time. The English use only *one-half* the above quantity of almonds.

Crême de Naphe. From *sweetened spirit* (60 u. p.) containing 3½ *lb.* of *sugar* per gall., 7 quarts; *orange flower water* (foreign), 1 quart. Delicious.

Crême de Noyeau. See *Noyeau.*

Crême d'Orange. From *oranges*, sliced, 3 dozen; *rectified spirit*, 2 gall.; digest for 14 days; add of *lump sugar*, 28 *lb.* (previously dissolved in water, 4½ gall.); *tincture of saffron*, 1½ *fl. oz.;* and *orange flower water*, 2 quarts.

Crême de Portugal. Flavoured with *lemon*, to which a little *oil of bitter almonds* is added.

Curaçoa. From *sweetened spirit* at 56 u. p., containing 3½ *lb.* of *sugar* per gall., flavoured with a *tincture* made by digesting the *oleosaccharum* prepared from *Seville oranges*, 9 in number; *cinnamon*, 1 dr.; and *mace*, ¾ dr., in *rectified spirit*, 1 pint. It is coloured by digesting in it for a week or 10 days, *Brazil wood* (in powder), 1 *oz.*, and afterwards mellowing the colour with *burnt sugar*, q. s.

Delight of the Mandarins. From spirit (22 u. p.), 1 gall.; *pure soft water*, ½ gall.; *white sugar* (crushed small), 4½ *lb.; anisum chinæ*, and *ambrette* or *musk seed*, of each, bruised, ½ *oz.; safflower*, ¼ *oz.;* digested together in a carboy or stone bottle, capable of holding double, and agitated well every day for a fortnight.

Eau de Cedrat, Cedrat Water. As *crême de cedrat*, but using *less sugar.*

Eau de Chasseurs. See *Peppermint Cordial.*

Eau de Vie d'Andaye, Eau de vie d'Anis; Aniseed Liqueur Brandy. From *brandy* or *proof spirit,* 1 gall.; *sugar,* ¾ *lb.;* dissolved in *aniseed water,* 1 pint.

Extrait d'Absinthe de Suisse; Swiss Extract of Wormwood. From the *tops of absinthum majus,* 4 *lb.; tops of absinthum minus,* 2 *lb.; angelica root, calamus aromaticus, seeds of anisum chinæ,* and *leaves of dittany of Crete,* of each, 15 gr.; *brandy* or *spirit* at 12 u. p., 4 gallons; macerate for 10 days, then add *water,* 1 gall.; distil 4 gall. by a gentle heat, and dissolve in the distilled spirit of *crushed white sugar,* 2 *lb.* Tonic and stomachic. Served round at some tables after wine has been taken freely, to recruit the stomach, and enable it to bear more.

Gold Cordial. From *angelica root* (sliced), 1 *lb.; raisins,* ½ *lb.; coriander seeds,* 2 *oz.; caraway seeds* and *cassia,* of each, 1½ *oz.; cloves,* ½ *oz.; figs* and *sliced liquorice root,* of each, 4 *oz.; proof spirit,* 3 gall.; *water,* 1 gall.; digest 2 days, and distil 3 gallons by a gentle heat; to this add of *sugar,* 9 *lb.,* dissolved in *rose water* and *clean soft water,* of each, 1 quart; lastly, colour the liquid by steeping in it of *hay saffron,* 1¼ *oz.* This cordial was once held in much esteem. It derives its name from a small quantity of *gold leaf* being formerly added to it.

Huile d'Anis. See *Crême d'Anis.*

Huile de Vanille. Flavoured with *essence* or *tincture of Vanilla.* It is kept in a decanter, and used to flavour liqueurs, grog, &c.

Huile de Venus. From the *flowers of the wild carrot* (daucus silvestris,—*Linn.*) 2½ *oz.,* and *sugar,* 3 *lb.* to the gall. It is generally coloured by infusing a little *powdered cochineal* in it.

Jargonelle, Jargonelle Cordial. Flavoured with *essence of jargonelle pear* (acetate of amyle). *Pine-apple cordial* and *liqueurs* from some other *fruits* are also prepared from the new fruit essences. See *Essences, Ratafias,* and *Oils* (Volatile).

Lemon Cordial. Digest *fresh* and *dried lemon peel,* of each, 2 *oz.,* and *fresh orange peel,* 1 oz., in *proof spirit,* 1 gall. for a week; strain with expression, add of *clear soft* water, q. s. to reduce it to the desired strength, and *lump sugar,* 3 *lb.* to the gallon. The addition of a little orange flower or rose water improves it.

Liquodilla. Flavoured with *oranges* and *lemons,* of each, sliced, 3 in number; with *sugar,* 2½ *lb.* per gall.

Lovage Cordial. From the *fresh roots of lovage* (ligusticum levisticum,—*Linn.*), 1 *oz.,* to the gallon. A *fourth* of this quantity of the *fresh roots of celery* and *sweet fennel* are also commonly added. In some parts a little *fresh valerian root* and *oil of savine* are added before distillation. It is much valued by the lower classes in some of the provinces for its stomachic and emmenagogue qualities.

Oil of Cedrat. See *Crême de Cedrat.*

Orange Cordial. Like *lemon cordial* or *crême d'orange,* from *fresh orange peel,* ½ *lb.* to the gallon.

Parfait Amour, Perfect Love. Flavoured with the *yellow rind* of 4 *lemons,* and a teaspoonful of *essence of vanilla* to the gallon, with *sugar,* 3 *lb.,* and *powdered cochineal,* q. s. to colour.

Peppermint, Peppermint Cordial, Sportsman's do., X. Mint; Eau de Chasseurs. This well-known compound is in greater demand in every part of the kingdom than all the other cordials put together.

Prep. 1. From *peppermint water,* and *gin* or *plain spirit* (22 u. p.), of each, 1 pint; *lump sugar,* ¾ *lb.*

2. (*Wholesale.*) *English oil of peppermint,* 5 *oz.,* is added to *rectified spirit of wine,* 3 pints, and the mixture is agitated well together for some time in a corked bottle capable of holding 4 pints or more; it is then emptied into a cask having a capacity of *upwards* of 100 gall., and *perfectly white and flavourless proof spirit,* 36 gall., is poured in, and the whole well agitated for 10 minutes; a solution of the *best double refined lump sugar,* 2¾ cwt., in about 35 gall. of *pure filtered rain water,* is then added, and the contents of the cask "well rummaged up," in the usual manner, for at least 15 minutes; sufficient *clear rain water* to make up the whole quantity to *exactly* 100 gallons, and holding in solution *alum,* 5 *oz.,* is next added, and the whole is again well agitated for at least a quarter of an hour, after which the cask is bunged down, and allowed to repose for a fortnight before it is "broached" for sale.

Obs. The last formula produces a beautiful article, provided the ingredients are of good quality. Care on this point is particularly necessary in reference to the *essential oil,* which should only be purchased of some *known respectable dealer.* That prepared at Mitcham, Surrey, and hence called "*Mitcham oil of peppermint,*" is not only the strongest but the best flavoured, and though more than double the price of the foreign oil, is, in the long run, much the cheapest. The *sugar* should be sufficiently pure to dissolve in a wine glassful of clear soft water without injuring its *transparency,* and the *cask* should be a fresh-emptied gin pipe, or one properly prepared for gin, as, if it "gives colour," it will spoil the cordial. When these particulars are attended to, the product is a "*bright*" *transparent* liquor as soon as made, and does not require fining. Should there be be the slightest opacity, the addition of 2 *oz.* of *salt of tartar* dissolved in a quart of *hot water*, will have the effect of "clearing it down" in the course of a few days. The *product* is 100 gall. of cordial at 64 u. p.

Pimento, Pimento Cordial, Pimento Dram. Rather strongly flavoured with *allspice* or *pimento.* It has obtained a great repute in the West Indies in diarrhœa, cholera, and bowelly complaints generally.

Raspberry Cordial. From *raspberry brandy*, *capillaire*, and *water*, equal parts. A still superior article is prepared by flavouring *sweetened spirit* with the new "*raspberry essence.*"

Ratifias. These are numerous, and are noticed in another part of this volume. The same remark applies to *Shrub* and *Usquebaugh.*

Shrub. See *above.*

Sighs of Love.—*a.* From *proof spirit flavoured with otto of roses* and *capillaire*, equal parts.

b. From *sugar*, 6 *lb.; pure soft water*, q. s. to produce a gallon of syrup, to which add of *eau de rose*, 1 pint; *proof spirit*, 7 pints. It is stained of a pale pink by *powdered cochineal.* A very pleasant cordial. A drop or two (not more) of essence of ambergris or vanilla improves it.

Tears of the Widow of Malabar. As *balm of Molucca*, but employing *cloves* (bruised), ½ *oz.*, *mace* (shreded), 1 dr., and a teaspoonful of *essence of vanilla* for flavouring. Some add of *orange-flower water*, ¼ pint. It is slightly coloured with *burnt sugar.*

Tent. From *plain spirit* (22 u. p.) and *port wine*, of each, 1 quart; *sherry* and *soft water*, of each, 1 pint; *orange-flower water* and *lemon juice*, of each, ¼ pint; *essence of ambergris*, 2 drops (not more); *sugar*, 2 *lb.* See *Wines.*

Usquebaugh. See *above.*

LIQUID COLOURS. See *Stains*, *Show Colours*, *&c.*

LIQUODILLA. See *Liqueurs.*

LIQUOR. Syn. *Liquor*,—Lat. *Liqueur*,—Fr. This term is applied in the London Pharmacopœia to those aqueous solutions commonly, though improperly, called *waters;* as *liquor ammoniæ*, *liquor potassæ*, *&c.;* which, being simple solutions of pure potassa and gaseous ammonia, would be more correctly and intelligibly called "*solutions.*"

The term "*liquor*" has also, of late years, been applied to certain concentrated preparations, most of which would be more correctly termed "*fluid extracts*," as they merely differ from *good* extracts in their consistence, and from *ordinary* extracts in containing less starchy matter, albumen, and gum. There is also usually a little spirit added to them, to prevent decomposition. *Liquors of this kind* may be *prepared* of the finest quality, by the same processes that are required for the preparation of good soluble extracts; observing to stop the evaporation as soon as the consistence of treacle is acquired, and when cold, to add 1-4th or 1-5th part of their *then weight* in *rectified spirit.* The addition of 3 or 4 drops of the *oils of cloves* and *mustard seed*, dissolved in the spirit, will secure them from any risk of "*moulding*" or *fermenting;* in fact, with this addition many of them will keep well *without* spirit, provided they are evaporated sufficiently, and kept in a cool place. The *liquors* which are *merely concentrated infusions* or *decoctions*, and which, in their consistence, do not even approximate to extracts, may be made in the manner directed at pages 309 and 601.

Much confusion would be prevented if the term *concentrated decoction*, *infusion*, *&c.*, were adopted for those vegetable preparations possessing 8 times the usual strength; *liquors*, for those of a higher strength, but still sufficiently liquid, to be treated as such, in dispensing, &c.; and *fluid extracts*, for those possessing considerable consistence, and approaching the common extracts in their degree of concentration and mode of preparation. See *Decoctions*, *Infusions*, *Essences*, *Extracts*, *Solutions*, *&c.*

The following formulæ present some illustrations of the preparation of this class of medicines.

LIQUOR (Anodyne,—Hoffman's). See *Spirit of Ether* (Compound).

LIQUOR (Anodyne,—Vegetable). See *Spirit of Acetic Ether.*

LIQUOR (Antinephritic). Syn. *Liquor Antinephriticus*,— Lat. *Prep.* (Adams.) *Poppy heads*, 6 oz.; *water*, 1½ pint; boil to one third, strain with pressure, and add of *nitrate of potassa*, 1 oz. *Dose.* 1 to 2 teaspoonfuls night and morning; in gravel and painful affections of the kidneys and bladder.

LIQUOR (Antipodagric, — Beguin's). Syn. *Hoffman's Gout Liquid; Liquor Antipodagricus Hoffmannii*,—Lat. *Prep.*

From *Boyle's fuming liquor*, 1 part; *spirit of wine*, 3 parts. Sudorific. *Dose.* 20 to 30 drops; or *externally*, in gout, and other painful affections, either alone or combined with camphor. See *Perhydrosulphuret of Ammonia.*

LIQUOR (Antipsoric). Syn. *Liquor Antipsoricus, Lotio A.*,—Lat. *Prep.* (Van Mons.) *Sulphuret of sodium*, 1½ dr.; *hydrochlorate of ammonia*, 75 gr.; dissolve each separately in *water*, ½ pint, mix the solutions, and filter. In itch, and other moist skin diseases.

LIQUOR (Bleaching). See *Solution of Chloride of Lime.*

LIQUOR (Boyle's Fuming). See *Perhydrosulphuret of Ammonia.*

LIQUOR OF CALUMBA. Syn. *Liquor Calumbæ*,—Lat. Same as *concentrated infusion of calumba.*

LIQUOR OF CAMPHOR. See *Essences.*

LIQUOR OF CHIRETTA. Same as *concentrated infusion of chiretta.*

LIQUOR OF CINCHONA. Syn. *Liquor of Bark; Concentrated Infusion of Bark, Inspissated do. do.; Infusum Cinchonæ Spissatum*,—Ph. L. *Prep.* 1. (Ph. L.) *Yellow cinchona bark* (bruised), 3 ℔, is macerated in *distilled water*, 6 pints, at two successive operations, as directed under *extract of cinchona*, Ph. L.; the mixed infusions are evaporated by the heat of a water-bath to one fourth, and placed aside to settle; the clear portion is decanted, the remainder strained, and the mixed liquid again evaporated until its sp. gr. reaches 1·200; to this, when cold, *rectified spirit* is dropped in, by degrees, "so that 3 fl. dr. may be added to each fl. oz. of the liquor;" lastly, allow it to repose for 20 days, that the dregs may subside.—*Obs.* It is not at all clear whether the college means 3 *fl. dr. of spirit* to be added to *each fl. oz. of the liquid before its addition*, or that it is to be added so that *each fl. oz. of the product* shall contain that quantity. We presume the former. 1 fl. dr. of this preparation is said to represent fully 4 fl. oz. of the *infusion of cinchona*, Ph. L.; but it is obvious that it must be liable to great variations in strength. "In a general way, 1 fl. dr. may be considered equal to 3 fl. oz. of the infusion." (Pereira.) As commonly met with, this preparation is nearly destitute of the cinchona alkaloids.

2. *Yellow cinchona bark*, bruised, 56 *lb.*; and *water*, holding in solution *sulphuric acid*, 1½ *lb.*; are macerated together, with occasional agitation in a covered earthen vessel for 48 hours, after which the liquid is expressed, and the residuum or marc is treated with *fresh water*; the mixed strained liquid is then evaporated as rapidly as possible in earthenware, to exactly 6 *lb.*; to this *rectified spirit*, 1¼ *lb.*, is added, and the whole is set aside for a week or 10 days; the clear portion is, lastly, decanted and preserved in well-closed bottles. The *product* is very rich in quinine. It is 96 times as strong as the *decoction of cinchona*, Ph. L., and 12 times as strong as the *concentrated infusion* or *decoction of cinchona*, Ph. L. This preparation resembles the *liquor cinchonæ* sold by certain houses in the trade, at 24*s.* per *lb.*, wholesale.

3. Exhaust the *bark* as above, by maceration in 3 successive *waters without acid*, filter, evaporate the mixed liquors to 7 *lb.*, and proceed as before. Inferior to the last, and less rich in the cinchona alkaloids. Very thick; scarcely liquid.

LIQUOR OF PALE CINCHONA. Syn. *Liquor Cinchonæ Pallidæ; Infusum Cinchonæ Spissatum*,—Ph. L. From *pale bark*, as the last.

LIQUOR (Disinfecting). See *Solutions of the Chlorides of Lime, Soda,* and *Zinc*, and *Disinfecting Compounds.*

LIQUOR OF ERGOT. Syn. *Essence of Ergot of Rye, Concentrated Infusion of do.; Essentia Secalis Cornuti, Liquor Ergotæ, Infusum Ergotæ Concentratum*,—Lat. *Prep.* Recent *ergot of rye* (reduced to coarse powder by pounding, or preferably by grinding it in a pepper-mill), 1½ *lb.*, and *boiling distilled water*, 4 *lb.*, are digested together in a closed vessel, with frequent agitation until cold, and then put into a wide-mouthed bottle, along with *rectified spirit*, 2 *lb.*; the whole is then allowed to macerate for a week, after which the liquor is expressed and filtered. 4 fl. dr. of *this essence* are equal to 1 dr. of *ergot* in substance. It is 8 times the strength of the infusion (as usually prepared according to the formula of Pereira and others), and 2½ times the strength of the *tincture of ergot* of the London Apothecary's Hall. This is the only *essence* or *liquor of ergot* known in the wholesale trade.

LIQUOR OF FLINTS. See *Solutions.*

LIQUOR (Libavius's). Bichloride of tin.

LIQUOR OF MATICO. Syn. *Concentrated Infusion of Matico; Liquor Maticonis, Infusum Maticonis Concentratum*,—Lat. *Prep.* From *matico leaves*, 1 *lb.*; *rectified spirit*, ½ pint; *distilled water*, 32 fl. oz.; digest 10 days, express, and filter. 1 fl. dr. added to 7 fl. dr. of water is equal to 1 fl. oz. of the common infusion.

LIQUOR OF MYRRH. Syn. *Solution of Myrrh; Liquor Myrrhæ, Loco Liquaminis Myrrhæ,*—Lat. *Prep.* (Ph. Bor.) *Extract of myrrh* (Ph. Bor.), 1 oz.; *distilled water,* 5 fl. oz.; mix thoroughly, decant, and strain. It should be of a brownish-yellow colour, and turbid. *Dose.* ½ to 1 fl. dr.

LIQUOR OF OPIUM. Syn. *Liquor Opii, Liq. O. Concentratus, Liq. Opiatus,* —Lat. *Prep.* 1. See Black drop.

2. (Messrs. Smith.) *Opium,* 4 oz., is made into an *extract* and denarcotized by *ether;* it is then dissolved in alcohol, filtered, evaporated nearly to dryness, and redissolved in *water,* q. s. to furnish 12 oz. of solution; to this is added of *rectified spirit,* 2¾ oz., with *water,* q. s. to make the whole up to 16 oz. *Dose.* 3 to 12 drops.

LIQUOR OF OPIUM (Acetic). Syn. *Liquor Opii Aceticus,*—Lat. *Prep.* (Mr. Houlton.) See *Houlton's Laudanum.*

LIQUOR OF OPIUM (Citric). Syn. *Liquor Opii Citricus,*—Lat. *Prep.* 1. *Powdered opium,* 1½ oz.; *lemon juice,* 1½ pint; *evaporate* to one-half, cool, add of *rectified spirit,* 5 fl. oz., and the next day decant or filter; same strength as laudanum.

2. (*Liquor Morphiæ Citratis,*—Dr. Porter.) *Opium,* 4 oz.; *citric acid,* 2 oz.; triturate, and add of *boiling water,* 16 fl. oz.; digest with agitation for 24 hours, and filter. This last has above three times the strength of laudanum. It is sadly misnamed.

LIQUOR OF OPIUM (Hydrochloric). Syn. *Solution of Muriate of Opium; Liquor Opii Hydrochloricus,*—Lat. *Prep.* (Dr. Nichol.) *Powdered opium,* 1½ oz.; *distilled water,* 1 pint; *hydrochloric acid,* 1½ fl. oz.; digest a fortnight, and strain with expression. Same strength as laudanum. According to Dr. Nichol this is preferable to every other preparation of opium.

LIQUOR OF OPIUM (Sedative,—Battley's). Syn. *Sedative Solution of Opium; Liquor Opii Sedativus,* — Lat. *Prep.*—*a. Hard aqueous extract of opium* (bruised), 3 *oz.,* is boiled in *water,* 1½ pint, until dissolved; to the solution, when cold, *rectified spirit,* 6 *oz.,* is added, together with *water,* q. s. to make the whole measure *exactly* 1 quart.; the liquor is, lastly, filtered.

b. From *hard extract of opium,* 22 *oz.; boiling water,* 13 pints; *rectified spirit,* 3 pints; as the last.

c. From *extract of opium* (Ph. L.), 4¼ *oz.; water,* 1 quart, boil till reduced to 34 fl. oz.; cool, filter, and add of *rectified spirit,* 6 fl. oz. and *water,* q. s. to make up exactly 1 quart.

Obs. The first two formulæ, which vary only in their quantities, are identical with that employed by Mr. Battley, as we have already mentioned at *page* 438. As hard extract of opium is not always at hand, we have introduced a formula in which the ordinary extract is ordered. It gives a precisely similar product to the others, provided the *cold aqueous decoction* is filtered before adding the spirit. Battley's *liquor opii sedativus* is an excellent preparation, less exciting than opium or laudanum. *Dose.* 10 to 30 drops. Dr. Christison states that 20 drops of Battley's *solution* are equal to 30 drops of the common tincture.

LIQUOR OF RHUBARB. Syn. *Liquor Rhei, Infusum Rhei Concentratum,*—Lat. *Prep.* 1. *Rhubarb* (well bruised), 6¾ *oz.*; *water,* q. s.; *rectified spirit,* ½ pint; proceed as for *infusion of calumba* (conc.); to produce a quart. 8 times the usual strength.

2. See *Infusion of Rhubarb* (Concentrated).

LIQUOR OF SARSAPARILLA. Syn. *Fluid Extract of Sarsaparilla; Liquor Sarzæ, Essentia Sarsaparillæ,*—Lat. *Prep.* Either *the simple* or the *compound liquor of sarsaparilla* may be made from the corresponding decoction, or, preferably, the *infusion prepared with water* at 125° Fahr., by carefully evaporating it until sufficiently concentrated, and then straining it through flannel, and adding a *little spirit.* Jamaica sarsaparilla should be alone employed, as the other varieties, especially the Honduras, not only possess less medicinal virtue, and yield less extract, but are very liable to ferment, and get mouldy, unless an undue proportion of spirit is added to them. See *Extracts* (p. 441-2).

LIQUOR OF SENNA. Syn. *Liquor Sennæ,*—Lat. Both the *fluid extract* and the *concentrated infusion of senna* are called by this name, but more generally the former. The following are additional formulæ:—

1. (Duncan.) *Senna,* 15 *lb.; boiling water,* 5 gall.; proceed by the method of displacement, evaporate the product to 10 *lb.*, add of *molasses,* 6 *lb.* (previously concentrated over a water bath until it begins to congeal on cooling), dissolve, and further add of *rectified spirit,* 1¼ pint, together with *water,* q. s. to make the whole measure exactly 12 pints. Every fl. oz. represents 1 oz. of senna.

2. (Dr. Tweedy.) As the last, but using

tincture of ginger (prepared with rectified spirit), 1½ pint; instead of the spirit there ordered.

LIQUOR OF SOAP. Syn. *Liquor Saponis*,—Lat. See *Tinctures.*

LIQUOR (Styptic). Syn. *Liquor Stypticus*,—Lat. *Prep.* (Ph. Slesvico-Holsat. 1831.) *Alum* and *sulphate of copper*, of each, 1½ oz.; *sulphuric acid*, 1 oz.; *water*, 1 ℔; dissolve, and filter.

LIQUOR OF TARAXACUM. Syn. *Fluid Extract of Dandelion; Extractum Taraxaci Fluidum, Liquor Taraxaci*,—Lat. *Prep.* 1. *Dandelion roots* (dried), 28 *lb.*, are rinsed in *clean cold water*, to remove dirt, and then sliced small, and macerated in enough *cold water* to cover them, for 24 hours; the liquid is next pressed out, and after the fecula has subsided, the clear portion is decanted, and heated to 180° or 190° Fahr., to coagulate the albumen; the liquid is then filtered while hot, and evaporated by steam, or preferably by a current of warm air, until it is reduced to 22½ *lb.;* to this *rectified spirit* 6 *lb.*, is added, and after thorough agitation, the vessel is set aside for a week or a fortnight, after which the clear portion is gently poured from the sediment and preserved in well-closed bottles in a cool place. A very fine article. It represents an equal weight of the root.

2. The *expressed juice of dandelion* is heated to near the boiling point, strained, and evaporated as the last to a proper consistence; ¼th or ⅕th of *rectified spirit* is then added, and the liquid is otherwise treated as before. Very odorous and pale coloured.

3. *Dried root* (coarsely powdered), 1 *lb.; water*, 1¼ pint; *rectified spirit*, ½ pint; digest a week, express the liquor, pass it through a hair sieve into a bottle, and in 10 days decant the clear portion.

4. (Ph. Bor.) *Extract of dandelion*, 3 parts; *water*, 1 part (or q. s.); triturated together.

5. (Mr. W. Procter.) *Fresh root*, 2 *lb.*, is sliced and reduced to a pulp, and macerated with ⅙th of its bulk of *rectified spirit* for 24 hours; it is then subjected to strong pressure, the *marc* is treated with *water containing a little spirit*, 1 pint, and the liquid is again expressed; the mixed product is evaporated to 12 fl. oz., and when cold, *rectified spirit*, 4 fl. oz., is added, and the whole filtered.

Obs. Liquor of taraxacum has a very large sale. The *dose* is 1 to 2 fl. dr. See *Extracts.*

LIQUOR OF VALERIAN. Syn. *Fluid Extract of Valerian; Liquor Valerianæ, Extractum V. Fluidum*,—Lat. *Prep.* See *Extracts.* 1 fl. oz. is equal to ½ oz. of the root.

LIQUOR OF VANILLA. Syn. *Fluid Extract of Vanilla; Liquor Vanillæ, Extractum V. Fluidum*,—Lat. *Prep.* 1. *Vanilla* (sliced), 1 *lb.; rectified spirit*, 3 pints; prepare a tincture either by displacement or maceration, and reduce it by distillation at the lowest possible temperature, to 1½ *lb.;* put this into a strong bottle whilst hot, add of *white sugar candy* (in powder), ½ *lb.*, cork down, and agitate the whole until it is nearly cold. Very fine. *Used* chiefly for its odour and flavour. It represents half its weight of vanilla.

2. (W. Procter.) *Vanilla* (cut into thin transverse slices), 1 oz.; *sugar*, 3 oz.; triturate until reduced to fine powder, put it into a strong pint bottle, along with *syrup*, ½ pint; *water*, 2 oz. ;tie down the cork, and set the bottle for nalf an hour in *boiling water;* cool, strain, and treat the residue in a like manner with a mixture of *water*, 6 fl. oz., and *rectified spirit*, 1 fl. oz.; lastly, mix the two products. Greatly inferior to the last.

LIQUORS (Medicated Vinous). See *Wines.*

LIQUORICE. Syn. *Stick Liquorice; Liquoritia; Glycyrrhizæ Radix; Glycyrrhiza*,—Ph. L. & D. *G. Glabra*,—Ph. E. "The recent and the dried root of *glycyrrhiza glabra*," Linn., or common liquorice. "The fresh root is to be kept buried in dry sand for use." (Ph. L.) It has a sweetish taste, and is slightly aperient, expectorant, and diuretic. It is a popular demulcent and pectoral. As a masticatory it allays thirst and irritation. Its *extract* is the common *liquorice, Spanish liquorice*, or *Spanish juice* of the shops. See *Extracts, &c.*

LIRIODENDRINE. A white crystallizable principle, obtained from the *root-bark* of the *liriodendron tulipifera* (Linn.) or *tulip tree* of North America. It has a bitter taste, is soluble in alcohol, slightly so in water, and closely resembles boracic acid.

LISBON DIET-DRINK. The original formula for this article is given at *page* 328.

LIST. The *border* or *selvage* torn off a piece of cloth. It is used by the *French* polisher and law stationers to form their rubbers, and for numerous other purposes.

LITHARGE. Syn. *Semi-vitrified Oxide of Lead; Plumbi Oxydum*,—Ph. L. *Plumbi*

Oxydum Semi-vitreum,—Ph. D. *Lithargyrum*,—Ph. E. The litharge of *commerce* is semivitrified protoxide of lead, obtained chiefly by scraping off the *dross* that forms on the surface of *melted lead* exposed to a current of air (*dross of lead; plumbum ustum*), and heating it to a full red, to melt out any undecomposed metal. The *fused oxide* in cooling forms a yellow or reddish semi-crystalline mass, which readily separates into scales ; these, when ground, constitute the *powdered litharge* of the shops. Litharge is also prepared by exposing red lead to a heat sufficiently high to fuse it, and *English litharge* is obtained as a secondary product by liquefaction, from argentiferous lead ore, when it is often called *silver stone*.

Pur. "Entirely, or almost entirely, soluble in dilute nitric acid. This solution is blackened by sulphuretted hydrogen. Potassa throws down a white precipitate, which is re-dissolved by adding the same in excess. If sulphate of soda be added to 100 gr. of this oxide dissolved in nitric acid, 135 gr. of sulphate of lead are precipitated." (Ph. L.) "50 gr. dissolve *entirely*, and without effervescence, in 1½ fl. oz. of pyroligneous acid; and the solution precipitated by 53 gr. of phosphate of soda, remains precipitable by more of the test." (Ph. E.) The solution in both acetic and nitric acid should be colourless. It is of great importance to the pharmaceutist to obtain pure litharge, as the slightest impurity will often colour and spoil his lead plaster (*emp. plumbi*), and solution of diacetate of lead (*liq. plumbi diacetatis*).

Uses. Litharge is employed *in pharmacy*, to make plasters and several other preparations of lead ; by *painters* as a "*drier*" for oils ; and for various other purposes in the arts.

Obs. The *litharge* of *commerce* is distinguished by its colour into *Litharge of gold* (lithargyrum auri, l. aurium, l. chrysitis), which is dark coloured and impure, and *Litharge of Silver* (silver stone ; lithargyrum argenti, l. argenteum, l. argyritis), which is purer, and paler coloured. The dark colour of the former is generally said to be owing to the presence of red lead ; but this we find is not the case, the increased colour depending chiefly on its being more slowly cooled. *Foreign litharge* generally contains copper and iron ; and, not unfrequently, a little silver and silica. These are readily detected by the usual tests. In *grinding litharge* about 1 *lb.* of *olive oil* is usually added to each 1 cwt., to prevent dust. The *best solvents* of litharge are *nitric acid* and *acetic acid.* As it slowly absorbs the carbonic acid of the air, it generally effervesces slightly when treated with acids, and this effervescence is stronger in proportion to its age.

LITHIA. Syn. *Oxide of Lithium.* An alkali or alkaline earth, discovered in 1818, by M. Arfwedson, in a mineral called *petalite.* It has since been found in a few other minerals, and in minute quantities in some mineral springs.

Prep. (Berzelius.) *Petalite* or *spondumene* (in fine powder), 1 part ; *fluor spar*, 2 parts ; mix, add *oil of vitriol*, 10 parts, and heat the mixture as long as acid vapours are evolved ; dissolve the residuum in *pure water of ammonia*, boil, filter, evaporate the solution to dryness, and heat the dry mass to redness. The matter left is pure *sulphate of lithia*, from which *pure lithia* may be obtained by decomposing it by *acetate of baryta*, and expelling the acetic acid from the filtered solution by heat ; at first *carbonate of lithia* is formed, from which the carbonic acid is expelled as the temperature increases.

Prop., &c. Lithia is caustic, alkaline, and sparingly soluble in water. One of its most remarkable properties is its power of corroding platinum. It is distinguished from POTASSA and SODA by its *phosphate* and *carbonate* being only sparingly soluble in water,—from BARYTA, STRONTIA, and LIME, by forming crystallizable and soluble salts with *sulphuric acid* and *oxalic acid*,—and from MAGNESIA, by the solution of its *carbonate* exhibiting an alkaline reaction. Heated on platinum it tinges the flame of the blowpipe carmine red. With the acids, lithia forms SALTS, most of which may be made by the direct solution of *itself* or *carbonate* in the *dilute acids.*

LITHIA (Carbonate of). Syn. *Lithiæ Carbonas*,—Lat. *Prep.* To an *aqueous solution of sulphate of lithia*, add a *strong solution of sesquicarbonate of ammonia*, collect the precipitate, drain and press it, wash it with a little *rectified spirit*, and dry it. By dissolving it in *boiling water*, and slowly evaporating the solutions, crystals may be obtained.

Prop., &c. It resembles carbonate of magnesia in appearance ; is soluble in about 100 parts of cold water, and in considerably less of boiling water. It has been proposed by M. Lipowitz and others, as a solvent for uric acid deposits. According to Biswanger, 1 part of carbonate of lithia in 120 parts of water, takes up, at blood-heat, nearly 4 parts of uric acid. Mr. Alexander Ure recommends a dilute solution of this substance as an injection in lithic calculus, as it is a better solvent of uric acid than either borax or the alkaline carbonates. "Of all the various menstrua hitherto recommended, none appear to promise more favorably than the carbonate of lithia." "If by means of injections" (of this solution) "we can reduce a stone at the rate of a grain or more an hour, we shall not merely diminish the bulk of the calculus, but further loosen its cohesion, disintegrate it, so to speak, causing it to crumble down, and be washed away in the stream of urine." (Mr. A. Ure.) *Dose.* 2 to 5 gr., twice or thrice a day; as an *injection,* 1 gr. to *warm water,* 1 fl. oz. See *Earths.*

LITHIC ACID. See *Uric Acid.*

LITHIUM. The metallic base of *lithia,* first obtained by Sir H. Davy by exposing *hydrate of lithia* in contact with *mercury* to galvanic action, and decomposing the resulting *amalgam* by distillation. Its existence as a metal is so transient, that its properties cannot be fully examined. It is a white-coloured metal, like *sodium,* and exceedingly oxidable.

LITHOCHOLIC ACID. A name given by Wöhler to an acid found by him in a biliary concretion. It possesses no practical interest.

LITHOFELLIC ACID. Syn. *Lithofellinic Acid.* An acid discovered by Göbel, in a biliary concretion. It forms the chief portion of the substances called *oriental bezoar-stones.* It is obtained by digesting the *calculus* in *boiling alcohol* of 98%, evaporating, and re-digesting the residuum first in *cold,* and then in *boiling alcohol;* from the latter solution the acid is procured by slow evaporation. Colourless crystals, when pure, forming salts with the bases termed *Lithofellinates.* According to Taylor *lithofellic acid* is identical with *ellagic acid.*

LITHOGRAPHY. Want of space renders our notice of this beautiful and useful art necessarily brief.

There are two methods of lithography in general use. In the *one,* a drawing is made on the *stone* with a *lithographic crayon,* or with *lithographic ink;* in the *other* method, the design is made on *lithographic paper,* which, on being moistened and passed through the press, leaves its design on the surface of the stone, reversed. In either method, *water acidulated with oil of vitriol* or with *hydrochloric acid,* is poured over the stone, and by removing the alkali from the chalk or ink, leave the design on it in a permanent form, at the same time that it "etches" away a portion of the lights, and renders the surface more absorbent of water.

The *process* of *lithographic printing* is as follows:—*water* is thrown over the stone, the "*roller*" charged with *printing ink* is passed over the surface, the *paper* is applied, and a copy is obtained by the action of the *lithographic press.* The same process must be had recourse to for *each* copy. The nature of the stone is such that it retains with great tenacity the resinous and oily substances contained in the ink or crayon employed to form the design, and also absorbs water freely; this, combined with the peculiar affinity between resinous and oily substances, and their mutual power of repelling water, occasions the ink on the printing roller to *adhere to the design,* and to *leave untouched the lights.*

The *stones* are *prepared for lithography* by polishing in the ordinary way; the style of work for which they are intended determining the degree of labour bestowed upon them. For *crayon drawings,* the surface should have a fine grain, but the finish of the stone must depend upon the desired softness of the intended drawing; for *writing* or *drawing on in ink,* the surface must receive a higher polish, and must be finished off with *pumice stone and water.*

The *best lithographic stones* are obtained from Solenhofen, near Munich, and from Pappenheim, on the banks of the Danube. The white lias which lies immediately under the blue, near Bath, also yields good lithographic stones, and furnishes the principal portion of those employed in this country. See *Crayons, Inks,* and *Papers.*

LITHONTRIPTICS. Under this head are included numerous substances (*lithics; lithica*) used to prevent the formation of urinary calculi, or to dissolve them when already formed. Those employed with the former intention are more correctly termed *antilithics* (antilithica), and those with the latter, *lithontriptics,* or *lithonlytics* (lithontriptica, lithonlytica). In cases exhibiting a lithic diathesis, much depends on the regulation of the diet of the patient. When there is a superabundant secretion of uric acid, the food should contain as little nitrogen as possible, and should therefore be mainly of a vegetable nature; but, at the same time, care must be taken that the healthy action of the stomach is not impaired by the sudden or undue privation of the usual or necessary diet. *Indigestible substances,* as new bread, pastry, salt meat, and even soup, should be avoided; nor should malt liquors or acid wines be allowed. When the *white sand deposits* or the *phosphates* occur, an acid system of diet is beneficial, with abstinence from alkalies, soda water, &c.; whilst lemon juice, the acid wines, and fruits in moderation, may be taken with advantage.

The following are the principal substances included under this head by pharmacological writers:—*Alkalies and their carbonates, benzoic acid, borax, carbonate of lithia, carbonic acid, carrot, cinnamic acid, diluents* (generally), *diuretics* (generally), *juniper, malic acid, Malvern waters, mineral acids, nitrosaccharate of lead, opium, phosphate of soda, phosphoric acid, poppies, turpentines, uva ursi, vegetable acids, vegetable astringents, vegetable bitters, Vichy waters, wall pellitory, water* (pure).

LITMUS. Syn. *Turnsole; Lacmus, Lacca Cærulea, L. Musiva, L. Musci,*—Lat. A blue substance prepared by the united influence of *water, air, ammonia,* and either *potassa* or *soda,* from *rocella tinctoria, lecanora tartarea,* or any of the other *tinctorial lichens* capable of yielding archil, by a process essentially similar to that adopted for the latter substance, except that *chalk* is generally used to form the paste, which is moulded into cakes and dried.

Pur., &c. "Soluble in both water and alcohol. Its blue colour is reddened by acids, and is restored by the addition of alkalies." (Ph. L. 1836.) It is extensively used by the *dyer* as a red and crimson colouring matter, and by the *chemist* as a test for acids. See *Archil, Cudbear, &c.*

LIVE-LONG. See *Candies.*

LIVER. Syn. *Hepar,*—Lat. A large abdominal viscus, the exclusive duty of which, until recently, was stated by physiologists to be *to secrete bile;* but the secretion of sugar for combustion in the lungs or capillaries is now said to be one of its chief duties. The *liver* is subject to several *diseases,* both functional and organic, among which *inflammation* or *hepatitis* holds the most important place. The *acute form of this disease* is ushered in with pain in the region of the liver, with sickness, costiveness, and a strong, hard, and frequent pulse, with great pain about the clavicle and shoulders. There is cough, oppressed breathing, and often vomiting of bilious matter. The urine is scanty, and of a saffron-yellow colour, and the skin and eyes are also tinged yellow. The *treatment* consists chiefly in bleeding, purging with salines accompanied with mercurials, the use of antimonials, and a blister applied over the region of the liver. Bitter tonics, as calumba, cascarilla, and gentian, may afterwards be had recourse to; and if the patient resides in a hot climate, a change to a temperate one should be made if possible. *Chronic hepatitis* requires similar treatment, but of a less active character. The more usual *causes* of diseases of the liver, besides those common to the other viscera, are residence in a hot climate, and the excessive use of highly seasoned food and alcoholic liquors.

LIVER. Syn. *Hepar,*—Lat. A term formerly applied to numerous substances, on account of their colour; as *liver of antimony* (hepar antimonii), *liver of sulphur* (hepar sulphuris), &c.

LIVERWORT. The *marchantia conica* and *polymorpha* (Linn.); on account of their supposed value in diseases of the liver. This name is now often given to Iceland moss.

LIVE-STOCK. The *choice, employment, breeding,* and *fattening* of *domestic animals* for the purposes of labour and profit, form most important objects in the successful management of a farm, and receive the especial attention of every scientific agriculturist. Want of space precludes us from doing more than to call attention to the necessity of selecting those breeds only which are most suited to the object in view, and so treating them as to enable them to return us the greatest amount of useful labour, or become the soonest ready for the market.

LIXIVIATION. The process of dissolving out or extracting the saline matter of bodies, more especially of ashes, the residua of distillations, &c., by means of ablution or digestion in water. The solution so obtained is called a *lye, ley,* or *lixivium,* and the salts resulting from the evaporatiom of such solutions, *lixivial salts.*

LOADSTONE. Syn. *Magnetic Ironstone.* Native crystallized magnetic oxide of iron. See *Iron* (Oxides of).

LOAM. A native mixture of *clay, sand,* and *oxide of iron,* with more or less chalk. *Loamy soils* are of this description. They are called *heavy* or *light,* according to the proportion of clay; and *sandy, calcareous,* or *gravelly,* just as sand, gravel, or chalk form a characteristic portion of them.

LOBELIA. Syn. *Indian Tobacco; Lobelia,*—Ph. L. E. & D. "The flowering herb" of "*lobelia inflata,*"—Linn. (Ph. L.), or *bladder-podded lobelia.* This herb has an unpleasant odour, and an acrid, burning, nauseous taste, somewhat resembling that of tobacco. In *small doses* (1 to 3 gr.) it is expectorant and diaphoretic; in *larger ones* (5 to 15 gr.), nauseant and emetic;

and in *excessive* doses, poisonous. According to Dr. Pereira, its principal value is that of an antispasmodic. It has been highly recommended by Dr. Elliotson in spasmodic asthma. He commences with small doses, and gradually increases them, unless headache or nausea occurs. Others give a full dose at or before the commencement of the fit. It has been also tried in croup, hooping-cough, and other diseases of the respiratory organs, with variable effect.

Lobelia is the panacea of Dr. Coffin, the author of the pretended system of medicine irreverently called "Coffinism."

LOBELIANINE. Syn. *Oil of Lobelia, Odorous Principle of do.* This name has been given by Dr. Pereira to the butyraceous volatile oil obtained by distilling Indian tobacco (*lobelia inflata*) along with water.

LOBELIC ACID. The acid existing in decoction of lobelia. It closely resembles gallic acid. It reddens litmus, and is precipitated by several metallic salts.

LOBELINE. Syn. *Lobeline, Lobelina.* A light yellowish-brown oily substance, found by Dr. Colhoun in lobelia inflata. It is volatile, soluble in alcohol, ether, and water; and in oil of turpentine, oil of almonds, and some other fixed oils; with the acids it forms crystallizable salts which are soluble. It resembles, and is probably identical with the nicotine of Berzelius. It may be *obtained* by the action of *alcohol* on the *seeds*, evaporation, digestion of the residue in *dilute acid*, and subsequent precipitation. 1 *oz.* of the seeds furnishes 2 gr. When perfectly pure, 1 gr. will kill a large dog.

LOBSTERS. See *Shell Fish.*

LOCKSOY. Rice boiled to a paste and drawn into threads. *Used* to thicken soups. It is imported from China.

LOCOFOCOS. See *Matches.*

LOCUSTIC ACID. A sour liquid obtained from the grasshopper. It is impure acetic acid.

LOGWOOD. Syn. *Sapan Wood; Hæmatoxylum,*—Ph. L. E. & D. *Hæmatoxyli Lignum, Lignum Campechense, L. Campechianum, L. Campescanum, L. Indicum, L. Sappan,*—Lat. var. The wood of *hæmatoxylon campechianum* (Linnæus). It is a valuable astringent, and its decoction, extract, and infusion are useful remedies in chronic diarrhœa and dysentery, and in hæmorrhages, &c. The extract is an efficient substitute for catechu and kino.

Logwood is extensively employed in *dyeing* and *calico printing* for the production of *reds, violets, purples, blacks, drabs, &c.* It readily yields its colour both to spirit and boiling water. The colour of its infusion is a fine red, turning on the purple or violet; *acids* turn it on the YELLOW, and *alkalies* DEEPEN it. To *stuffs mordanted* with *alum*, it gives various shades of VIOLET and PURPLE, according to the proportions of the materials. By using *solution of tin* as the mordant, various shades of RED, LILAC, and VIOLET, may be obtained. The addition of a little *Brazil wood* is commonly made to *brighten* the red. With a *mordant* of *sulphate* or *acetate of iron*, it dyes BLACK; and with the addition of a little *sulphate of copper*, GRAYS of various shades. It is, however, chiefly employed, in conjunction with *gall-nuts*, for blacks, to which it imparts a lustre and velvety appearance. *Silk* is usually turned through the cold decoction, but for *wool* the decoction is used either hot or boiling. Logwood is one of the cheapest and most easily managed of the dye stuffs. It is also used to make ink. See *Hematine, Inks, &c.*

LOHOCH. See *Linctus.*

LOLIINE. A pulverulent grayish-white substance obtained from *lolium temulentum* (Linn.) or *bearded darnel.* It is soluble in water and hot alcohol, has an acid reaction, and is very acrid. It has been proposed as a remedy in headache, neuralgia, sciatica, &c.

LOOCH. See *Linctus.*

LORICA. A species of lute applied as a coating to chemical vessels before exposing them to the fire. Its application is called *lorication.* See *Lutes.*

LOTION. Syn. *Lotio,*—Lat. An external application, or wash, consisting of water holding in solution medicinal substances. Lotions may be *prepared* of any soluble medicaments that are capable of exerting their action by contact with the skin. Writers on *pharmacology* have arranged them in classes, as sedative, anodyne, stimulant, &c., according to their effects. *Sedative* and *refrigerant* lotions are commonly employed to allay inflammation;—*anodyne* and *narcotic* lotions, to relieve pain;—*stimulant* lotions, to induce the maturation of tumours, &c.;—*detergent* lotions, to clean foul ulcers;—*repellent* and *resolvent* lotions, to discuss tumours, remove eruptions, &c.; *counter-irritant* lotions, to excite a secondary morbid action, with the intention of relieving one already existing. *Lotions* are usually *applied* by wetting a piece of linen with them and keeping it on the part affected; or, in slight cases, by moistening the part with the fingers previously dipped into them. Lotions are more agreeable if made with *rose water*, but are not thereby rendered more efficacious. In all cases, *distilled water*, or *filtered soft water*, is alone admissible as the solvent.

As *lotions* are, in general, mere *extemporaneous* or *magistral preparations*, it will, of course, be only necessary here to give the formulæ for a few of those which are the most useful or the most frequently employed. These will serve as examples from which others may be prepared. As a GENERAL RULE, the *medium dose* of any substance dissolved in a *fluid ounce* of *distilled water*, forms a lotion of the proper strength, under all ordinary circumstances; or, what is the same thing, the *medium dose in grains*, taken in *scruples*, is sufficient for a *pint* of such a lotion. Thus; the dose of *sulphate of zinc*, is 1 to 3 gr., therefore—$\frac{1+3}{2} = 2$ gr., which is the proportion of sulphate of zinc to be taken for 1 *fl. oz. of water*, or 40 gr. for 1 *pint*. Again, the dose of *bichloride of mercury* is ⅛ to ¾ gr., therefore—$\frac{\frac{1}{8}+\frac{3}{4}}{2} = \frac{7}{16}$ gr.; or nearly ½ gr. per *fl. oz.*, and 8½ gr. *per pint*. In this method, extreme or unusual doses, as, for instance, those of sulphate of zinc, as an emetic, in poisoning, &c., are not taken into the calculation. In all cases in which lotions are intended for extremely susceptible parts, it is proper to dilute them with an equal bulk of water. When intended for *collyria* they should be diluted with at least 3 to 4 times their bulk of water. See *Embrocations, Liniments, &c.*

LOTION (Acetate of Ammonia). Syn. *Lotio Ammoniæ Acetatis*,—Lat. *Prep.* 1. *Solution of acetate of ammonia*, 1 part; *water*, 2 parts.

2. (Hosp. F.) *Solution of acetate of ammonia, rectified spirit*, and *water*, equal parts. Discutient and refrigerant. In ordinary inflammations.

LOTION (Acetate of Lead). Syn. *Lotio Plumbi Acetatis*,—Lat. *Prep.* (Collier.) *Sugar of lead*, 1 dr.; *distilled water*, 8 fl. oz. Sometimes a little *vinegar* is added. In excoriations, burns, sprains, contusions, &c. See *Solution of Diacetate of Lead*.

LOTION (Acetate of Zinc). Syn. *Lotio Zinci Acetatis*,—Lat. *Prep.* (Béral.) *Acetate of zinc*, 1½ dr.; *water*, 1 pint. Astringent; similar to lotion of sulphate of zinc.

LOTION (Acetic). Syn. *Lotio Aceti*,—Lat. *Prep.* 1. *Vinegar*, 1 part; *water*, 2 or 3 parts. For bruises, contusions, &c., and as a general refrigerant application to sound parts.

2. *Vinegar*, 1 fl. oz.; *cold water*, ½ pint; as a wash in chronic ophthalmia, &c.

LOTION (Acid). See *Lotions of Acetic, Nitric*, and *Phosphoric Acid, &c.*

LOTION (Aconitine). Syn. *Lotio Aconitinæ*,—Lat. *Prep.* (Turnbull.) *Aconitina*, 8 gr.; *rectified spirit*, 2 fl. oz. In neuralgia; applied by means of a small piece of sponge mounted at the end of a stick. It must never be employed when the skin is broken or abraded; and it would be wise, in most cases, to dilute it with double its volume of proof spirit.

LOTION (Alkaline). Syn. *Lotio Alkalina, L. Potassæ Carbonatis*,—Lat. *Prep.* (P. Cod.) From *salt of tartar*, 1 oz.; *water*, 1 pint. Stimulant and detergent. Diluted with an equal bulk of water it forms an excellent cosmetic wash to remove scurf from the hair. Sometimes it is made with *almond milk* instead of water.

LOTION (Alum). Syn. *Lotio Aluminis*,—Lat. *Prep.* 1. From *alum*, 1½ dr.; *distilled* or *rose water*, 1 pint. Astringent. For sore gums, nipples, excoriations, &c.

2. (*Compound*,—Cadet de Gassicourt.) *Alum* and *sulphate of zinc*, of each, 1 dr.; *plantain water*, 1 pint. As a wash for wounds and bleeding ulcers.

LOTION (Ammoniacal). Syn. *Lotio Ammoniæ, L. Ammoniacalis*,—Lat. *Prep.* 1. *Liquor of ammonia*, 3 fl. dr.; *cold water*, 5 fl. oz. As a stimulant to indolent ulcers, and in certain skin diseases.

2. (Swediaur.) *Liquor of ammonia, spirit of thyme*, and *spirit of camphor*, equal parts. In headaches; applied to the forehead and temples, and in other cases, as a counter-irritant. In most cases, it should be used diluted.

3. (*Opiated*,—Dr. Kirkland.) *Sal volatile*, 3½ fl. oz.; *tincture of opium*, ½ fl. oz.; *water*, 4 fl. oz. Anodyne, stimulant, and resolvent.

LOTION (Antiphlogistic). Syn. *Lotio Antiphlogistica*,—Lat. *Prep.* 1. (Copland.) *Solution of diacetate of lead*, 3 fl. dr.; *solution of acetate of ammonia*, 2 fl. oz.; *distilled water*, 1 pint. Refrigerant, sedative, and repellent. *Used* to allay inflammation, &c.

2. (A. T. Thomson.) *Opium*, 2 dr.; *distilled vinegar*, ½ pint. Anodyne and refrigerant; in swelled joints, &c.

LOTION (Arnica). Syn. *Lotio Arnicæ*,—Lat. *Prep.* 1. *Tincture of arnica*, 1 fl. dr.; *rose water*, 2½ fl. oz. In contusions, bruises, extravasations, &c.

2. (Niemann.) *Arnica flowers*, ½ oz.; *hot vinegar*, 3 fl. oz.; *boiling water*, 5 fl. oz.; infuse until cold, and strain. In acute hydro-

cephalus; or with *water*, q. s. to measure a pint, as a common lotion.

LOTION (Arsenical). Syn. *Lotio Arsenicalis, L. Acidi Arseniosi,*—Lat. *Prep.* 1. *Arsenious acid,* 5 gr.; *water,* 1 pint. In psoriasis, &c.

2. (Compound,—M. le Febre.) *Arsenious acid,* 8 gr.; *boiling water,* 16 fl. oz.; dissolve, and add of *extract of hemlock,* 1 oz.; *solution of diacetate of lead,* 3 fl. oz.; *tincture of opium,* 1 fl. dr. Every morning in cancer.

LOTION (Astringent). Syn. *Lotio Astringens,*—Lat. See *Lotions of Alum, Sulphate of Zinc, &c.*

LOTION (Barlow's). *Prep.* From *sulphuret of potassium* (in powder), 3 dr.; *soap* (sliced), 1½ dr.; *lime water,* 7½ fl. oz.; *proof spirit,* 2 fl. oz.; dissolve. In itch, ringworm, &c.

LOTION (Bateman's). *Prep.* From *bichloride of mercury,* 2 gr.; *compound spirit of lavender,* 1 fl. oz.; dissolve, and add of *distilled water,* 4 fl. oz. In obstinate cutaneous eruptions, more especially those of a papular character.

LOTION (Belladonna). Syn. *Lotio Belladonnæ,*—Lat. *Prep.* (Graefe.) *Extract of belladonna,* ½ dr.; *dilute solution of diacetate of lead,* ½ pint. Applied to tumours and glandular enlargements.

LOTION (Bichloride of Mercury). Syn. *Lotio Hydrargyri Bichloridi, L. H. Chloridi Corrosivi,*—Lat. *Prep.* 1. *Corrosive sublimate,* 5 to 10 gr.; *distilled water,* 1 pint. The addition of 5 or 6 gr. of *hydrochlorate of ammonia,* or as many drops of *hydrochloric acid,* increases the solvent action of the water, and renders the preparation less liable to change. Some persons dissolve the sublimate in 1 or 2 fl. dr. of *rectified spirit* before adding it to the water; but this is unnecessary. In obstinate eruptions, glandular swelling, obstinate sores, &c.; also as an injection.

2. (Good.) *Corrosive sublimate,* 1 dr.; *sal ammoniac,* 2 dr.; *nitre,* 4 dr.; *water,* 6 fl. oz.; dissolve. In itch, &c. For use, it should be diluted with about 3 times its bulk of water.

3. (*Lotio Hydrargyri Amygdalina,*—St. B. Hosp.) *Blanched bitter almonds,* 1 oz.; *water,* 1 pint; make an emulsion, and add of *bichloride of mercury* (dissolved in a little rectified spirit), 10 gr. This resembles *Gowland's lotion,* and may be used for it.

LOTION (Black). See *Mercurial Lotions.*

LOTION (Borax). Syn. *Lotio Boracis, L. Boracica.*—Lat. *Prep.* 1. (Dr. Abercrombie.) *Borax,* 2½ dr.; *distilled vinegar,* ¼ pint. In ringworm.

2. (Copland.) *Borax* (in powder), 1 dr.; *rose water* and *orange-flower water,* of each, 3 fl. oz.; dissolve. A fragrant and effective application to sore gums, sore nipples, excoriations, &c.

3. (Dr. Johnson.) *Borax,* 2 dr.; *precipitated chalk,* 1 oz.; *rose water* and *rectified spirit,* of each, 3 oz. For sore nipples.

4. (Dr. Meigs.) *Borax,* ½ oz.; *sulphate of morphia,* 6 gr.; *rose water,* 8 fl. oz. To allay itching and irritation, especially pruritus vulvæ.

LOTION (Bromine). Syn. *Lotio Brominii,*—Lat. *Prep.* (Dr. Glover.) *Bromine,* 1 dr.; *water,* 1 pint. As an application to scrofulous ulcers.

LOTION (for Burns). See *Liniments.*

LOTION (Camphorated). See *Evaporating Lotion.*

LOTION (Capsicum). Syn. *Lotio Capsici,*—Lat. *Prep.* (Griffith.) *Tinctures of capsicum* and *camphor,* of each, 4 fl. oz.; *liquor of ammonia,* 2 fl. oz. A powerful rubefacient and counter-irritant.

LOTION (Carbonate of Soda). Syn. *Lotio Sodæ Carbonatis,*—Lat. *Prep.* From *carbonate of soda,* ½ oz.; *water,* 1 pint. To allay itching and irritation. See *Alkaline Lotion.*

LOTION (Cherry Laurel). Syn. *Lotio Lauro-cerasi,* — Lat. *Prep.* 1. *Cherry-laurel water* (distilled), 1½ fl. oz.; *distilled water,* ½ pint. Anodyne; useful to allay irritation, &c. Some persons with delicate skin employ it as a wash after shaving.

2. *Cherry-laurel water* (distilled), 4 oz.; *rectified spirit* and *ether,* of each, 1 fl. oz.; *extract of belladonna,* 2 dr.; agitate well together in the cold. An excellent application in neuralgia, painful tumours, &c.

LOTION (for Chilblains). See *Chilblains, Liniments, &c.*

LOTION (Chlorate of Soda). Syn. *Lotio Sodæ Chloratis,*—Lat. *Prep.* (Darling.) *Chlorate of soda,* 5 dr.; *water,* ½ pint. In pruritus, &c.

LOTION (Chloride of Lead). Syn. *Lotio Plumbi Chloridi,*—Lat. *Prep.* (Mr. Tuson.) *Chloride of lead,* 1 dr.; *hot distilled water,* 1 pint; dissolve. In cancerous ulcerations, painful neuralgic tumours, &c.

LOTION (Chloride of Tin). Syn. *Lotio Stanni Chloridi,*—Lat. *Prep.* (M. Nauche.) *Chloride of tin,* 1 gr.; *distilled water,* 2 to 3 fl. oz. In cancerous ulcerations.

LOTION (Chloride of Zinc). Syn. *Lotio Zinci Chloridi,*—Lat. *Prep.* 1. *Chloride of zinc,* 10 gr. (or *solution,* ½ fl. dr.); *water* 1 pint. As a disinfectant and preventive lotion.

2. (Voght.) *Chloride of zinc*, 8 gr.; *extract of aloes*, 40 gr.; *distilled water*, 4 fl. oz. In atonic and foul ulcers.

LOTION (Chlorinated). Syn. *Lotio Chlorinata*,—Lat. *Prep.* 1. *Lotio Calcis Chlorinatæ.—a.* From *chloride of lime*, 3 dr.; *water*, 1 pint; agitate together for some time, and strain through muslin.

b. (Derheims.) *Chloride of lime*, 1 oz.; *water*, 1 quart; triturate and filter.

2. (*Lotio Sodæ Chlorinatæ.*) From *chloride of soda*, as the last. They are both excellent washes for foul ulcers, the itch, &c.; and, when diluted, for the teeth, to sweeten the breath, remove the smell of tobacco smoke, to prevent infection, and for various similar purposes. When intended for application to very tender or abraded surfaces, they must be largely diluted with water.

LOTION (Chloroform). Syn. *Lotio Chloroformi*, — Lat. *Prep.* *Chloroform* (pure), 1½ fl. oz.; *rectified spirit* and *cold distilled water*, of each, ½ pint. Anodyne. A piece of oiled silk should be laid over the rag to prevent evaporation. The lotion made with *water*, as commonly prescribed, is inert.

LOTION (for Corns). See *Corns.*

LOTION (Creasote). Syn. *Lotio Creasoti*,—Lat. *Prep.* 1. *Creasote*, 2 fl. dr.; *liquor of potassa*, 3 fl. dr.; *water*, ½ pint.

2. *Creasote*, 3 fl. dr.; *vinegar* and *water*, of each, ½ pint. In burns, itch, phagedenic ulcerations, ringworm, chancre, &c.

LOTION (Cyanide of Potassium). Syn. *Lotio Potassii Cyanidi*, — Lat. *Prep.* 1. (Cazenave.) *Cyanide of potassium*, 10 gr.; *emulsion of bitter almonds*, 6 fl. oz. In chronic eruptions and other cases attended with much itching or irritation.

2. (Foy.) *Cyanide of potassium*, 8 gr.; *distilled water*, 1 fl. oz. In neuralgia, acute rheumatism, &c.; applied by means of compresses of linen. Both the above are poisonous if swallowed. Malherbe has employed a very much stronger solution, but its use is attended with so much danger that we think it unsafe to publish the formula for it.

LOTION (Delphinia). Syn. *Lotio Delphiniæ, Embrocatio D.*,—Lat. *Prep.* (Dr. Turnbull.) *Delphinia*, 20 to 60 gr.; *rectified spirit*, 2 fl. oz. *Used* as lotion of veratria.

LOTION (Detergent). Syn. *Lotio Detergens*,—Lat. Several lotions of this character will be found under the names of their leading ingredient.

LOTION (Diacetate of Lead). Syn. *Goulard's Lotion; Lotio Plumbi Diacetatis*,—Lat. The dilute liquor of diacetate of lead, Ph. L. See *Solutions.*

LOTION (Evaporating). Syn. *Lotio Evaporans, L. Vaporans, L. Spiritus Diluti*,—Lat. *Prep.* 1. (Copland.) *Sulphuric ether*, *rectified spirit*, and *solution of acetate of ammonia*, of each, 1½ fl. oz.; *rose water*, 3½ fl. oz.

2. (Guy's Hosp.) *Rectified spirit*, 1 part; *water*, 5 parts.

3. (Erasmus Wilson.) *Rectified spirit*, 1 part; *water*, 4 to 6 parts.

4. (*Camphorated*, — Ware). *Camphor*, ½ dr.; *elder flowers*, ½ oz.; *rectified spirit*, 4 oz.; digest 24 hours and strain.

Obs. The above are *soothing* and *refrigerant*, if allowed to evaporate by free exposure; *stimulant*, if the evaporation is prevented by covering the part with the hand, or a piece of oiled silk. They are useful applications in nervous headaches, restlessness, itching and irritability of the skin, &c. "A little *rose water* added to the simple water makes an agreeable addition, and sometimes *camphor water* (julep), or a *little Goulard's extract*, may be deemed advantageous, when a greater degree of calming effect is required." (Eras. Wilson.) *Eau de Cologne*, diluted with an equal quantity of water, is often used as an evaporating lotion.

LOTION (Gall-nuts.) Syn. *Lotio Gallæ*,—Lat. *Prep.* From *gall-nuts* (bruised), ½ oz.; *boiling water*, 1 pint; infuse until cold, and strain. Astringent. An excellent application to sore nipples, or to strengthen them before suckling; *spirit of wine*, 3 fl. oz., may be advantageously added to the cold infusion, and a like portion of water omitted. See *Decoctions.*

LOTION (Glycerine). Syn. *Lotio Glycerini, L. Glyceriniæ*,—Lat. *Prep.* 1. *Glycerine*, 1 oz.; *water*, 1 pint. To allay itching, and remove dryness, &c., in various skin diseases; also in chaps of the nipples, lips, and hands. For the latter purpose the addition of 2 to 3 dr. of *borax* is recommended by some writers.

2. *Glycerine*, 1 oz.; *thick mucilage*, 2 oz.; *lime water*, 7 oz. In burns, scalds, chaps, excoriations, &c.

3. (Mr. Startin.) *Glycerine*, 1 oz.; *extract of belladonna*, 1 dr.; *soap liniment*, 3 oz.; triturate together. In bruises, sprains, and swelled joints; gouty, neuralgic, and rheumatic pains, &c.

4. (Mr. Startin.) *Trisnitrate of bismuth*, ½ dr.; *tincture of foxglove* and *dilute nitric acid*, of each, 1 fl. dr.; *glycerine*, 4 dr.; *rose water*, 8½ fl. oz. To allay the itching in prurigo, and some other skin diseases.

LOTION (Goulard's). See *Lotion of Diacetate of Lead.*

LOTION (Gout). Syn. *Lotio Antarthritica,*—Lat. *Prep.* 1. *Glycerine,* 1 oz.; *extract of belladonna,* 3 dr.; *veratrine,* 10 gr., dissolved in *rectified spirit,* 2 fl. oz.; mix, and further add of *water,* 17 fl. oz. It is poisonous if swallowed.

2. (*Scudamore's.*) From *camphor mixture,* 9 fl. oz.; *rectified spirit,* 3 fl. oz. The above are applied on rags or compresses, or are poured on the surface of poultices. (See *below.*)

LOTION (Gowland's). This celebrated nostrum is prepared as follows:—Take of *Jordan almonds,* 1 oz.; *bitter almonds,* ½ oz.; blanch them, and make an emulsion in *soft water,* 1 pint; to this add of *bichloride of mercury,* 15 gr., previously dissolved in *rectified spirit,* 2 fl. dr., together with enough *water* to make the whole measure 1 pint, and put it into bottles.

Obs. This preparation is chiefly used as a cosmetic to improve the complexion; and also as a wash for obstinate eruptions and minor glandular swellings and indurations. As a beautifier of the complexion it is employed by simply wetting the skin with it, either by means of the corner of a napkin or the fingers dipped into it, after which it is gently wiped off with a dry cloth. Dr. Paris represents this nostrum to contain ½ dr. of corrosive sublimate in every pint, which is not the case; but even the smaller quantity which is employed is in part decomposed by the organic matter in the emulsion.

LOTION (Granville's Counter-irritant). See *Liniment of Ammonia* (Compound).

LOTION (Hannay's Preventive). *Water* alkalized with *potassa. Used* against infection.

LOTION (Hemlock). Syn. *Lotio Conii,* —Lat. *Prep.* (Mid. Hosp.) *Extract of hemlock,* 3 dr.; *opium,* 1 dr.; *boiling water,* 1 pint; digest until cold, and strain. Anodyne and resolvent; in glandular enlargements, painful ulcers, cancer, indurations, rheumatism, neuralgia, &c.

LOTION (Hooping Cough,—Struve's). *Lotio antipertussica,*—Lat. *Prep.* (Paris.) *Potassio-tartrate of antimony,* 1 dr.; *tincture of cantharides,* 1 oz.; *water,* 2 oz. This is a powerful counter-irritant, and should be used with caution, as it is apt to induce a troublesome eruption on the parts to which it is frequently applied.

LOTION (Hydriodate of Arsenic and Mercury). Syn. *Lotio Arsenici et Hydrargyri Hydriodatis,*—Lat. *Prep.* From *Donovan's solution,* 1 part; *water,* 9 parts. In lepra, psoriasis, and other scaly skin diseases.

LOTION (Hydrochlorate of Ammonia). Syn. *Lotio Ammoniæ Hydrochloratis,*—Lat. *Prep.* 1. (*Weaker.*) From *sal ammoniac,* 1 to 4 dr.; *water,* 1 pint. As a wash in itch, ulcers, tender feet, swelled joints, &c.

2. (*Stronger.*) From *sal ammoniac,* 1 to 2 oz.; *water,* 1 pint. In contusions, chronic tumours, extravasations, chilblains, &c., when the skin is not broken. Both are stimulant and resolvent or discutient. *Vinegar* is often substituted for the whole or part of the water; and sometimes a fifth or sixth part of *rectified spirit* is added.

LOTION (Hydrochloric). Syn. *Lotio Acidi Hydrochlorici,*—Lat. *Prep.* 1. *Hydrochloric acid,* 1 fl. oz.; *water,* 1 pint. In *lepra,* and several other skin diseases.

2. (Foy.) *Hydrochloric acid,* 1 part; *water,* 16 parts. In chilblains, when the skin is unbroken.

LOTION (Hydrocyanic). Syn. *Lotio Hydrocyanica, L. Acidi Hydrocyanici,*—Lat. *Prep.* 1. (Magendie.) *Medicinal hydrocyanic acid,* 1 to 2 fl. dr.; *lettuce water,* 1 pint. In hepatic affections.

2. (Sneider.) *Medicinal acid,* 1½ fl. dr.; *rectified spirit* and *water,* of each, 6 fl. oz.

3. (A. T. Thomson.) *Medicinal acid* and *rectified spirit,* of each, 2 fl. dr.; *acetate of lead,* 16 gr.; *distilled water,* 7½ fl. oz. In impetigo, &c.

Obs. Lotions of prussic acid are employed to allay pain and irritation in various chronic skin diseases, especially the scaly and itchy eruptions; and in cancer, &c., with variable success. See *Hydrocyanic Acid.*

LOTION (Hyposulphite of Soda). Syn. *Lotio Sodæ Hyposulphitis,*—Lat. *Prep.* (Mr. Startin.) *Hyposulphite of soda* and *alum,* of each, 1½ dr.; *eau de Cologne,* ½ fl. oz.; *rose watar,* 7½ fl. oz. In the advanced stages of acne.

LOTION (Iodide of Potassium). Syn. *Lotio Potassii Iodidi,*—Lat. *Prep.* 1. From *iodide of potassium,* 1 to 2 dr.; *water,* 1 pint. In the usual cases in which ioduretted preparations are employed.

2. (Dr. O. Ward.) *Iodide of potassium,* 1 dr.; *water,* ⅝ pint. In Itch.

LOTION (Iodide of Zinc). Syn. *Lotio Zinci Iodidi,*—Lat. *Prep.* (Ross.) *Iodine,* 1½ dr.; *zinc filings,* 1 dr.; *water,* 8 fl. oz.; digest with heat until the liquid becomes coloured, then filter. In enlarged tonsils.

LOTION (Iodine). Syn. *Lotio Iodinii,* —Lat. *Prep.* From *iodine,* 2 gr.; *rectified spirit,* 1 fl. dr.; dissolve, well agitate the solution with *distilled water*, 1 pint, and filter. An excellent wash for scrofulous ulcers, and in chronic ophthalmia, cutaneous scrofula, and several chronic skin diseases, particularly in highly sensitive habits.

LOTION (Ioduretted). Syn. *Lotio Iodureta*,—Lat. *Prep.* 1. *Iodide of potassium*, ½ dr.; *iodine*, 15 gr.; *water*, 1 pint. This is the common and best form of ioduretted lotion; but for *certain* cases it is used much stronger.

2. (Cazenave.) *Iodide of potassium* and *iodide of sulphur*, of each, 1 dr.; *water*, 1 pint. In itch; either alone or diluted with an equal bulk of water.

3. (Dauvergne.) *Iodine*, 3 dr.; *iodide of potassium*, 6 dr.; *water*, 3 fl. oz.; dissolve, and label the bottle No. 1. *Sulphuret of potassium*, 4 oz.; *water*, 8 fl. oz.; dissolve. For use, a tea-spoonful of No. 1, and a table-spoonful of No. 2, are to be added to about a pint of water. In itch, and several other skin diseases.

4. (Lugol.) *Iodine*, 1 to 3 gr.; *iodide of potassium*, 3 to 6 gr.; *water*, 1 pint. In scrofulous ophthalmia, fistulas, &c.; and as a wash in numerous skin diseases.

5. (Righini.) *Chloride of lime*, 4 dr.; *water*, 2½ fl. oz.; triturate together, filter into a stoppered bottle, and add of *tincture of iodine*, 1 dr. With a pint of *water* it forms an effective application in itch.

6. (Soubeiran.) *Iodide of potassium*, 1 oz.; *iodine*, ½ oz.; *water*, 6 oz.; dissolve. *Used* as *iodine paint;* also as a caustic to touch the surfaces of scrofulous ulcers, and the eyelids in scrofulous ophthalmia.

LOTION (Itch). Syn. *Lotio Antipsorica*, Lat. *Prep.* (Cazenave.) *Sulphuret of potassium*, 1 dr.; *soft soap*, 2 dr.; *water*, 8 fl. oz.; dissolve. An excellent remedy for the itch. It leaves little smell behind, and does not soil the linen. (See *above.*)

LOTION (Kirkland's). See *Lotion of Myrrh.*

LOTION (Lemon Juice). Syn. *Lotio Succi Limonis*,—Lat. *Prep.* From the *freshly expressed juice of lemon*, diluted with 4 or 5 times its bulk of *water.* To render it more agreeable, *rose water* may be employed, or a few drops of *eau de Cologne* added. It is cooling and detergent, and forms an excellent application to foul ulcers, and to allay the itching in numerous cutaneous affections.

LOTION (Lime Water). Syn. *Lotio Calcis Spirituosa*, — Lat. *Prep.* (Ph. Chirur.) *Rectified spirit*, 4 oz.; *lime water*, 8 fl. oz. See *Evaporating Lotion.*

LOTION (Mammillary). Syn. *Lotio Balsami Peruviani Composita*,—Lat. *Prep.* (Iverg.) *Balsam of Peru*, 1 dr.; *yelk of* 1 *egg;* make an emulsion, and add of *spirit of wild thyme*, 3 fl. oz. For sore nipples; to be followed, whilst still wet, by a "dusting" with a powder composed of *Peruvian bark*, 1 dr.; *gum arabic*, 2 dr.

LOTION (Mercurial). *Prep.* 1. (*Black Wash, Black Lotion, Mild Phagedænic do.; Lotio Nigra, L. Hydrargyri Cinerea, L. H. Nigra, L. H. Chloridi cum Calce, L. Mercurialis N., Aqua Phagedænica Mitis*,—Lat. var.—*a.* From *calomel*, 1 dr.; *lime water*, 1 pint; well shaken together. These are the usual proportions.

b. (Mid. Hosp.) To the last add of *thick mucilage*, 1 fl. oz.

Obs. Black wash is a favorite application to all kinds of syphilitic and scrofulous sores. The bottle should be well shaken before the lotion is applied. At Guy's Hospital the proportions are *calomel*, 1 dr., to *lime water*, 8 fl. oz.

2. (*Yellow Wash, Yellow Lotion, Phagedænic do.; Lotio Flava, L. Phagedænica, Aqua Ph., Lotio Hydrargyri Flava, L. H. Bichloridi cum Calce*,—Lat. var.—*a.* From *corrosive sublimate*, ½ dr.; *lime water*, 1 pint; well shaken together. This is the usual strength.

b. (St. B. Hosp.) *Corrosive sublimate*, 20 gr.; *lime water*, 6 fl. oz. *Used* as the last, but it is stronger and more active, from containing a little undecomposed bichloride.

LOTION (Myrrh). Syn. *Kirkland's Lotion; Lotio Myrrhæ*,—Lat. *Prep.* (Dr. Kirkland.) *Tincture of myrrh* and *lime water*, equal parts. In scorbutic ulcers and gums.

LOTION (Myrrh,—Compound). Syn. *Lotio Myrrhæ Composita*,—Lat. *Prep.* (Ph. Chirur.) *Honey of roses* and *tincture of myrrh*, of each, 2 fl. dr.; *lime water*, 2½ fl. oz. As the last; also used as a dentifrice.

LOTION (Nitrate of Bismuth.) Syn. *Lotio Bismuthi Nitratis*,—Lat. *Prep.* (Cutan. Hosp.) *Subnitrate* or *trisnitrate of bismuth*, ½ dr.; *corrosive sublimate*, 12 gr.; *spirit of camphor*, ½ fl. dr.; *water*, 1 pint. In itch, and some other eruptions.

LOTION (Nitrate of Silver). Syn. *Lotio Argenti Nitratis*, — Lat. *Prep.* 1. *Nitrate of silver*, 15 gr.; *nitric acid*, 10 drops; *distilled water*, ½ pint. As a wash for indolent ulcers, sore legs, &c.

2. (Mr. Jackson.) *Nitrate of silver*, 10 gr.; *water*, 1 fl. oz. For bed-sores; applied, at first, twice or thrice a day.

3. (Schreider.) *Nitrate of silver*, ½ dr.; *nitric acid*, 10 drops; *water*, 1½ fl. oz. In chilblains, soft corns, &c.

LOTION (Nitre). Syn. *Lotio Potassæ*

Nitratis,—Lat. *Prep.* 1. *Nitre,* 3 dr.; *vinegar,* ¼ pint; *water,* ¾ pint.

2. *Nitre,* 2 dr.; *sal ammoniac,* 1 dr.; *vinegar* and *water,* of each, ½ pint. In sprains, contusions, extravasations, tender feet, chilblains, &c. Diluted with an equal bulk of water it is a popular application to "black eyes."

LOTION (Nitric Acid). Syn. *Lotio Acida, L. Acidi Nitrici,*—Lat. *Prep.* 1. (Collier.) *Nitric acid,* ½ fl. oz.; *water,* 1 pint. In lepra and other scaly skin diseases.

2. (Copland.) *Nitromuriatic acid,* 1¼ dr.; *water,* 1 pint. In gangrene and mortification.

3. (Phœbus.) *Nitric acid,* 1 fl. dr.; *laudanum,* 1½ fl. dr.; *rose water,* ½ pint. For venereal ulcers.

LOTION (Nux Vomica). Syn. *Lotio Nucis Vomicæ,*—Lat. *Prep.* 1. *Alcoholic extract of nux vomica,* 10 gr.; *rectified spirit* and *water,* of each, 2½ fl. oz. In amaurosis.

2. (Radius.) *Alcoholic extract of nux vomica,* 8 gr.; *liquor of ammonia* (stronger), ½ fl. oz.; *rectified spirit,* 2 fl. oz. In paralysed limbs.

LOTION (Opium). Syn. *Lotio Opii, L. Opiata,*—Lat. *Prep.* 1. (Christison.) *Opium,* 40 gr.; *water,* ¼ pint; infuse, add to the filtered liquid a solution of *sugar of lead,* 40 gr., in *water,* ¼ pint, and filter.

2. (St. B. Hosp.) *Opium,* 1½ dr.; *boiling water,* 1 pint; triturate and strain. Anodyne; the first is also refrigerent and discutient.

LOTION (Oxide of Zinc). Syn. *Lotio Zinci Oxydi,*—Lat. *Prep.* 1. (Augustin.) *Oxide of zinc,* 1 dr.; *elder flower water,* 1½ fl. oz. In pustular erysipelas.

2. (Hosp. F.) *Oxide of zinc,* ½ dr.; *mucilage,* 2 fl. dr.; *water,* 6 fl. dr. As an astringent and desiccant, in scrofulous eruptions, excoriations, moist chaps, &c.

LOTION (Phagedænic). See *Mercurial Lotion.*

LOTION (Phosphoric Acid.) Syn. *Lotio Acidi Phosphorici,*—Lat. *Prep.* (Pereira.) *Dilute phosphoric acid* (Ph. L.), 1 fl. oz.; *water,* ½ pint. In caries and fistula.

LOTION (Potassa). Syn. *Lotio Potassæ,* —Lat. *Prep.* From *liquor of potassa,* 1 fl. oz.; *water,* 1 pint. Detergent; in scorbutic eruptions and foul ulcers, and to prevent infection.

LOTION (Potassio-tartrate of Antimony). Syn. *Lotio Antimonialis, L. Antimonii Potassio-tartratis, L. Rubefaciens,*—Lat. *Prep.* 1. *Tartar emetic,* 1 dr.; *tincture of camphor,* 2 fl. dr.; *water,* 1 pint. As a local stimulant. Diluted with twice or thrice its weight of water it is employed as a collyrium in chronic ophthalmia, and in specks on the cornea.

2. (Sir Wm. Blizard.) *Tartar emetic,* 20 gr.; *boiling water,* 1 fl. oz. *Used* to cleanse foul ulcers, to repress fungous growths and warts, and in ringworm, &c.

3. (Pereira.) *Tartar emetic,* 1 dr.; *boiling water,* 1½ fl. oz.; dissolve. *Employed* as a local irritant instead of the ointment. All the above are rubefacient and counter-irritant. See *Potassio-tartrate of Antimony.*

LOTION (Quinine). Syn. *Lotio Quinæ, Embrocatio Quinæ,* — Lat. *Prep.* From *disulphate of quinine,* 1 dr.; *rectified spirit,* 5 fl. oz. Applied over the spine in intermittents.

LOTION (Red). See *Mercurial Lotion.*

LOTION (Rubefacient). See *above.*

LOTION (Saponaceous). Syn. *Lotio Saponis; L. Saponacea,* — Ph. L. 1746. *Prep.* From *liquor of carbonate of potassa,* ½ oz.; *olive oil,* 4 oz.; *rose water,* 12 oz.; agitated together. Emollient; chiefly as a cosmetic.

LOTION (Saviard's). *Prep.* (Foy.) *Caustic potassa,* 1 dr.; *camphor,* 20 gr.; *sugar,* 1 oz.; *water,* 1 pint. As a wash for indolent ulcers.

LOTION (Struve's). See *Hooping Cough Lotion.*

LOTION (Sulphate of Copper). Syn. *Lotio Cupri Sulphatis,*—Lat. *Prep.* 1. *Blue vitriol,* 1 dr.; *camphor julep,* 1 pint. For phagedænic ulcers, and in itch, &c.

2. (Dr. Graves.) *Sulphate of copper,* 10 gr.; *water,* 1 fl. oz. In chilblains, ring-worm, &c.

3. (Mr. Lloyd.) *Sulphate of copper,* 1 oz.; *water,* 1 pint. In itch; either alone or diluted.

LOTION (Sulphate of Zinc). Syn. *Lotio Zinci Sulphatis,*—Lat. *Prep.* 1. *Sulphate of zinc,* ¾ dr.; *water,* 1 pint. Astringent; in some chronic skin diseases, as a wash for loose flabby granulations, and for ulcers that discharge profusely, &c.

2. (Collier.) *Sulphate of zinc,* 2 dr.; *water,* 1 pint. As a counter-irritant in pains of the joints, periosteum, old sprains, &c.

LOTION (Tar). Syn. *Lotio Picis Liquidæ,*—Lat. *Prep.* (Saunders.) *Quicklime,* 6 oz.; *water,* 2½ pints; slake, add of *tar,* 4 oz., and boil to one half. This liquid consists of a solution of pyrolignite of lime, and pyrogenous oil and resin. It may be advantageously employed in various chronic skin diseases, especially those affecting the heads of children. See *Tar Water.*

LOTION (Valerian). Syn. *Lotio Valerianæ, Embrocatio Antihysterica, E. Emmenagoga,*—Lat. *Prep.* From *tincture of* *valerian* and *proof spirit*, equal parts. In hysteria, suppressions, &c.

LOTION (Veratrine). Syn. *Lotio Veratriæ*,—Lat. *Prep.* (Dr. Turnbull.) *Veratrine*, 20 to 60 gr.; *rectified spirit*, 2 oz. In gout, rheumatism, &c. It is extremely poisonous, and must only be used where the skin is sound, and then with great caution.

LOTION (Verdigris). Syn. *Lotio Æruginis, L. Cupri Acetatis*,—Lat. *Prep.* From *verdigris*, 3 dr.; *vinegar*, ¼ pint; *water*, ¾ pint. As a wash for indolent scrofulous, and venereal ulcers.

LOTION (Vinegar). See *Lotion* (Acetic).

LOTION (Yellow). See *Mercurial Lotion.*

LOVE APPLES. See *Tomatoes.*

LOZENGE. Syn. *Troche; Trochiscus, Tabella*,—Lat. *Tablette*,—Fr. A small cake, often medicated, consisting principally of powdered sugar, made into a mass with some glutinous liquid, without the aid of heat, and dried. The form given to lozenges (*troches; tabellæ, trochisci; tablettes*) is generally that of a small round tablet or flattened cylinder; but, originally they were exclusively made in the shape of a lozenge or rhomb, from which circumstance their familiar name is derived. *Lozenges* are distinguished from *drops* or *pastilles* by the non-employment of heat in their preparation; and from *pastes*, by the latter being formed of vegetable juice or pulp, and having a softer consistence.

In the *preparation* of *lozenges*, the *dry ingredients* separately reduced to a *very fine* powder, are first *perfectly* mixed together, and then beaten into a stiff paste with the *glutinous liquid* employed to give them form; the mass is next rolled out to a proper thickness, and cut into pieces of the desired shape by means of a small cylinder or punch of steel or tin-plate, called a *lozenge-cutter*. The newly formed lozenges are lastly *dried* by placing them on an inverted sieve or frame covered with paper in a dry, warm, and airy situation, and are frequently turned until they become hard and brittle; due care being taken to preserve them from dust and dirt. To prevent the mass *adhering* to the fingers and utensils during the process of manufacture, a little finely powdered starch, or a very little *olive oil* scented with the same aromatic as that contained in the lozenges may be used. *Mucilage* of *gum arabic* or of *gum tragacanth, thin isinglass size*, or the *strained white of egg*, are the substances usually employed to make the pulverulent materials adhere together. A *strained decoction of Irish moss* is now frequently used for the same purpose, for "inferior qualities." The larger the proportion of gum which enters into the composition of lozenges, the slower they dissolve in the mouth; hence *powdered gum* is frequently added to the other materials to increase their quality in this respect, as well as to give additional solidity to those, which like *chalk*, for instance, are of a peculiarly dry or crumbly nature. *Starch* and *potato flour* are often added to lozenge-masses in lieu of a portion of the *sugar*, and even *plaster of Paris* is not unfrequently employed to give them weight; frauds which are readily detected in the manner noticed under *Gums, Sugar*, and *Sweetmeats.*

Lozenges as a *form of medicine* are now so seldom ordered by the faculty in this country, and those of the *confectioner* are so much superior in appearance to the corresponding articles prepared by the English druggist, that the London and Dublin Colleges have wisely expunged them from their pharmacopœias. On the Continent, however, this class of preparations is extensively employed, and pharmaceutical works groan under the load of formulæ published for their manufacture, which exhibit an amount of luxuriance in detail and repetition, which is amusing on account of its utter uselessness and the gravity with which the subject is treated.

As a general rule *medicated lozenges* should weigh from 8 to 10 gr. each, and a *medium* dose of their active ingredient should be distributed through the bulk of 6 to 8 of them, in which case 3 to 5 of them may be safely taken as a dose, or sucked during the lapse of 3 or 4 hours. This will be useful in the preparation of those for which no established proportions are given. In "sending out" compounds of this class containing *active medicaments*, as morphia or opium, the retailer as well as the manufacturer should be careful that the *quantity contained in each lozenge* is *plainly marked on the label.*

In *lozenges* intended for *mouth cosmetics*, or to *perfume the breath*, ambergris is generally regarded as the most appropriate perfume; but *hard smokers* frequently prefer cloves and cinnamon, and some ladies give the preference to roses, orange flowers, and orris or violets.

Lozenges are *coloured* with the same stains as are used for *liqueurs* and *sweetmeats.*

Lozenges, as well as *all other articles of confectionery*, should be *preserved* in well-closed glass bottles, or jars, or in tin canisters, so as to be *perfectly excluded* from the *air* and *damp*.

A *list* of the *principal lozenges*, both of the apothecary and the confectioner, is given below, together with formulæ for many of them, which will serve as examples for others.

LOZENGES (Absorbent). *Trochisci Antacidi*,—Lat. *Prep.* 1. Take of *precipitated chalk*, *¼ lb.; gum arabic*, 2 *oz.; double refined white sugar*, 14 *oz.;* all in impalpable powder; *oil of nutmeg*, ½ fl. dr.; pass the mixture through a fine sieve, beat it up with *mucilage*, q. s., roll the mass into a thin sheet, and cut it into lozenges; lastly, dry these by exposing them on a sheet of white paper to the air, out of contact with dust.

2. As the last, but substituting *heavy carbonate of magnesia*, 1½ *oz.*, for an equal weight of chalk. In diarrhœa, heartburn, acidity, &c. See *Chalk Lozenges*, *Magnesia do.*, *Soda do.*, *&c.*

LOZENGES (Acacia). See *Gum Lozenges.*

LOZENGES (Acidulated). Syn. *Acidulated Lemon Lozenges, Tartaric Acid do.; Trochisci Acidi Tartarici*,—Ph. E. *Prep.* From *tartaric acid*, 2 dr.; *oil of lemon*, 10 drops; *white sugar*, 8 oz.; *mucilage*, q. s. to make a lozenge-mass. The same ingredients mixed with heat form *acidulated* or *acid drops*. Both are useful in coughs, hoarseness, sore throats, &c. See *Cayenne Lozenges, Citric Acid do., Rose do., &c.*

LOZENGES (Alkaline). See *Soda Lozenges, Vichy do., &c.*

LOZENGES (Alum). Syn. *Trochisci Aluminis*,—Lat. Each lozenge contains 1½ gr. of *alum*. As an astringent. (See *below*.)

LOZENGES (Aniseed). Syn. *Trochisci Anisi*,—Lat. *Prep.* From *oil of aniseed*, 1½ fl. dr.; *finest white sugar*, 1 *lb.; mucilage*, q. s. Carminative and stomachic. In colic, griping, &c.; and as a pectoral.

LOZENGES (Anthelmintic). See *Worm Lozenges.*

LOZENGES (Antimonial). Syn. *Trochisci Antimoniales, Morsuli Stibii Kunkelii*, — Lat. *Tablettes de Kunkel*, — Fr. *Prep.* (P. Cod.) *Levigated sulphuret of antimony* and *cardamom seeds*, of each, 1 oz.; *almonds* (blanched), 2 oz.; *cinnamon*, ½ oz.; *sugar*, 13 oz.; *mucilage of tragacanth*, q. s.; to be divided into 15-gr. lozenges. As an alterative.

LOZENGES (Aperient). Syn. *Trochisci Aperientes*,—Lat. Each lozenge contains 1 gr. each of *calomel* and *scammony*, and 2 gr. of *jalap;* or instead of the last ¼ gr. of *jalapine*. 2 to 3 for a *dose*.

LOZENGES (Astringent). Syn. *Trochisci Astringentes*,—Lat. Each lozenge contains 1½ gr. of *alum* and 2 gr. of *catechu.* In spitting of blood, relaxed uvula, sore-throat, &c.

LOZENGES (Bark). Syn. *Trochisci Cinchonæ*,—Lat. *Prep.* (P. Cod.) *Cinchona*, 2 oz.; *cinnamon*, 2 dr.; *white sugar*, 14 oz.; *mucilage of gum tragacanth*, q. s.; mix, and divide into 16-gr. lozenges. Tonic.

LOZENGES (Bath). Syn. *Dawson's Lozenges.* From *extract of liquorice* and *gum arabic*, of each, 1½ *oz.; sugar*, 17 oz. It is both rolled into lozenges and formed into pipes. Demulcent; in tickling coughs, &c.

LOZENGES (Bismuth). Syn. *Trochisci Bismuthi*,—Lat. *Prep.* (Trousseau.) Each lozenge contains 1 gr. of *trisnitrate of bismuth.* Tonic and antispasmodic; in chronic dyspepsia, gastrodynia, nausea, cramp of the stomach, &c.

LOZENGES (Black Currant). *Trochisci Ribis Nigri*,—Lat. *Prep.* From *inspissated juice of black currants* and *sugar*, of each, in powder, 1 *lb.; tartaric acid*, ¼ *oz.; mucilage*, q. s. In hoarseness, &c.

LOZENGES (Borax). Syn. *Trochisci Boracis*, — Lat. Each lozenge contains 3 gr. of *borax*. One occasionally in aphthous sore mouth, sore throat, &c.

LOZENGES (Burnt Sponge). Syn. *Trochisci Spongiæ, T. S. Ustæ*,—Lat. *Prep.* (P. Cod.) *Burnt sponge*, 4 oz.; *sugar*, 12 oz.; *mucilage of tragacanth*, q. s.; divide into 12-gr. lozenges. In scrofula, glandular enlargements, &c.

LOZENGES (Cacao). Syn. *Trochisci Butyri Cacao*,—Lat. Each lozenge contains 1-3rd of its weight of *pure cacao-nut butter*. In habitual constipation; and in phthisis, scrofula, &c., instead of cod-liver oil; taken ad libitum. They are usually scented with roses.

LOZENGES (Caffeine). Syn. *Trochisci Caffeinæ*,—Lat. Each lozenge contains ¼ gr. of *caffeine*, and ½ gr. of *citric acid.* In hemicrania, hypochondriasis, &c.

LOZENGES (Calomel). Syn. *Worm Lozenges; Trochisci Calomelanos, T. Hydrargyri Chloridi*,—Lat. *Prep.* (P. Cod.) Each lozenge contains 1 gr. of *calomel.* Alterative, &c. They afford a simple way of introducing mercury into the system. During their use, salt food and acid liquors should be avoided. When given for *worms* they should be followed, in a few hours, by a purge.

LOZENGES (Camphor). Syn. *Trochisci*

Camphoræ—Lat. Each lozenge contains ¾ gr. of (finely powdered) *camphor*. They must be kept in a well-corked bottle.

LOZENGES (Carbonate of Lime). See *Chalk Lozenges.*

LOZENGES (Catechu). Syn. *Cachou Lozenges; Trochisci Catechu, Tro. de Terra Japonica,*—Lat. *Tablettes de Cachou,*—Fr. *Prep.* (Ph. E. 1744.) *Catechu,* 2 oz.; *tragacanth,* ½ oz.; *white sugar,* 12 oz.; *rose water,* q. s.

2. (P. Cod.) *Extract of catechu,* 4 oz.; *sugar,* 16 oz.; *mucilage of gum tragacanth,* q. s.; for 10-gr. lozenges.

3. (*Tro. Catechu et Magnesiæ,*—P. Cod.) *Magnesia,* 2 oz.; *powdered catechu,* 1 oz.; *sugar,* 13 oz.; *mucilage of gum tragacanth* (made with cinnamon water), q. s. to mix.

4. (*Perfumed.*) See *Cachou Aromatisé* and *Pastils.*

Obs. All the above are taken in diarrhœa, in relaxation of the uvula, in irritation of the larynx, and as cosmetics to fasten the teeth, and disguise a stinking breath. The one containing magnesia (No. 3) is also sucked in dyspepsia, acidity, and heartburn.

LOZENGES (Cayenne). Syn. *Trochisci Capsici,*—Lat. Flavoured with *essence* or *tincture of capsicum* or *cayenne,* with a *very concentrated chilli vinegar,* or a little pure *soluble cayenne pepper.*

2. (*Acidulated.*) To each *lb.*, add of *tartaric acid,* ½ *oz.* Both are used in dyspepsia, and to promote digestion and create an appetite. They have also been recommended in temporary deafness arising from exposure to cold. They are generally tinged of a light pink or red colour.

LOZENGES (Chalk). Syn. *Heartburn Lozenges; Trochisci Cretæ, T. Cardialgici, Tabellæ Cardialgicæ,*—Lat. *Prep.* (Ph. E.) *Prepared chalk,* 4 oz.; *gum arabic,* 1 oz.; *nutmeg,* 1 dr.; *white sugar,* 6 oz.; *rose* or *orange flower water,* q. s. Antacid and absorbent. 3 or 4 sucked ad libitum in heartburn, dyspepsia, diarrhœa, acidity of the stomach and bowels, &c.

LOZENGES (Charcoal). Syn. *Trochisci Carbonis,*—Lat. *Prep.* 1. (P. Cod.) *Prepared charcoal,* 4 oz.; *white sugar,* 12 oz.; *mucilage,* q. s. to mix. In diarrhœa, cholera, dyspepsia, &c.

2. (*Tro. Carbonis cum Chocolata,*—M. Chevallier). *Charcoal* and *white sugar,* of each, 1 oz.; *chocolate,* 3 oz.; *mucilage of gum tragacanth,* q. s. to mix. Nutritious; *used* as the last.

LOZENGES (Ching's Worm). *Prep.*—*a.* (*Yellow.*) From *saffron,* ½ *oz.; boiling water,* 1 pint; infuse, strain, add of *calomel,* 1 *lb.; powdered white sugar,* 28 *lb.;* mix well, make a mass with *mucilage of tragacanth,* and divide it into 7000 lozenges. Each lozenge contains 1 gr. of *calomel.*

b. (*Brown.*) From *calomel,* 7 *oz.; resinous extract of jalap,* 3½ *lb.; white sugar,* 10 *lb.; mucilage of tragacanth,* q. s.; mix, and divide into 6125 lozenges. Each lozenge contains ½ gr. of *calomel* and 3½ gr. of *resinous extract of jalap.* 1 to 6 of the *yellow* lozenges over night, as a vermifuge, followed by an equal number of the *brown* ones the next morning fasting. See *Patent Medicines.*

LOZENGES (Chlorate of Potassa). Syn. *Trochisci Potassæ Chloratis,*—Lat. Each lozenge contains 1½ gr. of *chlorate of potassa.* In phthisis, sore throat, &c. 6 to 12 a day.

LOZENGES (Chloride of Gold). Syn. *Trochisci Auri Chloridi,*—Lat. Each lozenge contains $\frac{1}{40}$ gr. of *neutral chloride of gold.* 2 to 4 daily, in scrofula, cancer, &c. (See *p.* 536.)

LOZENGES (Chloride of Gold and Soda). Syn. *Trochisci Auri et Sodii Chloridi, T. Sodii Auro-chloridi,*—Lat. (Chrestien.) Each lozenge contains $\frac{1}{16}$th gr. of *soda-chloride of gold.* Two daily; as the last. (See *p.* 537.)

LOZENGE (Chloride of Lime). Syn. *Trochisci Calcis Chloridi, T. C. Chlorinatæ,*—Lat. Each lozenge contains ¼ gr. of dry *chloride of lime.* They are frequently tinged with a little carmine. *Used* to sweeten the breath, and whiten the teeth. They do not keep well.

LOZENGES (Chocolate). Syn. *Trochisci Chocolatæ,*—Lat. From *vanilla chocolate,* pressed into sheets and cut into pieces whilst hot.

LOZENGES (Cinchona). Syn. *Trochisci Cinchonæ Extracti,*—Lat. Each lozenge contains 1½ gr. of *dry extract of bark.* A little *cinnamon* or *nutmeg* is often added. See *Bark Lozenges.*

LOZENGES (Cinnamon). Syn. *Trochisci Cinnamomi,*—Lat. From *cinnamon* (in fine powder), 1 *oz.*, or the *essential oil,* 1 fl. dr., to each *lb.* of *sugar.* Carminative and stomachic. "*Cassia Lozenges*" are made in the same way, and are frequently substituted for them.

LOZENGES (Citrate of Iron). Syn. *Trochisci Ferri Citratis,*—Lat. Each lozenge contains 1½ gr. of *ammonio-citrate of iron.* As a mild chalybeate tonic. They are sometimes made with equal parts of *sugar* and *vanilla chocolate.*

LOZENGES (Citrate of Magnesia). Syn.

Trochisci Magnesiæ Citratis,—Lat. Each 15-gr. lozenge contains 5 gr. of *pure citrate of magnesia.* Laxative.

LOZENGES (Citric Acid). Syn. *Trochisci Acidi Citrici,*—Lat. *Prep.* (P. Cod.) *Citric acid,* 3 dr.; *sugar,* 16 oz.; *essence of lemon,* 16 drops; *mucilage of tragacanth,* q. s.; mix, and divide into 12-gr. lozenges. In coughs, hoarseness, &c.

LOZENGES (Clove). Syn. *Trochisci Caryophilli,*—Lat. From *cloves* (powdered along with sugar), 2 oz., or *essential oil,* 1 fl. dr., to each *lb.* of *sugar.* They are frequently coloured. Carminative and stomachic; also *used* as a restorative after fatigue, added to chocolate to improve its flavour, and sucked to sweeten the breath.

LOZENGES (Colocynth). Syn. *Prepared Colocynth; Trochisci Alhandel, Colocynthis Præparata,*—Lat. *Prep.* (Ph. Bor. & Hamb. Cod.) *Colocynth pulp* (free from seeds and cut), 5 oz.; *gum arabic,* 1 oz.; *water,* q. s.; make a paste, dry, powder, and preserve it in a well-closed bottle. *Dose.* 2 gr. This must not be confounded with any of the previous preparations, and ought to have been inserted at *p.* 276. See *Colocynth.*

LOZENGES (Copaiba). Syn. *Trochisci Copaibæ,*—Lat. Each 16-gr. lozenge contains 1 drop of *balsam of copaiba,* flavoured with *oil of peppermint.* In urinary affections. A useless preparation.

LOZENGES (Cough). Syn. *Pectoral Lozenges, Pulmonic do.; Trochisci Anti-catarrhales,*—Lat. *Prep.* 1. *Black currant lozenge-mass,* 1 *lb.; ipecacuanha* (in very fine powder), 2 dr. For 12-gr. lozenges.

2. To the last, add of *powdered opium* and *camphor,* of each, $1\frac{1}{2}$ dr.

3. To either No. 1 or 2 add of *oil of aniseed,* $1\frac{1}{2}$ fl. dr.

4. (*Tablettes de Tronchin.*) From *powdered gum arabic,* 8 oz.; *oil of aniseed,* 16 drops; *extract of opium,* 12 gr.; *Kerme's mineral,* 1 dr.; *pure extract of liquorice,* 2 oz.; *white sugar,* 32 oz.; *water,* q. s.; mix and divide into 10-gr. lozenges.

5. (*Tablettes de Vandamme.*) From *benzoic acid,* 1 dr.; *orris powder,* 2 dr.; *gum arabic* (powdered), 1 oz.; *starch,* 2 oz.; *sugar,* 16 oz.; *water,* q. s.; mix and divide into 15-gr. lozenges.

6. Each lozenge contains $\frac{1}{2}$ gr. of *lactucarium,* $\frac{1}{8}$ gr. of *powdered ipecacuanha,* and $\frac{1}{12}$ gr. of *powdered squills,* together with $\frac{1}{3}$rd of their weight of *pure extract of liquorice.*

Obs. To render the above serviceable in coughs, hoarseness, &c., the bowels should be kept gently open with some mild aperient, and a light diet adopted, with abstinence from stimulating liquors. See *Emetine Lozenges, Ipecacuanha do., &c.*

LOZENGES (Crab's Eyes). Syn. *Trochisci Cancrorum Oculorum,*—Lat. From *crab's stones*; now superseded by *chalk lozenges.*

LOZENGES (Croton Oil). Syn. *Trochisci Crotonis,*—Lat. *Prep.* (Soubeiran.) *Croton oil,* 5 drops; *powdered starch,* 40 gr.; *white sugar,* 1 dr.; *chocolate,* 2 dr.; divide into 30 lozenges; 5 or 6 generally prove cathartic.

LOZENGES (Cubebine). Syn. *Trochisci Cubebini,*—Lat. *Prep.* (Ph. Hamb.) *Copaiba* and *extract of cubebs,* of each, 6 oz.; *yelk of* 3 *eggs;* mix, add of *powdered marshmallow root,* 6 oz.; make it into pipes of 12 gr. each, and roll them in *sugar.* In gleet, &c., and in affections of the mucous membranes of the throat and fauces. Lablonye orders them to be made of *sugar,* and flavoured with *oil of peppermint.*

LOZENGES (Cubebs). Syn. *Trochisci Cubebæ,*—Lat. *Prep.* (Spitta.) *Cubebs,* 2 dr.; *balsam of tolu,* 6 gr.; mix, and add of *extract of liquorice,* 1 oz.; *syrup of tolu,* 1 dr.; *powdered gum,* q. s.; divide into 10-gr. lozenges. One of these, allowed to melt gradually in the mouth, is said to alleviate the obstruction in the nose, in coryza.

LOZENGES (D'Arcet's). See *Vichy Lozenges.*

LOZENGES (Digestive). See *Rhubarb Lozenges, Ginger do., Digestive Candy, &c.*

LOZENGES (Edinburgh). *Prep.* From *extract of poppies,* 2 *oz.; powdered tragacanth,* 4 *oz.; sugar,* 10 *oz.; rose water,* q. s. to form a lozenge mass.

LOZENGES (Emetine). Syn. *Trochisci Emetinæ,*—Lat. *Prep.* (Magendie.)—*a.* From *impure* or *coloured emetine,* 32 gr. (or *pure emetine,* 8 gr.); *white sugar,* 2 oz.; *mucilage,* q. s. to mix; divide into 64 lozenges. Emetic. *Dose.* 1 for a child, and 4 for an adult. They are generally tinged of a pink colour with carmine.

b. From *impure* or *coloured emetine,* 32 gr. (or *pure emetine,* 8 gr.); *sugar,* 4 oz.; *mucilage,* q. s.; divide into 256 lozenges. Pectoral. 1 every hour or oftener, for an adult. The last are intended to take the place of ipecacuanha lozenges, but are rather stronger.

LOZENGES (Escharotic). Syn. *Trochisci Escharotici,*—Lat. *Prep.* (P. Cod.) *Corrosive sublimate,* 2 dr.; *starch,* 4 dr.; *mucilage of tragacanth,* q. s.; mix, and divide into 3-gr. oat-shaped granules. For *external use* only. See *Caustic* (Zinc).

LOZENGES (Ferrocyanide of Iron). Syn. *Trochisci Ferri Ferrocyanidi, T. Cærulei*,—Lat. Each lozenge contains $1\frac{1}{2}$ gr. of *pure prussian blue.* Alterative, febrifuge, and tonic; in epilepsy, intermittents, diseases of the ganglionic system, &c.

LOZENGES (Fruit). *Prep.* From *juice of black currants* (boiled to the consistence of an extract), 1 *lb.; do. of red currants*, $\frac{1}{2}$ *lb.; powdered gum tragacanth*, $\frac{1}{4}$ *lb.; sugar*, 3 *lb.; raspberry syrup*, q. s.; *pear essence*, a few drops. Resemble *black currant lozenges*, but are more agreeable.

LOZENGES (Ginger). Syn. *Trochisci Zingiberis*,—Lat. From the best *unbleached Jamaica ginger*, and *gum arabic*, of each, in very fine powder, $1\frac{1}{2}$ *oz.; double refined lump sugar*, 1 *lb.; rose water* (tinged with *saffron*), q. s. A still finer quality may be made by using an equivalent proportion of *essence of ginger*, instead of the powder. *Inferior qualities* are prepared with *coarser sugar*, to which some *starch* is often added. *Ginger lozenges* are carminative and stomachic, and are useful in flatulency, loss of appetite, dyspepsia, &c.

LOZENGES (Gold). Syn. *Trochisci Auri*,—Lat. Each lozenge contains $\frac{1}{16}$th gr. of *pulverulent gold.* (See *above.*)

LOZENGES (Gum). Syn. *Trochisci Acaciæ, T. Gummi Arabici, T. Gummosi*,—Lat. *Prep.* 1. (Ph. E.) *Gum arabic*, 4 oz.; *starch*, 1 oz.; *white sugar*, 12 oz.; (all in very fine powder); *rose water*, q. s.

2. (P. Cod.) *Gum arabic*, 1 ℔; *sugar*, 3 ℔; *orange flower water*, 2 fl. oz.

3. (*Transparent.*) From the same materials, but employing a gentle heat. Demulcent; *used* to allay "tickling coughs."

LOZENGES (Gum Tragacanth). Syn. *Trochisci Tragacanthæ, T. Gummi T.*,—Lat. *Prep.* (Ph. E. 1744.) *Compound powder of tragacanth*, 3 oz.; *sugar*, 12 oz.; *rose water*, 4 fl. oz. Resemble the last; but are more durable in the mouth.

LOZENGES (Heartburn). See *Chalk Lozenges, &c.*

LOZENGES (Iceland Moss). Syn. *Trochisci Lichenis*,—Lat. (P. Cod.) Contain half their weight of dried and powdered *lichen jelly.* Resemble gum lozenges.

LOZENGES (Indian Hemp). Syn. *Trochisci Cannabis, T. C. Indici*,—Lat. (M. Ebriard.) Each lozenge contains $\frac{1}{12}$ gr. of *extract of Indian hemp.* (See *p.* 562.)

LOZENGES (Iodide of Iron). Syn. *Trochisci Ferri Iodidi*,—Lat. Each lozenge contains $\frac{1}{2}$ gr. of dry *iodide of iron.* 12 to 20 daily; in amenorrhœa, chlorosis, scrofulous debility, &c. They are generally flavoured with a little nutmeg or cinnamon.

LOZENGES (Iodide of Potassium). Syn. *Trochisci Potassii Iodidi*,—Lat. Each lozenge contains 1 gr. of *iodide of potassium*, flavoured with *nutmeg* or *cinnamon.* 10 to 15 daily; in scrofula, indurations, &c. One of the best ways of taking iodide of potassium.

LOZENGES (Ipecacuanha). Syn. *Trochisci Ipecacuanhæ*,—Lat. *Prep.* 1. (P. Cod., Hamb. do., and Ph. U. S.) Each lozenge contains $\frac{1}{4}$ gr. of *ipecacuanha.*

2. (*Tro. Ipecac. cum Camphora.*) Each lozenge contains $\frac{1}{2}$ gr. of *camphor*, and $\frac{1}{4}$ gr. of *ipecacuanha.*

3. (*Tro. Ipecac. cum Chocolata*,—P. Cod.) Each lozenge contains 1 gr. of *ipecacuanha*, and 12 gr. of *chocolate à la vanille.* The above are pectoral and expectorant, and are very useful in tickling and chronic coughs, hoarseness, &c.

LOZENGES (Iron). Syn. *Trochisci Ferri, T. Chalybeati*,—Lat. Each lozenge contains 1 gr. of *Quevenne's iron.*

2. (*Tro. Ferri Carbonatis.* Each lozenge contains $1\frac{1}{2}$ gr. of *saccharine carbonate of iron.* They are both mild and excellent chalybeates. See *Steel Lozenges.*

LOZENGES (Jujube). See *Jujube Paste.*

LOZENGES (Kermes Mineral). Syn. *Trochisci Kermetis*,—Lat. *Prep.* 1. (P. Cod.) Each lozenge contains $\frac{1}{6}$ gr. of *Kermes mineral*, and about $\frac{3}{4}$ gr. of *gum*, made up with *sugar* and *orange flower water.* Diaphoretic and expectorant.

2. (*Compound.*) As the last, but with the addition of $\frac{1}{6}$ gr. of *opium*, $\frac{1}{4}$ gr. of *squills*, and $\frac{1}{2}$ gr. of *ipecacuanha.* Anodyne and expectorant; both are very useful in catarrhs.

LOZENGES (Lactate of Iron). Syn. *Trochisci Ferri Lactatis*,—Lat. *Prep.* (M. Cap.) Each lozenge contains 1 gr. of *lactate of iron.* Tonic. *Useful* in debility, accompanied with a diseased state of the organs of digestion.

LOZENGES (Lactic Acid). Syn. *Trochisci Acidi Lactici*,—Lat. Each lozenge contains 1 gr. of *lactic acid* to about 12 gr. of *sugar.* They are best flavoured with *vanilla* or *nutmeg.* In dyspepsia, &c., especially in gouty subjects. Those prepared by Magendie's formula contain a larger proportion of acid, but are much too sour for frequent use.

LOZENGES (Lactucarium). Syn. *Trochisci Lactucarii*,—Lat. *Prep.* (Ph. E.) Prepared with *lactucarium* in the same manner as the *opium lozenges*, Ph. E. Each of these lozenges contains from $\frac{1}{6}$ to $\frac{1}{7}$ gr. of lactucarium. Anodyne and demulcent. *Used* to allay tickling coughs, &c.

LOZENGES (Lavender). Syn. *Trochisci Lavandulæ,*—Lat. From ¾ fl. dr. of *Mitcham oil of lavender* to each *lb.* of *sugar*, and tinged red with *liquid lake* or *carmine ;* or violet, with *litmus* or *indigo. Used* chiefly to scent the breath. Those of the shops are generally deficient in odour.

LOZENGES (Lemon). Syn. *Trochisci Limonis, T. Limonum,*—Lat. *Prep.* 1. From 1½ fl. dr. of *oil of lemon* to each *lb.* of *double refined white sugar.*

2. (*Acidulated.*) See *Citric Acid* and *Tartaric Acid Lozenges.*

Obs. Lemon lozenges and drops are agreeable sweetmeats, and those that are acidulated are often very useful to promote expectoration, ("*cut the phlegm,*" as it is commonly called,) in coughs, &c. The last are also made into drops as well as lozenges, when they form the "*acidulated lemon drops*" of the shops. Those that are made with citric acid are by far the most wholesome. Both lemon lozenges and drops are generally coloured with *infusion of saffron* or *turmeric.*

LOZENGES (Lettuce). Syn. *Trochisci Lactucæ,*—Lat. *Prep.* From *extract of lettuce, extract of liquorice, gum,* and *sugar*, equal parts. Anodyne and demulcent; in obstinate coughs, without expectoration.

LOZENGES (Lichen). See *Iceland Moss Lozenges.*

LOZENGES (Liquorice). Syn. *Black Lozenges; Trochisci Glycyrrhizæ, T. G. Glabræ, T. Bechici Nigri,*—Lat. *Prep.* (Ph. E.) *Extract of liquorice* and *gum acacia,* of each, 6 oz.; *white sugar,* 12 oz.; dissolve in *water,* q. s.; evaporate to a paste, and form into lozenges. Pectoral and demulcent. Useful to allay tickling coughs, and remove hoarseness.

LOZENGES (Liquorice,—with Opium). See *Opium Lozenges.*

LOZENGES (Magnesia). Syn. *Heartburn Lozenges; Trochisci Magnesiæ,*—Lat. *Prep.* 1. (Ph. E.) *Carbonate of magnesia,* 6 oz.; *powdered white sugar,* 3 oz.; *oil of nutmeg,* 20 drops; *mucilage of tragacanth,* q. s. to mix.

2. (Ph. U. S.) *Calcined magnesia,* 4 oz.; *sugar,* 12 oz.; *nutmeg,* 1 dr.; *mucilage of tragacanth,* q. s.; for 10-gr. lozenges.

3. (*Wholesale.*) *Calcined magnesia,* 3 *oz.; powdered gum tragacanth,* 1 *oz.*; *double refined lump sugar,* ¾ *lb.; rose* or *orange-flower water,* q. s. to make a lozenge mass.

Obs. Magnesia lozenges are very useful in heartburn, acidity, and indigestion. The confectioners generally omit the nutmeg, and make their mucilage with either *rose* or *orange-flower water,* or else add the dry gum to the mass, and then mix up the powders with one or other of these liquids. It is also an improvement to use calcined magnesia, which is about twice as strong as the carbonate, and consequently less need be employed.

LOZENGES (Manna). Syn. *Trochisci Mannæ,*—Lat. *Prep.* (Van Mons) *Powdered tragacanth,* 1 dr.; *white sugar,* 12 oz.; *manna,* 3 oz.; *orange-flower water,* q. s. to mix. Demulcent, and in large numbers slightly laxative.

LOZENGES (Marsh-mallow). Syn. *Trochisci Althææ,*—Lat. *Tablettes de Guimauve,*—Fr. *Prep.* (P. Cod.) *Marsh-mallow root* (decorticated and finely powdered), 2 oz.; *sugar,* 14 oz.; *mucilage of tragacanth* (made with *orange-flower water*), q. s. Demulcent and expectorant. *Useful* to allay the irritation in cough, &c. The preparations of marshmallow have always been highly esteemed as pectorals by the vulgar.

LOZENGES (Minium). Syn. *Trochisci Minii,*—Ph. E. 1744. *Prep.* From *red lead,* 1 dr.; *corrossive sublimate,* 2 dr.; *crum of bread,* 1 oz.; *rose water,* q. s.; to be made up into oat-like grains. For external use only.

LOZENGES (Morphia). Syn. *Trochischi Morphiæ, T. M. Hydrochloratis,*—Lat. *Prep.* (Ph. E.) *Hydrochlorate of morphia,* 20 gr.; *tincture of tolu,* ½ fl. oz.; *powdered white sugar,* 25 oz.; dissolve the hydrochlorate in a *little warm water,* mix it with the tincture and the sugar, make a mass with *mucillage of gum tragacanth,* q. s., and divide it into 15-gr. lozenges. *Each lozenge* contains about $\frac{1}{40}$ gr. of hydrochlorate of morphia. *Used* as opium lozenges, but are pleasanter. The *morphia lozenges* of the *shops* generally contain $\frac{1}{24}$ gr. of *hydrochlorate of morphia.* (Pereira.)

LOZENGES (Morphia and Ipecacuanha). Syn. *Trochisci Morphiæ et Ipecacuanhæ,* —Lat. *Prep.* (Ph. E.) As the last, adding of *ipecacuanha,* 1 dr. Each lozenge contains about $\frac{1}{40}$ gr. of *hydrochlorate of morphia,* and $\frac{1}{13}$ gr. of *ipecacuanha.* Anodyne and expectorant; in tickling coughs, &c., and to allay pain.

LOZENGES (Naphthaline). Syn. *Trochisci Naphthalinæ,*—Lat. *Prep.* (Dupasquier.) Each lozenge contains about $\frac{1}{7}$ gr. of *naphthaline,* and is flavoured with *oil of aniseed.* Expectorant; from 15 to 20 daily.

LOZENGES (Nitre). Syn. *Trochisci Nitri, T. e. Nitro,*—Lat. *Prep.* (Ph. E. 1783.) *Nitre,* 3 oz.; *white sugar,* 9 oz.; *mucilage of tragacanth,* q. s. to mix. Diuretic; but chiefly sucked, without swallowing, to remove incipient sore-throat.

LOZENGES (Nitre,— Camphorated). Syn. *Trochisci Nitri Camphorati,*— Lat. *Prep.* (Chaussier.) Each lozenge contains ⅛ gr. of *opium*, ½ gr. of *camphor*, and 1 gr. of *nitre.* In hoarseness, sore-throat, &c.

LOZENGES (Nutmeg). Syn. *Trochisci Myristicæ,*—Lat. From *oil of nutmeg*, 1 fl. dr. to each *lb.* of *sugar*, and coloured with *infusion of saffron.* Carminative and stomachic; in colic, &c.

LOZENGES (Opium). Syn. *Anodyne Lozenges; Trochisci Opii, T. Glycyrrhizæ cum Opio,*—Lat. *Prep.* 1. (Ph. E.) *Opium* (strained), 2 dr.; *tincture of tolu*, ½ oz.; triturate together, add of *powdered sugar*, 6 oz.; *extract of liquorice* (soft) and *powdered gum acacia*, of each, 5 oz.; mix, and divide into 10-gr. lozenges. *Each lozenge* contains ⅛ to ⅐ gr. of opium. *Used* to allay tickling cough, and irritation of the fauces, and as an anodyne and hypnotic.

2. (Ph. U. S.) *Opium* (in fine powder), 2 dr.; *extract of liquorice, gum arabic,* and *sugar*, of each, 5 oz.; *oil of aniseed*, ½ fl. dr.; *water*, q. s.; divide into 6-gr. lozenges. Each lozenge contains ⅒ gr. of opium. As the last.

LOZENGES (Orange). Syn. *Trochisci Aurantii,*—Lat. From *oil of orange*, 1½ fl. dr. to each *lb.* of *sugar*, and *infusion of saffron* for colouring. By adding *citric or tartaric acid*, 3 dr., "*acidulated orange lozenges*" will be formed.

LOZENGES (Orange Flowers). Syn. *Trochisci Aurantii Florum,*—Lat. *Prep.* (P. Cod.) *Powdered sugar*, 1 *lb.*; *neroli*, 1 dr.; *orange-flower water*, q. s.; make it into drops (*pastilli*); or, omit the water and make it into lozenges with *mucilage of tragacanth* made with *orange-flower water.* Delightfully fragrant.

LOZENGES (Orris-root). Syn. *Trochisci Iridis,*—Lat. *Prep.* From *orris-root* (in very fine powder), 1 *oz.*; *sugar*, 1 *lb.*; *mucilage of tragacanth*, q. s. to mix. *Used* to perfume the breath.

LOZENGES (Oxalate of Potassa). Syn. *Trochisci Potassæ Oxalatis, T. P. Superoxalatis,*—Lat. As acidulated lozenges, but using *quadroxalate of potassa* (salt of sorrel) instead of tartaric acid.

LOZENGES (Oxalic Acid). Syn. *Trochisci Acidi Oxalici,*—Lat. As acidulated lozenges, but using *oxalic acid* instead of tartaric acid. The last two are refrigerant, but their use is objectionable, especially for patients who labour under the oxalic diathesis. In large quantities they are *poisonous.*

LOZENGES (Paregoric). Syn. *Trochisci Paregorici,*—Lat. Medicated with 2 fl. oz. of *paregoric*, and 2 dr. of *tartaric acid*, to each *lb.* of *sugar*, and tinged of a pink colour with lake or cochineal. As a pectoral in catarrhs, &c.

LOZENGES (Paullinia). Syn. *Trochisci Paulliniæ, T. Guaranæ,*—Lat. *Prep.* (Dr. Gavrelle.) Each lozenge contains nearly ½ gr. of *extract of guarana* or *paullinia*, and is flavoured with *vanilla.* 12 to 20 daily, as an alterative and tonic; in chlorosis, diarrhœa, &c.

LOZENGES (Pectoral). Syn. *Trochisci Pectorales, T. Bechici,*—Lat. *Prep.* 1. (Black; *T. Bechici Nigri.*) See *Liquorice Lozenges.*

2. (Dr. Grunn.) *Powdered squills*, 4 parts; *extract of lettuce*, 8 parts; *ipecacuanha*, 18 parts; *manna*, 125 parts; *sugar*, 250 parts; *mucilage of tragacanth*, q. s. to mix.

3. (Magendie.) See *Emetine Lozenges.*

4. (*Yellow; Tro. Bechici Flavi*). *Powdered orris root*, 6 dr.; *starch*, 4 dr.; *liquorice powder*, 3 dr.; *saffron*, 2 dr.; *sugar*, 8 oz.; *mucilage of tragacanth*, q. s. to mix.

5. (*White; Tro. Bechici Albi,*—Ph. L. 1788.) *Orris root*, 4 dr.; *liquorice powder*, 6 dr.; *starch*, 1½ oz.; *sugar*, 18 oz.; *mucilage of tragacanth*, q.s. to make a lozenge mass.

Obs. All the above are used as demulcents in coughs, colds, &c. The *second* and *third* are anodyne as well as demulcent. For other formulæ see *Cough Lozenges, Liquorice do., Opium do., &c.*

LOZENGES (Pellitory). Syn. *Trochisci Pyrethri,* — Lat. *Prep.* From *pellitory*, *mastic*, and *tragacanth*, of each, in fine powder, equal parts; *orange flower water*, q. s. to mix. In toothache.

LOZENGES (Peppermint). Syn. *Trochisci Menthæ Piperitæ,*—Lat. *Prep.* 1. (P. Cod.) *Oil of peppermint*, 1 dr.; *powdered sugar*, 16 oz.; *mucilage of tragacanth*, q. s.

2. (Ph. U. S.) *Oil of peppermint*, 1 fl. dr.; *sugar*, 12 oz.; *mucilage of tragacanth*, q. s.

3. (Wholesale.) 1 fl. dr. of the *finest Mitcham oil of peppermint* to each *lb.* of the *finest double refined white sugar*, with *mucilage* of either *gum arabic* or *tragacanth* to mix.

Obs. The best peppermint lozenges are made of the *very finest double refined sugar*, and of *English* oil of peppermint only, carefully mixed up with *very clean* mucilage. The *commoner qualities* are made by employing inferior lump sugar and foreign oil of peppermint, or what is better, English oil of peppermint, but in a less proportion than for the better sorts. The addition of starch, in quantity varying from $\frac{1}{6}$th to $\frac{2}{9}$ths of the whole mass is also commonly made to them; and in the *cheapest varieties* even *plaster of Paris* or *chalk* is occasionally introduced by unprincipled makers. The addition of a *very small* quantity of *blue smalts*, reduced to an impalpable powder, is commonly made to the sugar, to increase its whiteness. "*Transparent*" or "*semi-transparent peppermint lozenges*" are made from the same materials as the opaque ones; but the sugar is not reduced to quite so fine a powder, and the cake is rolled thinner before cutting it. A *little oil of almonds* or of *olives* is also occasionally mixed with the ingredients, to promote the transparency; but it tends to render the lozenges less white.

Peppermint lozenges and *drops* are useful in flatulency, nausea, and griping; and judging from the enormous and constantly increasing demand for them, they are more highly esteemed by the public than all other lozenges and confections.

LOZENGES (Pontefract). These are made of the *purest refined juice* or *extract of liquorice*, and have long been esteemed as a demulcent.

LOZENGES (Poppy). Syn. *Trochisci Papaveris*,—Lat. *Prep.* From *extract of poppies*, 3 *oz.; sugar*, 15 *oz.; powdered gum tragacanth*, 2 *oz.; rose water*, q. s. to mix. *Used* in coughs as an anodyne and demulcent, in lieu of opium lozenges.

LOZENGES (Pulmonic). See *Cough Lozenges, Pectoral do., Wafers, &c.*

LOZENGES (Quinine). Syn. *Trochisci Quininæ Sulphatis*,—Lat. *Prep.* (Soubeiran.) Each lozenge contains about $\frac{1}{16}$th gr. of *sulphate* (disulphate) *of quinine.* Tonic, and stomachic, in dyspepsia, &c.; but to render them useful the quantity of the alkaloid should be doubled.

LOZENGES (Rhubarb). Syn. *Digestive Lozenges, Rhubarb Tablettes; Tabellæ de Rheo, Trochisci Rhei*,—Lat. *Prep.* (P. Cod.) *Powdered rhubarb*, 1 oz.; *sugar*, 11 oz.; *mucilage of tragacanth*, q. s.; divide into 12-gr. lozenges. Stomachic and laxative. Sucked before dinner they excite the appetite, and after it, promote digestion. They are frequently aromatized with a little *cinnamon* or *vanilla.*

LOZENGES (Rhubarb,—Aromatized). Syn. *Trochisci Rhei Aromatici*,—Lat. See *Digestive Candy* (and *above*).

LOZENGES (Rose). Syn. *Trochisci Rosæ*,—Lat. *Prep.* 1. (*Acidulated; Tro. R. Acidæ.*) From *otto*, 5 to 10 drops; *citric* or *tartaric acid*, 3 *dr.; sugar*, 1 *lb.; mucilage*, q. s.

2. (Ph. E. 1746.) *Red-rose leaves* (powdered), 1 oz.; *sugar*, 12 oz.; *mucilage*, q. s.

3. (*Pâte de Rose Lozenges, Pati Rosa do.*) As No. 1, omitting one-half of the acid.

4. (*Red; Tro. R. Rubri.*) As No. 1; but coloured with *liquid lake*, or an *infusion of cochineal.*

Obs. Some makers add of *starch*, 4 *oz.*, substitute *oil of rhodium* for otto of roses, and use *mucilage made with rose water;* but the quality of course suffers. They are chiefly used to perfume the breath.

LOZENGES (Saffron). Syn. *Trochisci Croci*,—Lat. *Prep.* From *hay saffron* (in fine powder), 1 *oz.; white sugar*, 1 *lb.; mucilage of gum tragacanth*, q. s., to mix. Anodyne, pectoral, and emmenagogue; but chiefly used to raise the spirits in hypochondriasis.

LOZENGES (Santonine). Syn. *Tasteless Worm Lozenges; Trochisci Santonini*,—Lat. *Prep.* (M. Calloud.) Each lozenge contains $\frac{1}{2}$ gr. (nearly) of *santonine.* 5 to 10 daily, as a vermifuge.

LOZENGES (Soda). Syn. *Trochisci Sodæ Bicarbonatis*,—Lat. *Prep.* 1. (Ph. E.) *Bicarbonate of soda*, 1 oz.; *powdered gum arabic*, $\frac{1}{2}$ oz.; *sugar*, 3 oz.; *mucilage*, q. s.

2. (*Wholesale.*) From *bicarbonate of soda* and *powdered gum tragacanth*, of each, 2 *oz.; double refined lump sugar*, $\frac{8}{4}$ *lb.*; *rose water*, q. s. to mix. In acidity, heartburn, &c. See *Vichy Lozenges.*

LOZENGES (Soda and Ginger). Syn. *Trochisci Sodæ et Zingiberis*,—Lat. To the last, add of *ginger* (in very fine powder), 1$\frac{1}{2}$ *oz.; powdered gum*, $\frac{1}{2}$ *oz.*

LOZENGES (Squills). Syn. *Trochisci Scillæ*,—Lat. Each lozenge contains $\frac{1}{8}$ gr. of *powdered squills*, and 2 gr. of *extract of liquorice.*

LOZENGES (Squills and Ipecacuanha.) Syn. *Trochisci Scillæ et Ipecacuanhæ*,—Lat. As the last, adding for each lozenge $\frac{1}{4}$ gr. of *powdered ipecacuanha.* Both the above are useful cough lozenges.

LOZENGES (Starch). Syn. *Trochisci Amyli, T. Bechici Albi*,—Lat. See *Pectoral Lozenges.*

LOZENGES (Steel). Syn. *Trochisci Ferri, T. Chalybeati*,—Lat. *Prep.* (P. Cod.) *Levigated iron filings*, 1 oz.; *sugar*, 10 oz.; *cinnamon*, 2 dr.; *mucilage of tragacanth*, q. s.; mix, and divide into 480 lozenges. Tonic. See *Iron Lozenges.*

LOZENGES (Sulphur). Syn. *Trochisci Sulphuris*,—Lat. *Prep.* (P. Cod.) From *sulphur* (pure precipitated), 2 oz.; *sugar*, 16 oz.; *mucilage of tragacanth* (made with rose water), q. s. to mix. Useful in piles and some skin diseases. The "*tro. e sulphure,*" Ph. L. 1788, was made with washed sulphur, and "*tro. diasulphuris,*" Ph. E. 1744, contained *benzoic acid.*

LOZENGES (Tartaric Acid). See *Acidulated Lozenges.*

LOZENGES (Tolu). Syn. *Balsamic Lozenges; Trochisci Tolutani, T. Balsamicæ,*—Lat. *Prep.* 1. (P. Cod.) *Balsam of tolu* and *rectified spirit,* of each, 1 oz.; dissolve, add of *water,* 2 fl. oz., heat the mixture in a water bath, and filter; make a mucilage with the filtered liquid, and *gum tragacanth* (in powder), 80 gr.; add of *sugar,* 16 oz., make a mass, and cut it into lozenges.

2. (*Wholesale.*) As the last, but using only *one-half* the weight of *balsam of tolu.* Pectoral and balsamic.

LOZENGES (Tronchin's). Same as *Tablettes de Tronchin.* (See *p.* 726.)

LOZENGES (Vanilla). Syn. *Trochisci Vanillæ,*—Lat. *Prep.* 1. *Essence of vanilla,* 3 fl. dr., to each *lb.* of *sugar.*

2. (Guibourt.) From *vanilla* triturated to a fine powder with 7 times its weight of *sugar.* Antispasmodic, nervine, and stomachic. *Used* to sweeten the breath, to flavour chocolate, &c.

LOZENGES (Vichy). Syn. *D'Arcet's Lozenges; Trochisci Sodæ,*—Lat. *Pastilles de Vichy,*—Fr. *Prep.* 1. (P. Cod.) *Bicarbonate of soda,* 1 oz.; *powdered sugar,* 19 oz.; *mucilage of gum tragacanth,* q. s.; mix, and divide into 20-gr. lozenges.

2. (M. D'Arcet.) As the last, adding a little *oil of peppermint* to give a slight flavour. Antacid or absorbent; in heartburn, &c.

LOZENGES (Violet). Syn. *Trochisci Violæ, T. Violarum.*—Lat. *Prep.* Orris lozenges coloured with the *juice of violets.* (See *p.* 729.)

LOZENGES (Wistar's Cough). *Prep. gum arabic, extract of liquorice,* and *sugar,* of each, 2½ oz.; *powdered opium,* 1 dr.; *oil of aniseed,* 40 drops; for 60 lozenges. One, three or four times a day.

LOZENGES (Worm). Syn. *Trochisci Anthelmintici, Morsuli contra Vermes,*—Lat. 1. Most of the advertised nostrums under this name have a basis of *calomel* (about 1 gr. per lozenge), and require to be followed by a purge a few hours afterwards.

2. (*Ching's*). (See *p.* 725.)

3. (Ph. Austr. 1836.) *Ethereal extract of wormseed,* 1 dr.; *jalap, starch,* and *sugar,* of each, 2 dr.; *mucilage of gum tragacanth,* q. s.; divide into 60 lozenges.

4. (Ph. Dan. 1840.) *Wormseed,* 1 oz; *ethiops mineral* and *jalap,* of each, 3 dr.; *cinnamon,* 2 dr.; *sugar,* 7 oz.; *rose water,* q. s.

5. (Ph. Hamb. 1845.) As No. 3.

6. (*Tasteless*). See *Santonine Lozenges.*

LOZENGES (Zinc). Syn. *Trochisci Zinci, T. Z. Sulphatis,*—Lat. *Prep.* (Dr. Copland.) Each lozenge contains ½ gr. of *sulphate of zinc.* Antispasmodic, expectorant, and tonic; and in quantity emetic.

LUBRICATING COMPOUNDS. See *Anti-attrition.*

LUCIFERS. See *Matches.*

LUMBAGO. Rheumatism of the loins. It is distinguished from *nephritis,* or inflammation of the kidneys, by the pain being aggravated on stooping. The *treatment* consists of strong stimulant embrocations or liniments, or of blisters over the part affected, with active aperients, warmth, and diaphoretics (as *Dover's powder*) at bedtime. The *hot* or *vapour bath* often gives almost immediate relief. See *Rheumatism.*

LUMINOUS PHIAL. See *Phosphorus.*

LUNA CORNEA. Fused chloride of silver.

LUNAR CAUSTIC. See *Nitrate of Silver.*

LUNCH or *Luncheon.* Among the middle classes this is a slight repast between breakfast and dinner; but among the higher or fashionable classes it constitutes the midday meal. See *Dinner* and *Meals.*

LUNGS. See *Stays* and *Respiration.*

LUPININE. A name given by M. Cassola to a species of gum obtained from *lupins.*

LUPINITE. A bitter substance extracted from the leaves of *lupinus albus* or *white lupin.*

LUPULINE. Syn. *Lupulina, Lupulinic Grains, L. Glands.* The yellow powder obtained from the *dried strobiles* or *catkins of the hops,* by gently rubbing and sifting them. *Dose.* 5 to 10 gr.; as an anodyne, tonic, &c. See *Hops.*

LUPULITE. Syn. *Hop Bitter* (Pure). The aromatic bitter principle of hops.

Prep. The *aqueous extract of the yellow powder* or *lupulinic grains of the strobiles,* along with a *little lime,* are treated with *rectified spirit;* the filtered tincture is evaporated to dryness, re-dissolved in *water,* and the solution is again filtered, and evaporated to dryness; the residuum is, lastly, washed with *ether,* and allowed to dry.

Prop., &c. A yellowish-white, bitter, uncrystallizable substance, soluble in 20 parts of water, very soluble in alcohol, and slightly so in ether. The yellow powder above alluded to is improperly called *lupuline;* a name which appears more appropriate to this compound than to the *lupulinic grains.*

LUPUS. A disease affecting the skin, remarkable for eating away the parts which it attacks with extreme rapidity. It is generally confined to the face, and commences with small spreading ulcerations, which become more or less concealed beneath bran-like scabs, and end in ragged ulcers, which gradually destroy the skin and muscular tissue to a considerable depth. Sometimes it assumes a form resembling that of ring-worm; in others, to the inexperienced eye, it simulates cancer. In its most malignant shape (*noli me tangere*) it frequently attacks the cartilages of the nose, when the whole of that organ is often destroyed by its ravages. Lupus is a disease of a most obstinate character and most difficult to cure, and, in many cases, appears to be even aggravated by medication. The only *treatment* besides that of a constitutional character, consists in the use of escharotic lotions, or in the separation of the diseased from the sound parts by caustic applications or the knife. Among internal remedies the *solutions of arsenic*, *chloride of barium*, and *hydriodate of arsenic and mercury* (Donovan's solution), appear to be the most beneficial.

LUSTRE. See *Plumbago.*

LUTE. Syn. *Luting; Lutum, Cæmentum*,—Lat. A composition employed to secure the joints of chemical vessels, or as a covering to protect them from the violence of the fire.

Prep. 1. *Linseed meal*, either alone, or mixed with an *equal weight of whiting*, and made into a stiff paste with water. It soon becomes very hard and tough.

2. *Ground almond cake*, from which the oil has been pressed, mixed up as the last. Both the above are much used for stills, resorts, and other vessels that are not exposed to a heat higher than about 320° Fahr. They are capable of resisting the action of the fumes of volatile oils, spirits, weak acids, &c., for some time.

3. *Fresh-slaked lime* made into a paste with strained *bullock's blood* or *size*. As the last.

4. *Plaster of Paris* made into a paste with *water*, and at once applied. It bears a nearly red heat, but becomes rather porous and friable.

5. *Powdered clay* or *whiting* made into putty with *water* and *boiled linseed oil.* This is commonly known as "*fat lute.*"

6. A mixture of *powdered clay* and ground *bricks*, made up with *water* or a *solution of borax.* For joining crucibles, &c., which are to be exposed to a strong heat.

7. *Pipe-clay* and *horse-dung*, made into a paste with *water.* As a coating for glass vessels, to preserve them from injury from exposure to the fire. This composition is used by the pipe-makers, and will stand unharmed the extremest heat of their kiln for 24 hours. It is applied by spreading it on paper.

8. As the last, but employing *shredded tow* or *plumbago* for *horse-dung.*

Obs. For the joints of small vessels, as *tubes, &c.*, especially those of glass or earthenware, pieces of *vulcanized Indian tubing* slipped over and tied above and below the joint, are very convenient substitutes for lutes, and have the advantage of lasting for a long time, and bearing uninjured the heat at which oil of vitriol boils. Flat rings or "*washers*" *of vulcanized rubber* are also excellent for still heads, &c., whenever the parts can be "pinched together" by screws or clamps.

LUTEOLINE. Syn. *Luteoleine.* A yellow colouring matter, discovered by Chevreul in *reseda luteola* (Linn.) or *weld.* It is crystallizable and volatile. It may be obtained in beautiful, transparent, yellow needles by sublimation. See *Weld.*

LYCOPODIUM. Syn. *Club Moss, Common do. do.; Lycopodium clavatum*—Linn. The seed (*pollen*) of this plant is exceedingly combustible; thrown suddenly from a powder puff or bellows across the flame of a candle, it produces the imitation flashes of lightning of our theatres. *Rosin* (in fine powder) which is often used for the same purpose, is much less effective. The powder is also employed as a "dusting powder" in excoriations, and to roll up boluses and pills. The herb is very astringent, and where it is plentiful, has long been used for the restoration of ropy wine and beer. See *Hands, &c.*

LYNCH'S REMEDY (for Rheumatism). See *Embrocations.*

MACARONI. This only differs from vermicelli in the size of the pipes, which are about as large as a goose quill. When properly dressed it is very wholesome and nutritious. A *pleasant dish* may be made by boiling *macaroni* in *water* until soft, either with or without a *little salt*, draining off the water, and then stewing it with a *little butter*, *cream*, or *milk*, and *grated cheese*, adding *spice* to palate. It may be made into a "form" and browned before the fire.

MACAROONS (English). *Prep.* Take of *sweet almonds*, 1 *lb.;* blanch and beat them to a paste, add of *lump sugar*, 1¼ *lb.; whites of* 6 *eggs;* the *grated yellow peel* of 2 *lemons;* mix well, make it into "forms," cover with *wafer paper*, and bake in a moderate oven.

MACE. Syn. *Macis*,—Lat. The aril or tough, unctuous, membranous envelope of the nutmeg. After being separated from the fruit it is dipped into *brine* and dried in the sun. It has a flavour and odour more agreeable than that of nutmeg, which in its general properties it resembles. It is used as a flavouring by cooks, confectioners, and liquoristes; and in medicine as a carminative. See *Oils, &c.*

MACERATION. Syn. *Maceratio*,—Lat. The steeping of a substance in cold water, for the purpose of extracting the portion soluble in that menstruum. The word is also frequently applied to the infusion of organic substances in alcohol or ether, or in water, either alkalized or acidulated.

MACHINES. The *construction* and *management of machinery* does not come within the province of this work. For some information in connexion with the subject, see *Anti-attrition, Evaporation, Fuel, Horse-power, &c.*

MACKEREL. The *scomber scombrus* (Linn.), a well-known spiny-finned sea-fish, much esteemed at certain seasons for the table. Though nutritious, is is very apt to disagree with delicate stomachs, and occasionally induces symptoms resembling those of poisoning. It keeps worse than, perhaps, any other fish, and hence the privilege granted by an old statute to hawk it about the streets on Sundays. The use of mackerel was formerly regarded as beneficial in liver affections.

MACQUER'S SALT. Binarseniate of potassa.

MADDER. Syn. *Rubia, Rubiæ Radix*, —Lat. The root of *rubia tinctorum* (Linn.) or *dyer's madder*. The best madder has the size of a common goose quill, a reddish appearance, and a strong odour. As soon as the roots are taken from the ground they are picked and dried; and before use, they are ground in a mill. Levant, Turkey, and Smyrna madder, is imported *whole*,—French, Dutch, and Zealand madder *ground*. The finest quality of ground madder is called "*crop*" or "*grappe*;" "*ombro*" and "*gamene*" are inferior sorts, and "*mull*" the worst.

Madder contains several distinct principles, as—*madder red*, or *alizarine*;—*madder purple*, or *purpurine*;—*madder orange*, or *rubiacine*, a substance very soluble in ether and in hot alcohol;—*madder yellow*, or *xanthine*, which is very soluble in water and in alcohol; and—*madder brown*, a substance little known;—*rubian*, a peculiar bitter substance, and several resins, &c.

Pur. Madder is frequently adulterated with logwood, Brazil wood, and other dye-stuffs of inferior value; and also, not unfrequently, with brick dust, red ochre, clay, sand, mahogany saw-dust, bran, &c. These admixtures may be detected as follows:—

1. When dried at 212° Fahr., and then incinerated, not more than 10% to 12% of ash should be left.

2. It should not lose more than 50% to 56% by exhaustion with cold water.

3. When assayed for alizarine (see *below*) the quantity of this substance obtained should be equal to that from a sample of the same kind of madder which is known to be pure, and which has been treated in precisely the same manner. The operation may be conducted as follows:—500 gr. of the *sample* are weighed, and after being dried by the heat of *boiling water* or *steam*, are gradually added to an equal weight of *concentrated sulphuric acid* contained in a glass vessel, and stirred with a glass rod; after a few hours the charred mass is washed with *cold water*, collected on a filter, and dried by the heat of boiling water; the carbonized mass (*commercial garancine*) is next powdered, and treated with successive portions of *rectified spirit to which a little ether has been added*, at first in the cold, and afterwards with heat, until the liquid is no longer coloured by it, when the mixed tincture is filtered, and evaporated (distilled) to dryness; the weight of the residuum divided by 5, gives the *per centage* of RED COLOURING MATTER present. Or,—The dried *carbonized matter* is exhausted by boiling it in a *solution* of 1 part of *alum* in 5 or 6 parts of *water*, and the decoction, after being filtered whilst in the boiling state, is treated with *sulphuric acid* as long as a precipitate falls, which is washed, dried, and weighed as before.

Uses, &c. Madder has been given in jaundice and rickets, and as an emmenagogue. It imparts a red colour to the bones of animals which are fed on it. *Dose.* ½ dr. to 2 dr., twice or thrice a day. It is principally employed as a dye stuff. See *Red Dyes, Ivory, &c.*

MADDER RED. Syn. *Alizarine, Garancine, Lizaric Acid.* The red colouring principle of madder, first obtained in a separate form by Robiquet.

Prep. 1. By cautiously exposing *dried* and *powdered madder* or *commercial garancine* to heat, and collecting the sublimate, which may then be crystallized from *alcohol.*

2. The *aqueous decoction of madder* is treated with *dilute sulphuric acid* as long as a precipitate falls, which after being washed, is boiled in a *solution of sesquichloride of aluminum* as long as it gives out colour; the liquid is then filtered, precipitated with *hydrochloric acid,* and the precipitate washed and dried. It may be purified from a little adhering purpurine, by dissolving it in *alcohol,* again throwing it down with *hydrate of alumina,* boiling the precipitate with a *strong solution of soda,* and separating the alizarine from its combination with alumina by means of *hydrochloric acid;* it is lastly crystallized from *alcohol.*

3. (A. Meillet.) *Alum,* 3 parts, is dissolved in *water* at 140° Fahr., 30 parts, and *madder,* 13 parts, added to the solution; the whole is then gently boiled for 30 or 40 minutes, after which, it is thrown upon a filter, and submitted to strong pressure; this treatment is repeated with fresh solutions a *second* and a *third* time; the mixed filtrates are then decanted, and when nearly cold, *oil of vitriol,* 1 part, diluted with twice its bulk of *water,* is added, care being taken to stir the liquid all the time; the supernatant fluid is next decanted, and the residuum well washed, and lastly, dried in the air. If required *quite pure,* it is dissolved, whilst still moist, in a *solution* of 1½ times its weight of *carbonate of potassa* in 15 parts of *water,* and after reprecipitation with *sulphuric acid,* is washed and dried as before.

4. (Robiquet & Colin.) *Powdered madder* is exhausted with *water* of a temperature not exceeding 68° Fahr., and after being dried, 1 part of it is boiled for 15 or 20 minutes in a solution of *alum,* 8 parts, in *water,* 40 parts; the liquid is filtered whilst boiling, the marc well-washed with a fresh *solution of alum,* the mixed liquids precipitated with *sulphuric acid,* and the precipitate washed and dried, as before.

5. *Madder* exhausted by 2 or 3 macerations in 5 or 6 times its weight of *cold water,* is submitted to strong pressure, to remove adhering water, and the *marc,* whilst still moist, is mixed with ½ its weight of *oil of vitriol diluted with an equal quantity of water;* the whole is kept at the temperature of 212° for an hour, and after being mixed with *cold water* is thrown on a linen strainer, well-washed with *cold water,* and dried.

6. From *powdered madder* and *oil of vitriol,* equal parts, without heat, as described at *p.* 733.

7. (Mr. F. Steiner.) The "*used madder*" of the dye-works is run into filters, and precipitated with *sulphuric acid;* the matter thus obtained is put into bags and rendered as dry as possible by hydraulic pressure; the pressed cake is next crumbled to pieces, placed in a leaden vessel, and treated with 1-5th of its weight of *oil of vitriol,* afterwards assisting the action of the acid by introducing steam to the mixture; the resulting dark-brown carbonized mass is, lastly, well washed, dried, powdered, and mixed with about 5% of *carbonate of soda,* when it is ready for sale. *Patent,* dated Aug., 1843. The *last three formulæ* produce the *garance* or *garancine* of commerce now so extensively used in dyeing.

Prop., *&c.* Pure *anhydrous alizarine* crystallizes in magnificent orange-red crystals, which may be fused and sublimed; it is freely soluble in alkaline solutions, which it colours purple or violet; and in oil of vitriol, giving a rich red colour; water throws it down from the last unchanged; it is also soluble in hot alcohol, a hot solution of alum, and less freely, in hot water. *Hydrated alizarine* occurs in small scales resembling mosaic gold. When impure, it generally forms shining reddish-brown scales. *Commercial garancine* is a deep brown or puce-coloured powder, and will probably, ere long, entirely supersede crude madder for dyeing. The properties of garancine as a dye-stuff are precisely similar to those of madder. A *solution of alum* added to a *solution of alizarine,* and precipitated by *carbonate of potassa,* furnishes a *rose lake,* which, after being washed with *water,* and dried, possesses a most charming tint.

MADDERIC ACID. One of two colourless acids found by Runge in madder.

MADEIRA. See *Wines.*

MADNESS. See *Insanity.*

MAGILP. Syn. *Meggellup.* A mixture of *pale linseed oil* and *mastic varnish,* employed by artists as a vehicle for their "glazings." The proportions vary according to the work. It is thinned with turpentine.

MAGISTERY. Syn. *Magisterium,*—Lat. The old name of precipitates obtained by diluting certain solutions with water. The following are the principal substances to which this term has been applied:—*Magistery of alum,* hydrate of alumina; *m. of bismuth,* trisnitrate of do.; *m. of diaphoretic antimony,* materia perlata; *m. of opium* (Ludolph's), crude morphia; *m. of lapis calaminaris; m. of zinc,* hydrated oxide of zinc; *magisterium marcasitæ*, trisnitrate of bismuth.

MAGNESIA. Syn. *Calcined Magnesia, Oxide of Magnesium; Magnesia*,—Ph. L. E. & D. *Mag. Calcinata; M. Usta*,—Ph. L. 1788. *Burnt Magnesia, Caustic do., Bitter Earth, Talc do.*,—Obs. A light white substance, classed with the earths.

Prep. 1. (Ph. L. E. & D.) Expose *carbonate of magnesia* in a crucible (earthen or platinum) to a full red heat for 2 hours, or until the powder suspended in water does not effervesce on the addition of *dilute sulphuric* or *hydrochloric acid.*

Prop. A very light, white, odourless, tasteless, powder; sp. gr. 2·3; when moistened it slightly acts on turmeric paper; soluble in 5142 parts of cold water, and in 36,000 parts of boiling water. It slowly absorbs carbonic acid from the atmosphere. With the acids it forms salts, most of which may be made by the direct solution of the earth, or of its hydrate or carbonate.

Pur. "Being moistened with water, it slightly changes the colour of turmeric to brown. It dissolves in hydrochloric acid without effervescence. Neither bicarbonate of potassa, nor chloride of barium, throws down anything from this solution." (Ph. L.) "Fifty grains are entirely soluble in 1 fl. oz. of hydrochloric acid; an excess of ammonia occasions in the solution only a scanty precipitate of alumina: the filtered liquid is not precipitated by oxalate of ammonia." (Ph. E.) Distilled water, which has been boiled on it, is not affected on the addition of either chloride of barium or nitrate of silver.

Tests. Magnesia is precipitated—1. By the pure alkalies as a bulky white hydrate, which is insoluble in water, but freely soluble in dilute acids.—2. As a bulky white carbonate, by the carbonates of potassa and soda. Both the above precipitates readily dissolve in dilute nitric and hydrochloric acids, forming salts which are very deliquescent, and which are soluble in alcohol.—3. Solutions of magnesian salts are not precipitated by the alkaline sulphates or sulphuric acid, nor, when very dilute, by oxalate of ammonia.—4. Ammonia only throws down part of the magnesia present, the remainder uniting to form a double salt, which is not decomposable by the addition of ammonia in excess; but the whole of the magnesia is thrown down on the addition of carbonate of potassa, and boiling the mixture for some time. By the above tests, magnesia is readily distinguished and separated from the *other earths.* Its insolubility in alkaline solutions distinguishes it from *alumina.* In all cases ebullition promotes the formation of the precipitate.

Estim. It may be thrown down in the form of carbonate, and after being washed, dried, and strongly ignited in a platinum crucible for 2 hours, may be weighed as pure magnesia.

Uses, &c. Calcined magnesia is chiefly employed in medicine. It is antacid and laxative, and its general action resembles that of the alkalies. It is exhibited in heartburn, diarrhœa, constipation of children, gout, &c. Its continued use, however, is not unaccompanied with danger, as instances are recorded in which it has accumulated in the intestines, and produced very serious consequences. *Dose.* As an *antacid*, a teaspoonful; as a *purgative*, ½ dr. to 2 dr. or more. Combined with rhubarb it is a favorite purge for infants.

Obs. Calcined magnesia is now seldom prepared by the retail druggist. On the *large scale*, covered crucibles made of porous earthenware are employed as the containing vessels, and the heat is applied by placing them side by side, in a sort of furnace, or rather oven, heated with coke. The process is known to be complete when the magnesia presents a peculiar luminous appearance, technically called "brightening." After calcination, the crucibles, still covered, are allowed to cool, when their contents are at once passed through a fine sieve, and preserved in well-corked bottles or jars, as it quickly absorbs carbonic acid from the air. *Prod.* 42 to 43$\frac{0}{0}$.

MAGNESIA (Heavy). Syn. *Heavy Calcined Magnesia, Condensed do. do.; Magnesia Ponderosa, M. Calcinata P.*,—Lat. *Prep.* From the *heavy carbonate* by calcination in the usual manner. For this purpose the mixed solution of the *sulphate of magnesia* and *alkaline carbonate* is generally at once evaporated to dryness and calcined, the alkaline sulphate resulting from the decomposition being afterwards removed by careful washing.

Prop., &c. Heavy magnesia resembles the ordinary calcined magnesia of the shops (*light calcined magnesia*) in all except its density. The assertion, however, that 1 part of the *former* is equal to 3 of the *latter*, which frequently appears on the labels, is a gross exaggeration.

MAGNESIA (Henry's Calcined). This, for the most part, resembles the last preparation.

MAGNESIA (Acetate of). Syn. *Magnesiæ Acetas*,—Lat. Very soluble, deliquescent, and difficultly crystallizable.

MAGNESIA (Carbonate of). Syn. *Subcarbonate of Magnesia, Hydrated do. do.; Light Carbonate of do.; Magnesiæ Carbonas,*—Ph. L. E. & D. *M. Subcarbonas,* Ph. L. 1824. *M. Alba,*—Ph. L. 1788. *Magnesia,*—Ph. D. 1807. *M. Subcarbonas Hydrata, M. Anglica, M. Salis Amari, M. Hydrico-carbonica, Carbonas Magnesicus cum Aquâ, Comitissæ Palmæ Pulvis,*—Lat. var. *Prep.* 1. (Ph. L.) *Sulphate of magnesia,* 4 ℔, and *carbonate of soda,* 4 ℔ 9 oz.; *boiling distilled water,* 4 gall.; dissolve the salts separately in one half the water, filter, mix the solutions, and boil for 2 hours, constantly stirring with a spatula, *distilled water* being frequently added to compensate for that lost by evaporation; lastly, the solution being poured off, wash the precipitated powder with *boiling distilled water,* and dry it. The formulæ of the Ph. E. & D. & Ph. L. 1836, are essentially the same, except that the ebullition is limited to from 10 to 20 minutes.

2. (Ph. D. 1826.) *Sulphate of magnesia,* 25 parts; *carbonate of potassa,* 24 parts; *boiling water,* 400 parts; as the last, but merely boiling for "a short time."

3. Add a *solution of carbonate of potassa* or *soda* to the *bittern* or *residuary liquor* of the sea salt works, and well wash and dry the precipitate as before. This is known in commerce as "*Scotch magnesia.*"

Prop. Carbonate of magnesia is a white, inodorous, tasteless powder, possessing similar properties to calcined magnesia, except effervescing with acids, and having less saturating power. An ounce measure is filled by 45 to 48 gr. of the powder lightly placed in it.

Pur. "It is soluble in dilute sulphuric acid. From this solution, when the effervescence has ceased, nothing is thrown down by bicarbonate of potassa. Water in which it has been boiled does not change the colour of turmeric paper to brown, nor is any thing thrown down on the addition of chloride of barium or nitrate of silver." (Ph. L.) By solution in dilute sulphuric acid, 100 parts lose 36·6 parts by weight." (Ph. L. 1836.)

Obs. The carbonate of magnesia of commerce is usually made up into cakes or dice, while drying; or it is permitted to drain and dry in masses, which are then cut into squares with a thin knife. It is powdered by simply rubbing it through a wire sieve. The presence of iron in the solution of the sulphate of magnesia, when the crude salt is employed, and which is destructive to the beauty of the preparation, may be got rid of by the addition of *lime water* until the liquor acquires a slight alkaline reaction, and subsequent decantation after repose. *Dose.* As an *antacid,* ½ to a whole teaspoonful 3 or 4 times daily; as a laxative, ½ dr. to 2 dr. It is commonly taken in milk. It is apt to produce flatulence, but in other respects is preferable to calcined magnesia.

MAGNESIA (Heavy Carbonate of). Syn. *Magnesia Carbonas Ponderosa,* — Lat. *Prep.* 1. (Apothecaries' Hall.) A *saturated solution of sulphate of magnesia,* 1 part, is diluted with *water,* 3 parts, and the mixture heated to the boiling point; a *cold saturated solution of carbonate of soda,* 1 part (*all by measure*) is then added, and the whole is boiled with constant agitation until effervescence ceases; *boiling water* is next freely poured in, and after assiduous stirring for a few minutes, and repose, the clear liquid is decanted, and the precipitate thrown on a linen cloth and thoroughly washed with hot water; it is, lastly, drained, and dried in an iron pot.

2. (Ph. D.) Dissolve *sulphate of magnesia,* 10 *oz.*, in *boiling distilled water,* ½ pint; and *carbonate of soda* (cryst.), 12 *oz.*, in *boiling distilled water,* 1 pint; mix the two solutions, and evaporate the whole to dryness by the heat of a sand bath; then add of *boiling water,* 1 quart, digest with agitation for half an hour, and wash the insoluble residuum as before; lastly, drain it, and dry it at the temperature of boiling water.

Obs. The above preparations, although commonly called carbonates of magnesia, appear to be a compound of carbonate with hydrate, in proportions, which are not perfectly constant. On account of the excess of base in its composition, it was formerly regarded as a subsalt. A great deal has been written uselessly respecting the preparation of these carbonates, about which, however, there is neither mystery nor difficulty, as some writers would lead their readers to suppose. If the solutions are very dilute, the precipitate is exceedingly light and bulky; if otherwise, it is denser. By employing nearly saturated solutions, and then heating them and mixing them together whilst very hot, a very heavy precipitate is obtained, but it is apt to be gritty or crystalline. The same occurs when cold solutions are mixed, and *no* heat is employed. The lightest precipitate is obtained from cold highly dilute solutions, and subsequent ebullition of the mixture. Mr. Pattinson, a chemist of Gateshead, prepares a very beautiful and pure heavy carbonate from magnesian limestone. The latter is calcined at a dull red heat (not hotter) for some time, by which the carbonic acid is expelled from the carbonate of magnesia, but not from the lime, which hence continues insoluble. The calcined mass is next reduced to a milk with water in a suitable cistern, and the carbonic acid resulting from its own calcination, forced into it under powerful pressure. The result is a saturated solution of magnesia, the lime remaining unacted on, so long as the magnesia is in excess. The solution by evaporation yields the *heavy carbonate*, whilst carbonic acid is expelled, and may be again used in the same manufacture. 154 to 160 gr. of the heavy carbonate are required to fill an ounce measure when lightly placed in it, by which it appears to be fully thrice as dense as the light carbonate. The *dose* is of course proportionate.

MAGNESIA (Carbonate of,—Henry's). This is ordinary carbonate of magnesia, the washing of which has been finished with a little rose water.

MAGNESIA (Bicarbonate of). Syn. *Magnesiæ Bicarbonas*,—Lat. This name has been applied to the small prismatic crystals of *hydrated neutral carbonate of magnesia* which are deposited when "fluid magnesia" is exposed for some time to the air, under an error as to their constitution. A similar mistake is made by Pereira and others, who state that "this salt is obtained in solution only;" whereas, the solution of magnesia to which they refer is simply a solution of the common carbonate in an excess of carbonic acid, or in highly carbonated water, without any chemical union taking place. It might with more propriety be called a supercarbonate, as analysis proves its composition to vary in different samples.

MAGNESIA (Citrate of). Syn. *Magnesiæ Citras*,—Lat. *Prep.* 1. By saturating a *dilute solution of citric acid* with either *calcined magnesia* or *carbonate of magnesia*, with heat, avoiding excess, and crystallizing by evaporation in the usual manner.

2. (Dorvault.) *Citric acid* (cryst.), 100 parts; heat it in a capsule until it liquefies, then stir in of *calcined magnesia*, 29 parts (or, *carbonate*, 64 parts), and after the mass has become solid and cold, reduce it to powder, and preserve it from the air.

3. (Thevenot.) *Citric acid* (dried and powdered), 3 parts; *calcined magnesia*, 1 part; mix, and preserve it in well-closed bottles.

Prop., &c. Citrate of magnesia is a mild and agreeable laxative; its secondary effects resemble those of the carbonate. *Dose.* As a purgative, ½ to 1 oz. A solution of this salt in water, sweetened and flavoured, forms *Magnesian Lemonade.*

MAGNESIA (Citrate of,—Effervescing). Syn. *Magnesiæ Citras Effervescens*,—Lat. *Prep.* 1. *Citric acid* (dried and powdered), 7 parts; *heavy carbonate of magnesia*, 5 parts; mix, and preserve in well-corked bottles.

2. (*Extemporaneous.*) *Citric Acid* (cryst.), 20 gr.; *carbonate of magnesia*, 14 gr.; mix in a tumbler of *cold water*, and drink the mixture whilst effervescing. A pleasant saline.

Obs. The dry white powder sold as citrate of magnesia in the shops, is quite a different preparation to the above, and *does not contain a particle of citric acid.* The following formula is that of a wholesale London drug-house that does largely in this article:—

Calcined magnesia, 1¼ *lb.* (or *carbonate*, 2 *lb.*); *powdered tartaric acid*, 1½ *lb.*; *bicarbonate of soda*, 1 *lb.*; dry each article by a gentle heat, then mix them, pass the mixture through a fine sieve in a warm dry room, and keep it in well-corked bottles. A few drops of *essence of lemon*, and 3 *lb.* of *finely powdered sugar* are commonly added to the above quantity. This addition renders it more agreeable. If *citric acid* was employed in this preparation, instead of tartaric acid, it would be unobjectionable. Its sale as *citrate of magnesia* is a gross fraud.

MAGNESIA (Boro-citrate of). Syn. *Magnesiæ Boro-citras*,—Lat. *Prep.* (Cadet.) *Boracic Acid* (in powder), 113 gr.; *calcined magnesia*, 80 gr.; mix in a porcelain capsule, and add enough of a solution of *citric acid*, 260 gr., in *water*, 3½ pints, to form a thin paste; then add the remainder of the citric solution, and gently evaporate, with constant stirring, to dryness. A cooling saline, and in small doses, emmenagogue and lithontriptic. *Dose.* As an aperient, 3 to 6 dr.

MAGNESIA (Phosphate of). Syn. *Magnesiæ Phosphas*,—Lat. *Prep.* 1. From the mixed solutions of *phosphate of soda* and *sulphate of magnesia*, allowed to stand for some time. Small, colourless, prismatic crystals.

2. (Niemann.) By saturating *dilute phosphoric acid* with *carbonate of magnesia*, and evaporating the solution to dryness. An amorphous mass.

Obs. The above compounds somewhat differ from each other in composition, and in solubility. The neutral phosphate is soluble in about 15 parts of cold water, and less of boiling. Phosphate of magnesia exists in the grains of the cereals, and in considerable quantity in beer. It is also found in guano. *Dose.* 10 to 20 gr.; in caries, rickets, &c.

MAGNESIA (Ammonio-phosphate of). Syn. *Magnesiæ et Ammoniæ Phosphas,*—Lat. This compound falls as a white crystalline precipitate whenever *ammonia* or its *carbonate* is added, in excess, to a solution of a *salt of magnesia* which has been previously mixed with a *soluble phosphate,* as that of soda. It subsides immediately from concentrated solutions, but only after some time from dilute ones.

Prop., &c. Ammonio-phosphate of magnesia is very slightly soluble in pure water; when heated it is resolved into *bibasic phosphate* or *pyrophosphate of magnesia,* and is vitrified at a strong red heat. It is found in wheaten bran, guano, potatoes, &c., and occasionally forms one of the varieties of urinary calculi.

MAGNESIA (Potassio-tartrate of). Syn. *Magnesiæ Potassio-tartras, M. et Potassæ Tartras,*—Lat. *Prep.* From *cream of tartar* (in powder), 7 parts; *carbonate of magnesia,* 2 parts; *water,* 165 parts; boiled until the solution is complete, and then evaporated and crystallized. A mild aperient. *Dose.* 1 to 5 dr.; in scurvy, &c.

MAGNESIA (Silicate of). There are several *native silicates of magnesia,* more or less pure, of which, however, none is directly employed in medicine. *Meerschaum* and *steatite* or *soap-stone* are well-known varieties. *Serpentine* is a compound of silicate and hydrate of magnesia. The minerals *augite* and *horneblende* are double salts of silicic acid, magnesia, and lime, with some protoxide of iron. The beautiful crystallized mineral called *chrysolite* is a silicate of magnesia, coloured with protoxide of iron. *Jade* is a double silicate of magnesia and alumina, coloured with sesquioxide of chromium.

MAGNESIA (Sulphate of). Syn. *Epsom Salt; Sal Epsomensis; Magnesiæ Sulphas,*—Ph. L. E. & D. *Physical Salt, Bitter Purging do., Salts, Epsom Salts,*—Vulgo. *Vitriolated Magnesia, Sal Catharticum, S. C. Amarum, S. Anglicum, S. Seidlitzense, Magnesia Vitriolata,*—Obs. var. This compound was originally extracted from the saline springs of Epsom, Surrey, by Dr. Grew, in 1695. It is now exclusively prepared on the *large scale,* and from either magnesian limestone, or the residual liquor the sea-salt works.

Prep. 1. From *Dolomite* or *Magnesian lime-stone.*—*a.* The *mineral,* broken into fragments, is heated with a sufficient quantity of *dilute sulphuric acid* to convert its *carbonates* into *sulphates;* the *sulphate of magnesia* is washed out of the mass with *hot water,* and the solution, after defecation, is evaporated and crystallized.

b. The *lime-stone,* either simply broken into fragments, or else, calcined (burnt), and its constituent quicklime and caustic magnesia converted into *hydrates* by sprinkling (slaking) it with *water,* is treated with a sufficient quantity of *dilute hydrochloric acid* to dissolve out *all* the lime without touching the magnesia; the residuum of the latter, after being washed and drained, is dissolved in *dilute sulphuric acid,* and crystallized as before.

c. The *mixed hydrates* (see *b*) are digested in a *solution of sulphate of iron,* with agitation, until *all* the magnesia is dissolved; from the solution crystals of *sulphate of magnesia* are obtained, as before. The last two methods are included in the patent of Dr. William Henry, of Manchester, (1816,) and are admirable in situations in which hydrochloric acid may be obtained at an exceedingly low rate, as in the neighbourhood of soda works.

2. From *Bittern.*—*a.* The *residual liquor* or *mother-water of sea-salt* is boiled for some hours in the pans which are used during the summer for the concentration of brine; the saline solution is then skimmed and decanted from some common salt which has been deposited, after which it is concentrated by evaporation, and, finally, run into wooden coolers; in about 36 hours, 1-8th part of Epsom salts usually crystallizes out. This is called "*singles.*" By re-dissolving this in *water,* and re-crystallization, "*doubles,*" or Epsom salts fit for the market are obtained. A *second crop* of crystals may be procured by adding *sulphuric acid* to the *mother-liquor,* and re-concentrating the solution, but this is seldom had recourse to in England. Bittern yields fully 5 parts of sulphate of magnesia for every 100 parts of common salt that has been previously obtained from it.

b. A *concentrated solution of sulphate of soda* is added to *bittern,* in equivalent proportion to that of the chloride of magnesium in it, and the mixed solution is evaporated at the temperature of 122° Fahr. (Ure); cubical crystals of *common salt* are deposited as the evaporation proceeds, after which, by further concentration, and repose, regular crystals of sulphate of magnesia are obtained.

c. A sufficient quantity of *calcined* and *slaked magnesian lime-stone* is boiled in *bittern* to displace the hydrochloric acid from the magnesia, and the liquid is evaporated, &c., as before. This is a very economical process.

Prop. Small acicular crystals, or (by careful crystallization) large four-sided rhombic prisms; colourless; odourless; transparent; slightly efflorescent; extremely bitter and nauseous; when heated it fuses in its water of crystallization, the larger portion of which readily passes off, but one equivalent of water is energetically retained; at a high temperature it runs into a species of white enamel; it dissolves in its own weight of cold water, and in 3-4ths of that quantity of boiling water; it is insoluble in both alcohol and ether. Sp. gr. 1·66.

Pur. Sulphate of magnesia is soluble in an equal weight of water at 60° Fahr., by which it may be distinguished from sulphate of soda, which is much less soluble. Shaken in the cold with water and carbonate of baryta or of lime, an alkaline solution of carbonate of soda is obtained when Glauber salt is present. Digested in alcohol, the filtered liquid does not yield a precipitate with nitrate of silver, nor burn with a yellow flame, and evaporates without residue. "Not deliquescent in the air." (Ph. L.) "Sulphuric acid dropped into the solution should not expel any fumes of hydrochloric acid. 100 gr. dissolved in water, and mixed with a boiling solution of carbonate of soda, yield 34 gr. of carbonate of magnesia when dried." (Ph. L. 1836.) 100 gr. of the pure crystallized sulphate yield 16¼ gr. of calcined magnesia. (Pereira.) "10 gr., dissolved in 1 fl. oz. of water, and treated with a solution of carbonate of ammonia, are not *entirely* precipitated by 280 minims of solution of phosphate of soda." (Ph. E.)

Uses, &c. Sulphate of magnesia is an excellent cooling purgative, and sometimes proves diuretic and diaphoretic. *Dose.* 1 *dr.* to 1 *oz.*, as a purgative, or an antidote in poisoning by lead. Large doses should be avoided. Instances are on record of their having proved fatal. Dr. Christison mentions the case of a boy 10 years old, who swallowed 2 *oz.* of salts, and died within 10 minutes. The best *antidote* is an emetic. A small quantity of Epsom salts, largely diluted with water (as a drachm to ½ pint or ¾ pint), will usually purge as much as the common dose. This increase of power has been shown by Liebig to result rather from the quantity of water than the salt. *Pure* water is greedily taken up by the absorbents; but water holding in solution saline matter is rejected by those vessels, and consequently passes off by the intestines.

Obs. The selection of the process for the preparation of sulphate of magnesia must, necessarily, chiefly depend on the locality, and on the resources of the manufacturer. In all cases, however, the proper quantity of the materials employed to effect decomposition (*hydrochloric acid, sulphuric do., sulphate of soda, &c.*) must be determined by previous trials on the small scale, without which, loss and disappointment is almost sure to be experienced.

Oxalic acid has occasionally been mistaken for Epsom salt, with fatal results. They may be readily distinguished from each other by the following characteristics:—

EPSOM SALT.	OXALIC ACID.
Tastes extremely bitter and nauseous.	*Tastes* extremely sour.
Turns milky when dissolved in water and mixed with carbonate of soda or carbonate of potash; and after a time, a white sediment subsides.	*Effervesces* when mixed with carbonate of soda or carbonate of potash, and the liquid in a few seconds becomes transparent.

MAGNESIA (Ferro-sulphate of). Syn. *Magnesiæ Ferro-sulphas*,—Lat. *Prep.* 1. *Epsom salt*, 1¼ *lb.; water*, 1 fl. oz.; melt in a porcelain vessel, add of *protosulphate of iron* (cryst., powdered), 1 *oz.*, stir until the whole is liquefied, then remove the vessel from the fire, and allow it to cool very slowly.

2. *Sulphate of iron*, 1 *oz.; water*, 1¼ fl. oz.; dissolve, in the cold, and stir the solution with *Epsom salt*, 1 *lb.;* lastly, throw the crystals on a sieve to drain. A chalybeate aperient. *Dose.* 1 to 8 dr.

MAGNESIA (Tartrate of). Syn. *Magnesiæ Tartras, Magnesia Tartarica*,—Lat. *Prep.* By saturating a *solution of tartaric acid* with *carbonate of magnesia*, and gently evaporating to dryness. It is only very slightly soluble in water. *Dose.* "20 to 60 gr., or more;" "in painful chronic maladies of the spleen." (Pereira, ex Radmacher.) The *effervescing tartrate of magnesia* commonly sold under the name of "*citrate*," is noticed at *page* 737.

MAGNESIA AND QUININE (Ferro-sulphate of). Syn. *Magnesiæ et Quinæ Ferro-sulphas*,—Lat. *Prep.* Take of *sulphate of quinine*, 1½ dr.; *rectified spirit*, 1 fl. oz.; *dilute sulphuric acid*, q. s.; dissolve, add of *syrup*, 1 fl. dr., and stir the mixture with *ferro-sulphate of magnesia* (cryst.), 1 *lb.;* lastly, partially dry it on an inverted hair-sieve, and preserve it from the air. As an aperient in debilitated habits. *Dose.* 1 *dr.* to 1 *oz.* The last two preparations are not definite compounds, and are undeserving of the names given to them.

MAGNESIA AND POTASSA (Boro-tartrate of). Syn. *Magnesiæ et Potassæ Boro-tartras,*—Lat. *Prep.* (M. Garod.) *Boro-tartrate of potassa*, 100 parts; *water*, 600 parts; *carbonate of magnesia*, 24 parts; dissolve by heat, filter, and gently evaporate to dryness. It is made into a medicinal lemonade with a little *citric acid* or *lemon juice*, and some *syrup of lemon peel.*

MAGNESIAN APERIENT (Effervescing). *Prep.* 1. *Heavy carbonate of magnesia*, 2 *lb.; tartaric acid* and *double refined lump sugar*, of each, 1½ *lb.; bicarbonate of soda* (dried without heat), 1 *lb.;* each separately dried and in very fine powder; *essential oils of orange and lemon*, of each, ½ fl. dr.; mix well in a warm dry situation, pass the whole through a sieve, put it into warm dry bottles, and keep them well corked.

2. As the last, but substituting *calcined magnesia*, 1 *lb.*, for the heavy carbonate, and adding *sugar*, ¾ *lb.* The preceding furnish a very pleasant effervescing saline draught.

3. (*Moxon's.*)—*a.* Take of *sulphate of magnesia*, 2 *lb.;* dry it by a *gradually increased* heat, powder, add of *tartaric acid* (also dried and powdered), 1¼ *lb.; calcined magnesia*, ½ *lb.; finely powdered white sugar*, 3 *lb.; bicarbonate of soda* (dried without heat), 1 *lb.; essence of lemon*, 1 dr.; mix, and proceed as before.

b. (Durande.) *Carbonate of magnesia*, 1 part; *bicarbonate of soda, tartrate of soda and potassa* (sel de Seignette), and *tartaric acid*, of each, 2 parts; mix as before.

c. (Pharm. Journ.) *Sulphate of magnesia* and *bicarbonate of soda*, of each, 1 *lb.; tartaric acid*, ½ *lb.;* mix as before. The last two are much less agreeable than the others.

4. (M. Rogé's.) *Carbonate of magnesia*, 2 parts; *calcined magnesia*, 4 parts; *citric acid*, 13 parts: *lump sugar*, 25 parts; *essence of lemon*, q. s. to flavour. Very agreeable. This is known as *Rogé's Purgatif.*

Obs. The above are very useful and popular medicines in indigestion, heartburn, nausea, habitual costiveness, dyspepsia, &c. *Dose.* ½ to 2 dessert-spoonfuls, thrown into a tumbler 3 parts filled with cold water, rapidly stirred and drunk whilst *effervescing*, early in the morning fasting, or between breakfast and dinner.

MAGNESIAN LEMONADE. A solution of *citrate of magnesia*, flavoured with *lemon*, and *sweetened.* The effervescing citrate and tartrate of magnesia are frequently called "*effervescing magnesian lemonade.*" See *Lemonade* (Aperient), and *above.*

MAGNESIUM. Syn. *Magnium, Talcium.* The metallic base of magnesia. The existence of this metal was demonstrated by Sir H. Davy, in 1808; but it was first obtained in sufficient quantity to examine its properties, by Bussy, in 1830.

Prep. 5 or 6 pieces of *potassium* or *sodium*, about the size of peas, are introduced into a test tube, and covered with small fragments of *chloride of magnesium;* the latter is then heated to near its point of fusion, when the flame of the lamp is applied to the potassium, so that its vapour may pass through the stratum of heated chloride; when the vivid incandescence that follows is over, and the whole has become cold, the mass is thrown into *water*, and the insoluble metallic portion collected and dried.

Prop., &c. In colour and lustre it resembles silver; it is malleable; fusible at a red heat; unaffected by dry air and by cold water; burns with brilliancy in oxygen gas, yielding *oxide* or *protoxide of magnesium* (*magnesia*); inflames spontaneously in chlorine, yielding *chloride of magnesium;* it dissolves in the acids with the evolution of hydrogen gas, and pure salts of magnesia result.

MAGNESIUM (Bromide of). Syn. *Magnesii Bromidum,*—Lat. *Prep.* By dissolving *calcined magnesia* in *hydrobromic acid;* or by adding *calcined magnesia*, in excess, to a solution of *bromide of iron*, gently heated; the solution is filtered and gently evaporated to dryness. Alterative and resolvent properties have been attributed to it.

MAGNESIUM (Chloride of). Syn. *Muriate of Magnesia; Magnesiæ Hydrochloras, Magnesii Chloridum,*—Lat. *Prep.* (Liebig.) By dissolving *magnesia* in *hydrochloric acid*, evaporating to dryness, adding an *equal weight* of *hydrochlorate of ammonia*, projecting the mixture into a red hot platinum crucible, and continuing the heat till a state of tranquil fusion is attained. On cooling it forms a transparent, colourless, and very deliquescent mass, which is anhydrous, and soluble in alcohol.

Obs. Without the addition of the hydrochlorate of ammonia, it is impossible to expel the last portion of the water, without at the same time driving off the chlorine, in which case nothing but magnesia is left. The fused mass should be poured out on a clean stone, and when solid, broken into pieces, and at once transferred to a warm dry bottle. The P. Cod. orders the *hydrochloric solution* to be evaporated to the sp. gr. 1·384, and to be put, whilst still hot, into a wide-mouthed flask to crystallize. *Dose.* 1 to 4 dr.; as a laxative.

MAGNESIUM (Fluoride of). *Prep.* By direct solution of *magnesia* or its *carbonate* in *hydrofluoric acid.*

MAGNESIUM (Iodide of). Syn. *Magnesii Iodidum,*—Lat. *Prepared* in the same manner as the *bromide,* from *hydriodic acid* and *magnesia.*

MAGNESIUM (Sulphuret of). Syn. *Magnesii Sulphuretum,*—Lat. *Prep. Calcined magnesia,* 5 parts; *sulphur,* 4 parts; fuse together in a covered crucible. *Dose.* 4 to 12 gr.; in chronic exanthemata, hooping-cough, &c.

MAGNET. Syn. *Magnes,*—Lat. Besides its application to the loadstone, this name was formerly given to several compounds used in medicine.—*Arsenical magnet* (*magnes arsenicalis*), a substance once used as a caustic, consisted of *common antimony, sulphur,* and *arsenious acid,* fused together until they formed a sort of glass. *Magnes epilepsiæ* was native cinnabar.

Magnets have been *used* with apparent advantage in toothache, neuralgia, rheumatism, spasmodic asthma, and several other diseases. For the first, a single *bar* or *staff magnet* is commonly applied to the tooth or gum; but in the others a *compound magnet* or *magnetic* battery is employed. *Magnetic rings, bracelets, collars, girdles, &c.,* are made of several artificial magnets, with their opposite poles placed in contact, and inclosed in silk or linen.

MAGNETIC ADEPS. This substance is made by pouring *melted lard,* in a small stream, into *cold water,* placing the thin fragments thus obtained in a sieve covered with paper, or other suitable apparatus, and exposing it to the air for 3 or 4 months, or longer. *Used* to make mercurial ointment. It speedily "*kills*" 30 or 40 times its weight of quicksilver.

MAHOGANY. This is the wood of *Swietenia mahogoni* (Linn.), a native of the hotter parts of the new world. The *extract* is astringent, and has been used in tanning, and as a substitute for cinchona bark. The *wood* is chiefly employed for furniture and ornamental purposes, and, occasionally, in shipbuilding.

Imitations of *mahogany* are made by staining the surface of the inferior woods by one or other of the following methods:—

1. Warm the *wood* by the fire, then wash it over with *aquafortis,* let it stand 24 hours to dry, and polish it with *linseed oil* reddened *by digesting alkanet root* in it; or instead of the latter, give the wood a *coat of varnish,* or *French polish* which has been tinged of a mahogany colour with a little *aloes* and *annotta.*

2. *Socotrine aloes,* 1 *oz.: dragon's blood,* ½ *oz.; rectified spirit,* 1 pint; dissolve, and apply 2 or 3 coats to the *surface of the wood,* previously well smoothed and polished; lastly, finish it off with *wax* or *oil tinged with alkanet root.*

3. *Logwood,* 2 *oz.; madder,* 8 *oz.; fustic,* 1 *oz.; water,* 1 gall.; boil 2 hours, and apply it several times to the wood boiling hot; when dry, *slightly* brush it over with a *solution of pearlash,* 1 *oz.,* in *water,* 1 quart; dry, and polish as before.

4. As the last, but using a *decoction* of *logwood,* 1 *lb.,* in *water,* 5 pints. The tint may be BRIGHTENED by adding a little vinegar or *oxalic acid,* and DARKENED by a *few grains* of *copperas.*

Stains and *spots* may be taken out of mahogany furniture with a little *aquafortis* or *oxalic acid* and *water,* by rubbing the part with the liquid, by means of a cork, till the colour is restored; observing afterwards to well wash the wood with *water,* and to dry it and polish it as before.

MAIZE. Syn. *Indian Corn, Turkey do.; Zea, Triticum Turcicum,*—Lat. The seeds of *zea mays* (Linn.) Like the other corn plants, it is a species of grass (*gramineæ*), the albumen of which is sufficiently large and farinaceous to be ground into flour.

Maize is extremely nutritious, and although it is poorer in proteine matter than wheat, it is, of all the cereal grains, the richest in fatty oil, of which it contains about 9%. (MM. Dumas and Payen.) It is remarkable for its fattening quality on animals, but is apt to excite slight diarrhœa in those unaccustomed to its use. Its *meal* is the "*polenta*" of the shops. The *fine flour* is used by the biscuit-bakers. The *young ears* are also roasted and boiled for food.

MALAGMA. A poultice or emollient

application; recently applied by certain quacks to a notorious advertised plaster.

MALAMIC ACID. See *Aspartic Acid.*

MALAMIDE. Same as *Asparagin.*

MALEIC ACID. Syn. *Malæic Acid.* A peculiar acid obtained by distilling malic acid by a quick fire. A solution of *maleic acid* passes over into the receiver, from which crystals may be obtained by evaporation. It is soluble in water, alcohol, and ether, and possesses a sour taste. Heat resolves it into water and *anhydrous maleic acid.* If kept long fused at a low temperature, it passes into a crystalline mass of *fumaric* acid. It forms salts with the bases termed *maleates,* which are mostly insoluble.

MALIC ACID. Syn. *Acidum Malicum,*—Lat. This acid exists in the juice of many fruits and plants, either alone, or associated with other acids, or with potassa or lime.

Prep. 1. (Everitt.) The *stalks* of *common garden rhubarb* are peeled, and ground or grated to a pulp, which is subjected to pressure; the juice is heated to the boiling point, neutralized with *carbonate of potassa,* mixed with *acetate of lime,* and the insoluble oxalate of lime which falls is removed by filtration; to the clear and nearly colourless liquid, *solution of acetate of lead* is next added as long as a precipitate (*malate of lead*) continues to form; this is collected on a filter, washed, diffused through water, and decomposed by *sulphuric acid,* avoiding excess, the last portion of lead being thrown down by a *stream* of *sulphuretted hydrogen;* the filtered liquid is, lastly, carefully evaporated to the consistence of syrup, and left in a dry atmosphere until it becomes converted into a solid and somewhat crystalline mass of malic acid. If *perfectly pure malic acid* is required, the *malate of lead* must be crystallized before decomposing it with sulphuretted hydrogen. *Prod.* 20,000 gr. of the *peeled stalks* yield 12,500 gr. of *juice,* of which one imperial gallon contains 11,139¼ gr. of dry malic acid.

2. (Liebig.) The *impure solution of the acid,* as it exists in vegetable juices after clarification, is converted into *acid malate of ammonia,* by neutralizing one-half of it, and mixing it with the other half unneutralized. This salt forms larger crystals than the neutral malate, and is easily decoloured by any of the ordinary processes.

3. (Winckler.) The *juice of the mountain ash* (sorbus aucuparia,—*Linn.*), immediately after the fruit has turned red, but still unripe, is heated to the boiling point, skimmed, filtered, nearly neutralized with *ammonia,* and precipitated with a solution of 1 *part* of *acetate of lead* to every 72 *parts* of *juice;* the filtered liquid is again precipitated with *nitrate of lead;* the whole is next allowed to stand until it forms a mass of crystals, which are washed, dried, powdered, suspended in water, and decomposed by a *current of sulphuretted hydrogen;* the liquid is again filtered, neutralized with *ammonia,* decoloured with *animal charcoal,* a second time precipitated with *nitrate of lead,* and the resulting *malate of lead* decomposed by *sulphuretted hydrogen,* as before; the solution is, lastly, filtered, evaporated, and crystallized. *Prod.* Fully 2% of the weight of juice employed, in *crystallized malic acid.*

Prop., &c. Malic acid is slightly deliquescent, very soluble in water, soluble in alcohol, and has a pleasant acidulous taste. The aqueous infusion soon gets mouldy by keeping. When kept fused for some time at a low heat, it is converted into *paramaleic,* or *fumaric acid;* and when quickly distilled, it yields *maleic acid,* while *fumaric acid* is left in the retort. With the bases malic acid forms salts called *malates.* Of these the *acid malate of ammonia* is in large beautiful crystals; *malate of lead* is insoluble in cold water, but dissolves in warm dilute acid, from which it separates on cooling in brilliant silvery crystals; *acid malate of lime* also forms very beautiful crystals, freely soluble in water; *neutral malate of lime* is only sparingly soluble in water; the first is obtained by dissolving the latter in hot dilute nitric acid, and allowing the solution to cool very slowly.

Malic acid may be obtained from the juice of apples and several other sorts of fruit, by processes similar to the above.

MALLEABILITY. The peculiar property of metals which renders them capable of extension under the hammer. See *Metals.*

MALMSEY. See *Wines.*

MALT. Syn. *Bina, Byne, Brasium, Maltum,*—Lat. Corn which has become sweet, from the conversion of a portion of its starch into sugar, in consequence of incipient germination. Barley is the grain usually employed for this purpose.

Proc. The *grain* is steeped in *water* contained in large wooden or stone cisterns, for a period of from 40 to 60 hours, depending on the temperature of the weather, or until it becomes sufficiently swollen and soft enough to be easily pierced with a needle, or crushed between the thumb and finger without yielding a milky juice. The water is then drawn off, and the *swollen barley* is laid upon the stone floor of a suitable apartment called the *couch,* to the depth of 12 to 16 inches, where it is allowed to remain till the *acrospire* or rudiments of the *plumula* shoot forth. During this period the grain is at first turned every 24 hours, and afterwards 2 or 3 times a day, and at each turning the layer is spread out more and more, until it is reduced to the depth of about 3 or 4 inches. The sprouted grain is next removed to the malt kiln, and dried in a thin layer, until quite hard. By the process of drying the vitality of the seed is destroyed, and it may then be preserved without suffering further change. *Product.* Good barley yields about 80% by weight, and 109% by measure, of dried and sifted malt. Of the loss by weight, 12% must be referred to water existing in the raw grain.

Var. Independently of variations of quality, or of the grain from which it is formed, malt is distinguished into varieties depending on the heat of the kiln employed for its desiccation. When dried at a temperature ranging between 90 and 100° Fahr., it constitutes "*pale malt;*" when all the moisture has exhaled, and the heat is raised to from 120 to 125°, "*yellow,*" or "*pale amber malt,*" is formed; when the heat ranges between 135 and 140°, the product receives the name of "*amber malt;*" at 145 to 165°, "*amber-brown,*" or "*pale brown malt,*" is obtained. When the grain is dried at a still higher temperature, it forms "*brown malt;*" and when the heat is sufficient to blacken or discolour it, it is known as "*patent malt.*" In the preparation of the last variety the heat is sometimes pushed as high as even 430 to 435° Fahr.

Qual. Good malt has an agreeable smell, and a sweet taste; it is round and full in the grain, and is moderately brittle between the teeth. The admixture of *unmalted* with *malted* grain may be discovered by throwing a little into water,—*malt* floats on water, but *raw barley* sinks in it. The only certain method, however, of determining the value of malt, is to ascertain the amount of *soluble matter* which it contains, by direct experiment. This varies from 62 to 70%, and for good malt is never *less* than 66 to 67%. If we assume the quarter of malt at 324 *lb.*, and the average quantity of soluble matter at 66%, then the total weight of soluble matter will be fully 213¾ *lb.* per quarter; but as this "in taking on the form of gum and sugar" during the process of mashing, "chemically combines with the elements of water, so the extract, if evaporated to dryness, would reach very nearly 231 *lb.;* and this reduced to the basis of a barrel of 36 gallons, becomes, in the language of the brewer, 87 *lb.* per barrel, which, however, merely means, that the wort from a quarter of malt, if evaporated down to the bulk of a barrel or 36 gallons, would weigh 87 *lb.* more than a barrel of water." (Ure.)

Assay. 1. A small quantity of the sample being ground in a coffee or pepper mill, 100 gr. are accurately weighed, and dried by exposure for about 1 hour at the temperature of boiling water. The *loss in weight,* in grains, indicates the quantity of MOISTURE *per cent.* This, in good malt, should not exceed 6½ gr.

2. A *second* 100 gr. is taken and stirred up with about ½ pint of *cold* water; the mixture is then exposed to the heat of boiling water for about 40 minutes; after which it is thrown on a *weighed* filter, and the undissolved portion washed with a little hot water; the undissolved portion with the filter is then dried at 212° Fahr., and weighed. The *loss in weight,* less the per centage of moisture last found, taken in grains, gives the *per centage* of SOLUBLE MATTER. This should not be less than 66 gr. The same result will be arrived at by evaporating the filtered liquid and "washings" to dryness, and weighing the residuum.

3. A *third* 100 gr. is taken and mashed with about ½ pint of water at 160° Fahr., for 2 or 3 hours; the liquid is then drained off, the residue gently squeezed, and the strained liquid, evaporated to dryness, as before, and weighed. This gives the *per centage* of SACCHARINE, and should not be less than about 71 gr., taking the above average of malt as the standard of calculation.

Uses, &c. Malt is chiefly employed in the arts of brewing and distillation. Both *brown* and *patent malt* are merely used to colour the worts produced from *pale malt.* 1 *lb.* of *patent malt,* mashed with 79 *lb.* of *pale malt,* imparts to the liquor the colour and flavour of *porter.* The paler varieties of malt contain the largest quantity of saccharine matter. After the malt has been kiln-dried, the acrospire and roots may be removed by means of a sieve. Before malt is mashed for beer, it is ground in a mill. It has also been proposed to employ malt, instead of raw-grain, far fattening domestic animals, and as food for their young and those in a sickly state. Independently of dextrine and sugar, good malt contains about $\frac{1}{500}$th part of diastase, "which seems closely to resemble," in its catalytic agency, "the animal principle *pepsine*, to the influence of which the action of the gastric juice is now almost universally assigned by chemists." According to Dr. Ure, the failures of experiments in this direction have arisen from the ignorance of the experimentalists of the "most important elements involved in the investigation;" viz., that "diastase cannot exert its peculiar power, except under the influence of water at a somewhat high temperature" (165° to 170° Fahr.) Without availing ourselves of these facts, malt is, of course, less economical as food than raw barley; since a small portion of its carbon is lost in the process of germination. Infusion of malt (*sweet wort*, *malt tea*) is laxative, and has been recommended as an antiscorbutic and tonic. It has been given with great advantage in scurvy; but for this purpose good well-hopped mild beer is equally serviceable and more agreeable. See *Brewing*, *Distillation*, *Fermentation*, *&c.*

MALT LIQUORS. The *qualities* of *ale*, *beer*, and *porter*, as *beverages*, the *detection* of their *adulteration*, and the *methods* of *preparing them*, are described under their respective names and "*brewing;*" the present article will, therefore, be confined to a short notice of the *cellar management*, and the *diseases* of *malt liquors* generally.

Age. The appearance and flavour to which this term is applied, can, of course, be only given to the liquor by properly "storing" it for a sufficient time. Fraudulent brewers and publicans, however, frequently add a little *oil of vitriol* (diluted with water) to *new beer*, by which it assumes the character of an inferior liquor of the class 1 or 2 years old. *Copperas*, *alum*, *sliced lemons*, *Seville oranges*, and *cucumbers*, are also frequently employed by brewers for the same purpose.

Bottling. Clean, sweet, and dry bottles, and sound and good corks should be had in readiness. The liquor to be bottled should be perfectly clear; and if it be not so, it must be submitted to the operation of "*fining.*" When quite fine, and in good condition, the bung of the cask should be left out all night, and the next day the liquor should be put into bottles, which, after remaining 12 or 24 hours, covered with sheets of paper to keep out flies and dust, must be securely corked down. *Porter* is generally wired over. The wire for this purpose should be "annealed" and *not* resilient. If the liquor is intended for exportation to a hot climate, the bottles should remain filled for 2 or 3 days, or more, before corking them. The *stock* of *bottled liquor* should be stored in a cool situation; and a *small quantity* to meet present *demands* only, should be set on their sides in a warmer place to ripen. *October beer* should not be bottled before Midsummer, nor *March beer* till Christmas.

Cloudiness. Add a handful of *hops* boiled in a gallon of the *beer*, and in a fortnight fine it down.

Fining. See *Clarification*, and *Brewing* (*p.* 169).

Flatness. When the liquor is new, or has still much undecomposed sugar left in it, a sufficient remedy is to remove it into a warmer situation for a few days. When this is not the case, 2 or 3 pounds of *moist sugar* (foots), may be "rummaged" into each hogshead. In this way a second fermentation is set up, and in a few days the liquor becomes brisk, and carries a head. This is the plan commonly adopted by publicans. On the *small scale*, the addition of a few grains of *carbonate of soda* or of *prepared chalk*, to each glass, is commonly made for the same purpose; but in this case, the liquor must be drunk within a few minutes, else it becomes again flat and insipid. This may be adopted for home-brewed beer which has become sour and vapid.

Foxing or *bucking.* The spontaneous souring of worts or beer during their fermentation or ripening, to which this name is applied, may generally be remedied by adding to the liquor some *fresh hops* (scalded), along with some *black mustard seed* (bruised). Some persons use a little *made mustard*, or a *solution of alum* or of *catechu*, or a *little diluted sulphuric acid;* and in a week or 10 days afterwards further add some *bean-flour*, *treacle*, or *moist sugar.*

Frosted beer is recovered by change of situation; by the addition of some *hops boiled in a little sweet wort;* or, by adding a little *moist sugar* or *treacle* to induce a fresh fermentation.

Heading. This is added to thin and vapid beer to make it bear a frothy head. The most innocent, pleasant, and effective addition of this sort, is a mixture of *pure ammonia-citrate of iron* and *salt of tartar*, about equal parts, in the proportion of only a few grains to a quart. The composition commonly used by the publicans for this purpose is noticed at *p.* 561.

Improving. This is the trade synonym of "*adulteration*" and "*doctoring.*" Nevertheless there are cases in which "improvement" may be made without affecting the wholesome character of the liquor. Of this kind is the addition of hops, spices, &c., during the maturation of beer that exhibits a tendency to deteriorate. For this purpose some persons cut a *half-quartern loaf* into slices, and after toasting them very high, place them in a coarse linen bag along with ½ *lb.* of *hops*, and 2 *oz.* each of *bruised ginger*, *cloves*, and *mustard seed*, and suspend the bag by means of a string a few inches below the surface of the beer (a hogshead), which is then bunged close. The addition of a *little ground capsicum* in the same way is also a real improvement to beer, when judiciously made.

Mustiness. To each hogshead, racked into clean casks, add 1 *lb.* of *new hops* boiled in a gallon of the liquor, along with 7 *lb.* of *newly-burnt charcoal* (coarsely bruised and the fine dust sifted off), and a 4-lb. *loaf of bread* cut into thin slices and toasted rather black; "rouse up" well every day for a week, then stir in of *moist sugar*, 3 or 4 *lb.*, and bung down for a fortnight.

Recovering. This is said of unsaleable beer when rendered saleable, by giving it "*head*" or removing its "*tartness.*"

Ripening. This technicality in its application to the regular maturation of beer is noticed under "*storage.*" It is also used to express that condition by which liquors already mature, are rendered brisk, sparkling, or fit and agreeable for immediate use. In the language of the cellar, malt liquors are said to be "*up*," when they are well charged with gaseous matter and bear a frothy head. These qualities depend on the undecomposed sugar undergoing fermentation, which when active, can only be of comparatively short duration, and should, therefore, be repressed rather than excited in beers not required for immediate consumption. When we desire to give "*briskness*" to these liquors, whether in cask or bottle, it is only necessary to expose them for a few days to a slight elevation of temperature, by removing them, for instance, to a warmer apartment. This is the plan successfully adopted by "bottlers." The addition of a small lump of *white sugar* to *each bottle of ale* or *beer*, or a tea-spoonful of *moist sugar* to *each bottle* of *porter*, just before corking it, will render it fit for drinking in a few days in ordinary weather, and in 2 or 3 days in the heat of summer. A *raisin* or a *lump of sugar candy* is often added to each bottle with a like intention. The Parisians bottle their beer one day, and sell it the next. For this purpose, in addition to the sugar as above, they add 2 or 3 drops of *yeast.* Such bottled liquor must, however, be drunk *within* a week, or else stored in a very cold place; as it will otherwise burst the bottles, or blow out the corks. (See *p.* 169.)

Ropiness. A little *infusion of catechu* or of *oak bark*, and some *fresh hops*, may be added to the beer, which in a fortnight should be rummaged well, and the next day "fined" down.

Sourness. Powdered chalk, *carbonate of soda*, *salt of tartar*, or *pearlash*, is commonly added by the publicans to the beer, until the acidity is nearly removed, when 4 or 5 *lb.* of *moist sugar* or *foots* per hogshead are "rummaged" in, together with sufficient *water* to disburse double the amount of the outlay and trouble. Such beer must be soon put on draught, as it is very apt to get flat by keeping. *Oyster shells* and *egg shells* are also frequently used by brewers for the same purpose. To remove the acidity of beer, on the *small scale*, a few grains of *carbonate of soda* per glass may be added just before drinking it.

Storing. The situation of the *beer-cellar* should be such as to maintain its contents at a *permanently uniform temperature* ranging between 44° and 50° Fahr., a condition which can only be ensured by choosing for its locality an underground apartment, or one in the centre of the basement portion of a large building. See *Brewing*, *Fermentation*, and *Wines.*

Vamping. Half fill casks with the old liquor, fill them up with some newly brewed, and bung close for 3 weeks or a month.

MANDELIC ACID. Formobenzoilic or formobenzoic acid. (See *p.* 486.)

MANGANESE. Syn. *Manganesium*, *Manganium*, *Manganum*,—Lat. A hard, brittle, grayish-white metal, discovered by Gahn in the black oxide of manganese of commerce.

Prep. Reduce *oxide of manganese* (or preferably the *calcined carbonate*) to fine powder, make it into a paste with *oil*, adding about 1-10th of its weight of *calcined borax*, place the mixture in a Hessian crucible lined with *charcoal*, lute on the cover, and expose it to the strongest heat of a smith's forge for 2 hours; when cold, break the crucible and preserve the metallic button in *naphtha.*

Prop., *&c.* Very oxidable; fuses with great difficulty; unaffected by cold water; dilute sulphuric acid dissolves it with great energy, and the evolution of hydrogen.

Sp. gr. 8·013. In an oxidized state manganese is abundant in the mineral kingdom, and traces of it have been found in the ashes of plants, and in mineral waters.

The salts of manganese may be easily prepared in a state of purity by dissolving the precipitated carbonate in the acids. Most of them are soluble and several are crystallizable.

Tests. The salts of protoxide of manganese are distinguished as follows:—1. Caustic potassa, soda, and ammonia give white precipitates, insoluble in excess, and quickly becoming brown, and finally, nearly black, on exposure to the air. The presence of sal ammoniac interferes with the operation of these tests.—2. Ferrocyanide of potassium gives a white precipitate.—3. Sulphuretted hydrogen fails to precipitate acid solutions, and precipitates neutral solutions only imperfectly; but in alkaline solutions it gives a bright flesh-coloured insoluble precipitate, which becomes dark brown on exposure to the air.—4. Hydrosulphuret of ammonia, in neutral solutions, also yields a similar precipitate, which is very characteristic.—5. A compound of manganese fused with borax in the outer flame of the blowpipe, gives a bead, which appears of a violet-red colour whilst hot, and upon cooling acquires an amethystine tint; this colour is lost by fusion in the inner flame.—6. Heated upon platinum foil with a little carbonate of soda, in the outer flame, it yields a green mass whilst hot, which becomes bluish green when cold.

MANGANESE (Acetate of). Syn. *Acetate of Protoxide of Manganese; Manganii Acetas, Manganum Aceticum,*—Lat. *Prep.* 1. By neutralizing *concentrated acetic acid* with *carbonate of manganese,* and evaporating the solution so that crystals may form. Pure.

2. By mixing a *solution of sulphate of manganese* with a *solution of acetate of lime.*

Prop., &c. The crystals, when pure, are of a pale-red colour; permanent in the air; soluble in alcohol, and in 3½ parts of water; and possess an astringent and metallic taste. *Dose.* 5 to 10 gr., as an alterative, hæmatinic, &c.

MANGANESE (Carbonate of). Syn. *Carbonate of Protoxide of Manganese; Manganesii Carbonas,*—Lat. *Prep.* (Liebig.) Reduce the *black oxide of manganese* of commerce, to fine powder, and after washing it in *water acidulated with hydrochloric acid,* dissolve it in *strong hydrochloric acid,* and evaporate the resulting solution to dryness; dissolve the residuum in *water,* and add to the solution sufficient *carbonate of soda* to precipitate all the iron present; digest the mixed precipitate in the remainder of the liquid, filter, add *hydrosulphuret of ammonia* until it begins to produce a flesh-coloured precipitate, then filter, and add *solution* of *carbonate of soda* as long as a precipitate falls; lastly, well wash the newly formed *carbonate* in water, and dry it by a gentle heat.

2. By directly precipitating a *solution of the chloride* with *carbonate of soda,* and washing and drying the powder, as before.

Prop., &c. A pale buff or cream-coloured powder; insoluble in water; freely soluble in acids; exposed to a strong heat it loses its carbonic acid, absorbs oxygen, and is converted into the *red oxide.* It is chiefly employed in the preparation of the other salts of manganese. (See *below.*)

MANGANESE (Chloride of). Syn. *Protochloride of Manganese, Hydrochlorate of do., Muriate of do.; Manganesii Chloridum, M. Hydrochloras, Maganum Chloratum,*—Lat. *Prep.* 1. By saturating *hydrochloric acid* with *carbonate of manganese;* the solution is gently concentrated by evaporation, when crystals may be obtained, or it is at once evaporated to dryness; in either case the product must be placed in warm, dry, stoppered bottles, and preserved from the air.

2. From the *dark brown residual liquid* of the process of obtaining *chlorine* from binoxide of manganese and hydrochloric acid; this liquid is evaporated to dryness and then slowly heated to dull redness in an earthen vessel, with constant stirring, and kept at that temperature for a short time; the grayish-looking powder thus obtained is treated with *water,* and the solution separated from sesquioxide of iron and other insoluble matter by filtration; if any iron still remains, a little *carbonate of manganese* is added, and the whole boiled for a few minutes; the filtered solution is then treated as before. This is the least expensive and convenient source of this salt, as also of the *carbonate.*

Prop., &c. Rose-coloured tabular crystals; inodorous; very soluble both in water and alcohol; very deliquescent; when gradually heated to fusion, the whole of the water is expelled and *anhydrous chloride of manganese* remains; at a red heat it slowly suffers decomposition. Astringent, tonic, hæmatinic, and alterative. *Dose.* 3 to 10 gr.; in scorbutic, syphilitic, and certain chronic cutaneous affections; anæmia, chlorosis, &c.

Obs. The red solution formed when

sesquioxide of manganese is digested in *dilute hydrochloric acid*, in the cold, is regarded as SESQUICHLORIDE OF MANGANESE. It is decomposed by heat. PERCHLORIDE is obtained by mixing *permanganic acid* and *hydrochloric acid*, and conducting the evolved gas through a tube cooled to —4° Fahr. It is gaseous at a higher temperature, and is decomposed by moisture.

MANGANESE (Fluoride of). This has been formed by Dumas and Wöhler, but possesses no practical interest.

MANGANESE (Iodide of). Syn. *Manganesii Iodidum*,—Lat. *Prep.* By dissolving the *carbonate* in *hydriodic acid*, and evaporating the filtered liquid in vacuo or out of contact with air. *Dose.* 1 to 3 gr.; in anæmia, chlorosis, &c., occurring in scrofulous subjects.

MANGANESE (Oxides of). Manganese forms seven distinct compounds with oxygen,—5 *oxides* and 2 *acids*. The *protoxide*, or *green oxide of manganese* ($Mn + O$), is formed when either of the other oxides of manganese is mixed with charcoal, and exposed in a covered crucible to a white heat for some time. It rapidly oxidizes by exposure to the air, possesses strong basic properties, and readily dissolves in the liquid acids, forming the ordinary salts of manganese, many of which have a beautiful pink colour. On the addition of alkalies to these compounds *hydrated protoxide of manganese* (*manganesii oxydum hydratum*) falls as a white powder, which speedily absorbs oxygen and becomes brown unless *entirely* excluded from the air.—*Sesquioxide of manganese* ($Mn_2 + O_3$) is brown or brownish-black, and is found, ready formed, in the mineral kingdom. It is the residuum left in the retort when the black oxide is heated to moderate redness in the process of making oxygen gas.—*Binoxide of manganese* ($Mn + O_2$) is the well-known *black oxide* or *peroxide* of commerce, and is also found in the mineral kingdom. (See *below*.)—The *red*, or *fourth oxide of manganese* (*oxidum manganoso-manganicum*, $Mn_3 + O_4$), is another native compound. It may be prepared artificially by exposing the binoxide or sesquioxide to a white heat. It has a reddish-brown colour, and is incapable of forming salts. — *Varvacite* ($Mn_4 + O_7$) is another oxide which occurs as a mineral production. The remaining two oxygen compounds of manganese are *manganeseous acid* and *manganesic acid*.

MANGANESE (Binoxideof). Syn. *Black Oxide of Manganese, Peroxide of do.; Manganesii Binoxydum*,—Ph. L. *M. Oxydum*,—Ph. E. *Manganese, Tritoxide of do., Black Magnesia, Magnesia Nigra, M. Vitriariorum*,—Obs. This is the only oxide of manganese that is directly employed in the arts. It is a very plentiful mineral production, and is found in great abundance in some parts of the West of England. The manganese of the shops is prepared by washing, to remove the earthy matter, and grinding in mills. The blackest samples are esteemed the best. It is chiefly used to supply oxygen gas, and in the manufacture of glass and chlorine; in dyeing, and to form the salts of manganese. It has been occasionally employed in medicine, chiefly externally, in itch and porrigo, made into an ointment with lard. It has recently been highly recommended by Dr. Erigeler in scrofula. Others have employed it as an alterative and tonic with variable success. When slowly introduced into the system during a lengthened period, it is said to produce paralysis of the motor nerves. (Dr. Coupar.) *Dose.* 3 to 12 gr., or more, thrice daily, made into pills.

Pur. Native binoxide of manganese (*pyrolusite*) is usually contaminated with variable proportions of argillaceous matter, carbonate of lime, oxide of iron, silica, and sulphate of baryta, all of which lower its value as a source of oxygen, and for the preparation of chlorine. The richness of this ore, can, therefore, be only determined by an assay for its principal ingredient. (See *below*.) "It is soluble in hydrochloric acid, evolving chlorine." (Ph. L.) "Muriatic acid by the aid of heat dissolves it almost entirely, disengaging chlorine; heat disengages oxygen." (Ph. E.)

Assay. There are several methods adopted for this purpose, among which the following recommend themselves as being the most accurate and convenient:—

1. A *portion of the mineral* being reduced to very fine powder, 50 gr. of it are put into the little apparatus employed for the *analysis of carbonates* described at *page* 203, together with about ½ fl. oz. of *cold water*, and 100 gr. of *strong hydrochloric acid*, the latter contained in the little tube (*b*); 50 gr. of *crystallized oxalic acid* are then added, the cork carrying the chloride of calcium tube fitted in, and the whole quickly and accurately weighed or counterpoised; the apparatus is next inclined so that the acid contained in the small tube may be mixed with the other contents of the flask, and the reaction of the ingredients is promoted by the application of a gentle heat; the disengaged chlorine resulting from the mutual decomposition of

the hydrochloric acid and the binoxide of manganese, converts the oxalic acid into carbonic acid gas, which is dried in its passage through the chloride of calcium tube before it escapes into the air. As soon as the reaction is complete, and the residual gas has been driven off by a *momentary* ebullition, the apparatus is allowed to cool, when it is again *carefully* and *accurately* weighed. The *loss of weight* in grains, if doubled, at once indicates the *per centage* richness of the mineral examined in PURE BINOXIDE OF MANGANESE; or more correctly, every grain of carbonic acid gas evolved represents 1·982 gr. of the *binoxide.* (See *below.*)

2. (Fresenius & Will.) The apparatus employed is the *alkalimeter* figured at *page* 19, and described at *page* 42. The operation is similar to that adopted for the assay of alkalies by the same parties, and is a modification of the oxalic acid and sulphuric acid test for manganese, originally devised by M. Berthier. The standard weight of binoxide of manganese recommended to be taken by Messrs. Fresenius & Will is 2·98 grammes, along with 6·5 to 7 grammes of neutral oxalate of potassa. The process, with the quantities altered to adapt it for employment in the laboratories of these countries, is as follows:—*Binoxide of manganese* (in very fine powder), 50 gr.; *neutral oxalate of potassa* (in powder), 120 gr.; these are put into the flask *A* (see *Engr., p.* 19) along with sufficient *water* to about 1-4th fill it; the flasks *A* and *B* (the latter containing the *sulphuric acid*) are then corked *air-tight*, and thus connected into one apparatus, the whole is *accurately weighed.* The opening of the tube *b*, being then closed by a small lump of *wax*, a little *sulphuric acid* is sucked over from the flask *B* into the flask *A;* the disengagement of oxygen from the manganese immediately commences, and this reacting upon the *oxalic acid* present, converts it into *carbonic acid gas*, which passing through the concentrated sulphuric acid in the flask *B*, which robs it of moisture, finally escapes from the apparatus through the tube *d*. As soon as the disengagement of carbonic acid ceases, the operator sucks over a fresh portion of *sulphuric acid*, and this is repeated at short intervals, until bubbles of gas are no longer disengaged. The little wax stopper is now removed, and suction is applied at *h* until all the carbonic acid in the apparatus is replaced by common air. When the whole has become cold, it is again *weighed.* The *loss of weight*, doubled, indicates the amount of pure *binoxide of manganese* in the sample as before. (See *below.*)

3. (Prof. Otto.) 50 gr. of the *sample*, reduced to very fine powder, are mixed in a glass flask, with *hydrochloric acid*, 1½ fl. oz., diluted with ½ oz. of *cold water*, and portions of *pure protosulphate of iron* from a weighed sample, *immediately* added; at *first* in excess, and *afterwards*, in smaller doses, until the liquid ceases to give a blue precipitate with red prussiate of potash, or to evolve the odour of chlorine; heat being employed towards the end of the process. The *quantity of protosulphate* consumed is now ascertained by again weighing the sample. If the binoxide examined was pure, the loss of weight will be 317 gr.; but if otherwise, the per centage of pure oxide may be obtained by the rule of three. Thus; suppose only 298 gr. of the *sulphate* were consumed, then

317 : 100 : : 298 : 94,

and the richness of the sample would be 94%. The per centage value of the oxide for evolving chlorine may be obtained by multiplying the weight of the consumed sulphate of iron by 0·2588, which, in the above case, would give 76% of chlorine. For this purpose as well as for *chlorimetry* the sulphate of iron is best prepared by precipitating it from its *aqueous solution* with *alcohol*, and drying it out of contact with air until it loses its alcoholic odour.

Obs. Before applying the above processes, it is absolutely necessary that we ascertain whether the binoxide examined contains any *carbonates*, as the presence of these would vitiate the results. This is readily determined by treating it with a little *dilute nitric acid;*—if effervescence ensues one or more carbonates are present, and the sample, after being weighed, must be digested for *some time* in *dilute nitric acid* in excess, and then carefully collected on a filter, washed, and dried. It may then be assayed as before. The *loss of weight* indicates the *quantity* of *carbonates* present, with sufficient accuracy for technical purposes. The determination of this point is the more important, as these contaminations not merely lessen the richness of the mineral in pure binoxide of manganese, but also cause a considerable waste of acid when it is employed in the manufacture of chlorine.

MANGANESE (Phosphate of). Syn. *Phosphate of Protoxide of Manganese; Manganesii Phosphas*,—Lat. *Prep.* By precipitating a *solution of sulphate of manganese* with a *solution of phosphate of soda.* It must be preserved from the air. *Dose.* 3 to 12 gr.; in anæmia, rickets, &c.

MANGANESE (Sulphate of). Syn. *Sulphate of Protoxide of Manganese; Manganesii Sulphas, Manganum Sulphuricum*,—Lat. *Prep.* 1. By dissolving *carbonate of manganese* in *dilute sulphuric acid,* and evaporating the filtered solution so that crystals may form, or at once gently evaporating it to dryness. Pure.

2. (*Commercial.*) By igniting *binoxide of manganese* (pyrolusite) mixed with about 1-10th of its weight of *powdered coal* in an iron crucible or gas-retort, and digesting the residuum of the calcination in *sulphuric acid,* with the addition after a time of a little *hydrochloric acid;* the solution of *sulphate of manganese* thus obtained, after defecation, is evaporated to dryness, and heated to redness as before; the mass, after ignition, is crushed small, and treated with *water;* the solution is nearly pure, the whole of the iron having been reduced into the state of insoluble peroxide. *Used* by the calico-printers. Cloth steeped in the solution and afterwards passed through a solution of chloride of lime is dyed of a permanent brown.

Prop., &c. Pale rose-coloured crystals, furnishing a solution of a rich amethystine colour. With sulphate of potassa it forms a double salt (*manganese alum*). *Dose.* As an alterative and tonic, 5 to 10 gr.; as a cholagogue cathartic, 1 to 2 dr., dissolved in water, either alone or combined with infusion of senna. According to Mr. Ure, its action is prompt and soon over; 1 dr. of it occasions, after the lapse of an hour or so, one or more liquid bilious stools. In *large doses* it occasions vomiting, and in *excessive doses* it destroys life by its caustic action on the stomach. (Dr. G. C. Mitscherlich.) It has been administered with manifest advantage in torpor of the liver, gout, jaundice, syphilis, and certain skin diseases; and, combined with iron, in anæmia, chlorosis, rickets, &c.

MANGANESE (Sulphuret of). Syn. *Manganesii Sulphuretum,*—Lat. This is a natural mineral production; but may also be procured by igniting a mixture of 1 part of *sulphate of manganese* and 1 part of *charcoal.*

MANGANESE (Tartrate of). Syn. *Manganesii Tartras,*—Lat. *Prep.* By saturating a *solution of tartaric* with *moist carbonate of manganese.* Alterative and tonic. *Dose.* 4 to 12 gr.

MANGANESEOUS ACID. Syn. *Manganic Acid.* This acid ($Mn + O_3$) is formed whenever an *alkali,* or an *alkaline salt* capable of suffering decomposition by heat, is heated to redness along with an *oxide of manganese.* The addition of *nitre* or *chlorate of potassa* facilitates this change. The deep green saline mass thus obtained is a salt of this acid, and its solution in water, when concentrated *in vacuo,* yields small green crystals. When the crude salt is put into a large quantity of water, *hydrated binoxide of manganese* subsides, and a deep purple solution *of manganesic acid* (MINERAL CHAMELEON) is formed. (See *below.*)

MANGANESIC ACID. Syn. *Permanganic Acid.* This compound ($Mn_2 + O_7$) is best obtained as follows:—Mix *binoxide of manganese,* 8 parts, with *chlorate of potassa,* 7 parts (both in fine powder); add of *hydrate of potassa,* 10 parts (dissolved in a little water); evaporate to dryness, and expose the residuum (reduced to powder), to a *low* red heat, in a platinum crucible; dissolve the calcined mass (*manganate* or *manganeseate of potassa*) in a large quantity of water; decant the clear solution, evaporate until crystals begin to form on the surface, and set the whole aside to cool. The crystals thus obtained are *permanganate* or *manganesate of potassa,* from which the acid may be separated by converting them into *permanganate of baryta,* and by carefully decomposing this salt by *dilute sulphuric acid.* (Gregory.) Both the acid and its salts possess a fine red or purple colour, and bleaching properties, and are rapidly decomposed by organic matter.

MANGE. An animalcular eruptive disease, corresponding to the itch in man, common to several domestic animals, more especially the dog and horse. Like the itch it is contagious. The *causes* are confinement, diet, and bad living. The *treatment* should consist in the immediate removal of the cause, the frequent use of *soft soap and water* followed by frictions with *sulphur ointment* or by *solution of chloride of lime,* the administration of purgatives, and a change to a restorative diet.

MANGEL WURZEL. Syn. *Hybrid Beet, Root of Scarcity.* The *beta hybrida,* a variety of *beta vulgaris* (Linn.) or *common beet.* The *root* abounds in sugar, and has been used in Germany as a substitute for bread in times of scarcity. In these countries it is chiefly cultivated as food for cattle. The *young leaves* are eaten as spinach.

MANHEIM GOLD. See *Dutch Gold.*

MANIA. See *Insanity.*

MANIPULATION. See *Analysis, Laboratory, Testing, &c.*

MANNA. Syn. *Manna,*—Lat. "The

juice flowing from the incised bark" of "*fraxinus rotundifolia*, and *f. ornus* (?), hardened by the air." (Ph. L.) The finest variety of this drug is known as *flake manna* (manna canellata, m. cannulata) and occurs in pieces varying from 1 to 6 inches long, 1 or 2 inches wide, and ½ to 1 inch thick. It has a yellowish-white or cream colour; an odour somewhat resembling honey, but less pleasant; a sweet, mawkish taste; and is light, porous, and friable. It is laxative in *doses* of 1 to 2 oz.

A *factitious manna*, made of a mixture of *sugar*, *starch*, and *honey*, with a *very small* quantity of *scammony* to give it odour and flavour, and to render it purgative, has been lately very extensively offered in trade, and met with a ready sale.

MANNACROUP. A granular preparation of *wheat* deprived of bran, *used* as an article of food for children and invalids. (Brande.)

MANNA RESIN. A peculiar substance found in manna, and on which its disagreeable odour and flavour, and laxative quality are supposed to depend.

MANNITE. Syn. *Grenadine*, *Manna Sugar*, *Mushroom do.; Mannita*,—Lat. A sweet, crystallizable substance, found in manna and in several other vegetable productions. It may be formed artificially by exciting the viscous fermentation in a solution of common sugar.

Prep. 1. Digest *manna* in *boiling rectified spirit*, and filter or decant the solution whilst hot; the *mannite* crystallizes as the liquid cools in tufts of slender, colourless needles.

2. (Ruspini.) *Manna*, 6 *lb.; cold water* (in which the white of an egg has been beaten), 3 *lb.;* mix, boil for a few minutes, and strain the syrup through linen whilst hot; the strained liquid will form a semi-crystalline mass on cooling; submit this to strong pressure in a cloth, mix the cake with its own weight of *cold water*, and again press it; dissolve the cake thus obtained in *boiling water*, add a little *animal charcoal*, and filter the mixture into a porcelain dish set over the fire; lastly, evaporate the filtrate to a pellicle, and set the syrup aside to crystallize. Large quadrangular prisms; perfectly white and transparent.

Prop., &c. Mannite has a powerfully sweet and agreeable taste; dissolves in 5 parts of cold water, and about half that quantity of boiling water; freely soluble in hot, and slightly so in cold alcohol; fuses by heat without loss of weight; with sulphuric acid it combines to form a new acid-compound. It is *distinguished* from the true *sugars* by its aqueous solution not being susceptible of the vinous fermentation, and not possessing the property of rotary polarization. When pure it is perfectly destitute of purgative properties. It is now extensively imported from Italy, and is chiefly used to cover the taste of nauseous medicines, and as a sweetmeat.

MANURES. Substances added to soils to increase their fertility. The *food of vegetables*, as far as their organic structure is concerned, consists entirely of inorganic compounds; and no organized body can serve for the nutrition of vegetables, until it has been, by the process of decay, resolved into certain inorganic substances. These are *carbonic acid*, *water*, and *ammonia*, which are well known to be the final products of putrefaction. But, even when these are supplied to vegetables, their growth will not proceed unless certain mineral substances are likewise furnished in small quantities, either by the soil, or the water used to moisten it. Almost every plant, when burned, leaves ashes, which commonly contain *silica*, *potassa*, and *phosphate of lime;* often, also, *magnesia*, *soda*, *sulphates*, and *oxide of iron.* These mineral bodies appear to be essential to the existence of the vegetable tissues; so that plants will not grow in soils destitute of them, however abundantly supplied with carbonic acid, ammonia, and water. According to Liebig, the *carbon* of plants is *wholly* derived from carbonic acid, which is either absorbed from the *atmosphere*, and from *rain water*, by the *leaves*, or from the *moisture* and *air* in the soil, by the *roots*. Its carbon is retained and assimilated with the body of the plant, while its oxygen is given out in the gaseous form; this decomposition being always effected under the influence of light at ordinary temperatures. The *hydrogen* and *oxygen* of vegetables, which, when combined with carbon, constitute the ligneous, starchy, gummy, saccharine, oily, and resinous matters of plants, are derived from water chiefly absorbed by the roots from the soil. The *nitrogen* of vegetables is derived chiefly, if not exclusively, from ammonia, which is supplied to them in rain, and in manures, and which remains in the soil till absorbed by the roots. *Ordinary manures* may be regarded the more *valuable* according to the quantity of azotized matter which they contain; and also in proportion as the decomposition of quaternary substances acts gradually, and agrees in its action with the progress of vegetation. It is the azote *in combination* contained in manures which is the more especially useful; and the proportion of this, when ascertained, indicates the richness of such substances as fertilizing agents. In reference to the mineral constituents of soils, it appears that a soil is fertile or barren for any given plant according as it contains those mineral substances that enter into its composition. Thus, "the *ashes of wheat-straw* contain much *silica* and *potassa*, whilst the *ashes of the seeds* contain *phosphate of ammonia and magnesia* (ammonio-phosphate of lime). Hence, if a soil is deficient in any one of these, it will not yield wheat. On the other hand, a good crop of wheat will exhaust the soil of these substances, and it will not yield a second crop till they have been restored, either by manure or by the gradual action of the weather in disintegrating the subsoil. Hence the benefit derived from fallows and from the rotation of crops.

"When, by an extraordinary supply of any one mineral ingredient, or of ammonia, a large crop has been obtained, it is not to be expected that a repetition of the same individual manure next year will produce the same effect. It must be remembered, that the unusual crop has exhausted the soil probably of all the other mineral ingredients, and that they also must be restored before a second crop can be obtained.

"The salt most essential to the growth of the potato is the double phosphate of ammonia and magnesia; that chiefly required for hay is phosphate of lime; while for almost all plants potash and ammonia are highly beneficial."

From these principles we "may deduce a few valuable conclusions in regard to the chemistry of agriculture. *First*, by examining the *ashes of a thriving plant*, we discover the mineral ingredients which must exist in a soil to render it *fertile* for that plant. *Secondly*, by examining a soil, we can say at once whether it is *fertile* in regard to any plants the ashes of which have been examined. *Thirdly*, when we know the defects of a soil, the deficient matters may be easily obtained and added to it, unmixed with such as are not required. *Fourthly*, the *straw*, *leaves*, *&c.*, of any plant, are the *best manure for that plant*, since every vegetable extracts from the soil such matters alone as are essential to it. This important principle has been amply verified by the success attending the use of wheat-straw, or its ashes, as manure for wheat, and of the clippings of the vines as a manure for the vineyard. When these are used (in the proper quantity) no other manure is required. *Fifthly*, in the *rotation of crops*, those should be made to follow which require different materials; or a *crop* which *extracts little or no mineral matter*, such as *peas*, should come after one which *exhausts the soil* of its *phosphates* and *potassa*."

Of the chemical manures now so much used, BONE-DUST supplies the *phosphates* which have been extracted by successive *crops of grass* and *corn*, the whole of the bones of the cattle fed on these crops having been derived from the soil; its gelatin also yields ammonia by putrefaction. BRAN is a very valuable manure, especially for *potatoes*, as it contains much of the ammoniaco-magnesian phosphate. GUANO acts as a source of *ammonia*, containing much oxalate and urate of ammonia, with some *phosphates*. NIGHTSOIL and URINE, especially the latter, are most valuable for the *ammonia* they yield, as well as for *phosphates* and *potassa;* but are very much neglected in this country, although their importance is fully appreciated in Belgium, France, and China. NITRATE OF SODA probably acts by its alkali replacing potassa. It is also possible that its acid may yield nitrogen to plants, although we possess at present no evidence of this, and, indeed, no evidence that plants can derive their nitrogen from any other source than from ammonia.

All *organic substances* may be employed as manures; preference being, however, given to those abounding in *nitrogen*, and which readily decay when mixed with the soil.

The *analysis* of *manures*, *soils*, and the *ashes of plants*, for the purpose of ascertaining their composition and comparative value, is not easily performed by inexperienced parties; but a rough approximation to their contents, *sufficiently accurate for all practical purposes*, may be generally made by such persons with proper care and attention. See *Agriculture*, *Guano*, *Soils*, *Testing*, *&c.*

MANURES (Artificial). Various formulæ belonging to this head will be found dispersed, under their respective names, throughout this work. The following are additional ones:—

1. (Dr. Anderson.) *Sulphate of ammonia*, *common salt*, and *oil of vitriol*, of each, 10 parts; *chloride of potassium*, 15 parts; *gypsum* and *sulphate of potassa*, of each, 17 parts; *saltpetre*, 20 parts; *crude Epsom salt*, 25 parts; *sulphate of soda*, 33 parts. For clover.

2. (Huxtable.) *Crude potash*, 28 *lb.;*

common salt, 1 cwt.; *bone dust* and *gypsum*, of each, 2 cwt.; *wood ashes*, 15 bushels. For either corn, turnips, or grass.

3. (Prof. Johnstone.) *Sulphate of soda* (dry), 11 *lb.; wood ashes*, 28 *lb.; common salt*, ¾ cwt.; *crude sulphate of ammonia*, 1 cwt.; *bone dust*, 7 bushels. As a substitute for guano.

4. (Law's *Superphosphate.*) See *Coprolite.*

5. (*Fertilizing Powder.*) A mixture of *very fine bone dust*, 18 parts; *calcined gypsum* and *sulphate of ammonia*, of each, 1 part. The seed is ordered to be steeped in the "drainings" from a dunghill, and after being drained, but whilst still wet, to be sprinkled with the powder, and then dried.

6. (*Liquid Guano.*) See *Flowers.*

7. (*Sulphated Bones.*) See *Superphosphate of Lime.*

MANUS CHRISTI. *Prep.* 1. (*Manus Christi perlatæ.*) Drops, or pastilles, made of pearls, sugar, and rose water.—2. (*Manus Christi simplices.*) Rose drops, or pastilles, made into flat cakes.

MANUS DEI. The name of an old resolvent plaster compounded of *ammoniacum, galbanum, mastic, myrrh, oil, olibanum, wax*, and some other substances.

MANUSCRIPTS (Restoration of). See *Writing.*

MAPLE ACID. See *Aceric Acid.*

MAPS. These, as well as *architect's* and *engineer's designs, plans, sections, drawings, &c.*, may be *tinted* with any of the simple liquid colours, mentioned under the heads—*stains, velvet colours*, and *water colours;* preference being given to the first, on account of their transparency not interfering with the lines beneath them. To *prevent* the *colours* from *sinking* and *spreading*, which they usually do on common paper, the latter should be wetted 2 or 3 times with a sponge dipped in *alum water* (3 or 4 *oz.* to the pint), or with a *solution of white size;* observing to dry it carefully after each coat. This tends to give lustre and beauty to the colours. The colours for this purpose should also be thickened with a little *gum water.* Before *varnishing maps* after colouring them, 2 or 3 coats of clean size should be applied with a soft brush, —the *first* one to the back.

MARASCHINO. Syn. *Marasquin*,—Fr. A delicate liqueur spirit distilled from a peculiar cherry growing in Dalmatia, and afterwards sweetened with sugar. The best is from Zara, and is obtained from the *marasca cherry* only. An *inferior quality* is distilled from a mixture of cherries and the juice of liquorice root.

MARASMUS. Emaciation with corresponding debility. A gradual wasting away of the flesh, accompanied by diminished health and vital energy, without any other apparent disease. It is more especially applied to the "decline" of infancy, childhood, and early youth. See *Atrophy, Anæmia, &c.*

MARASQUIN DE GROSEILLES. *Prep.* From *ripe gooseberries*, 1 cwt.; *black-cherry leaves*, 14 *lb.;* bruise, ferment, distil, and rectify the spirit; to each quart of the product, add of *white sugar*, 1 *lb.;* dissolved in *water*, 1½ pint. A pleasant liqueur. See *Liqueurs.*

MARATHRITES. Wine strongly flavoured with fennel, formerly used in medicine.

MARBLE. Syn. *Limestone, Hard Carbonate of Lime; Marmor, Carbonas Calcis Durus*,—Ph. L. 1836. *M. Album*,—Ph. E. & D. Marbles are merely purer and more compact varieties of limestone, which admit of being sawn into slabs, and are susceptible of a fine polish. White marble is employed for the preparation of carbonic acid, and some of the salts of lime. It contains about 65% of lime. Sp. gr. 2·70 to 2·85. The *tests* of its *purity* are the same as those already noticed under *Chalk.*

Marble is best *cleaned* with a little *soap-and-water*, to which some *ox-gall* may be added. *Acids* should be avoided. *Oil* and *grease* may be generally removed by spreading a paste made of *soft soap, caustic potash lye*, and *fuller's earth*, over the part, and allowing it to remain there for a few days; after which it must be washed off with clean water. Any defect of polish may be brought up with *tripoli*, followed by *putty powder;* both being used along with *water.*

Marble is *mended* with one or other of the compounds noticed under *Cements.*

Marble may be *stained* or *dyed* of various colours by applying coloured solutions or tinctures to the stone made sufficiently hot to make the liquid just simmer on the surface. The following are the substances usually employed for this purpose:—

Blue. Tincture or solution of litmus, or an alkaline solution of indigo.

Brown. Tincture of logwood.

Crimson. A solution of alkanet root in oil of turpentine.

Flesh colour. Wax tinged with alkanet root, and applied to the marble hot enough to melt it freely.

Gold colour. A mixture of equal parts of white vitriol, sal ammoniac, and verdigris, each in fine powder, and carefully applied.

Green. An alkaline solution or tincture of sap green; or wax strongly coloured with verdigris; or the stone is first stained blue, and then the materials for yellow stain are applied.

Red. Tincture of dragon's blood, alkanet root, or cochineal.

Yellow. Tincture of gamboge, turmeric, or saffron; or wax coloured with annotta. Success in the application of these colours requires considerable experience. By their skilful use, however, a very pleasing effect, both of colour and grain, may be produced.

MARBLING (of Books, &c.) The *edges* and covers of *books* are *marbled* by laying the colour on them with a brush, or by means of a wooden trough containing mucilage, as follows:—Provide a *wooden trough*, 2 inches deep, 6 inches wide, and the length of a super-royal sheet; boil in a brass or copper pan any quantity of *linseed* and *water* until a thick mucilage is formed; strain this into the trough, and let it cool; then grind on a marble slab any of the following colours in *table beer.* For—BLUE, *Prussian blue* or *indigo*;—RED, *rose-pink, vermilion,* or *drop lake*;—YELLOW, *king's yellow, yellow ochre, &c.*;—WHITE, *flake white*;—BLACK, *ivory black,* or *burnt lamp-black*;—BROWN, *umber, burnt do., terra di sienna, burnt do.*; black, mixed with yellow or red, also makes brown;—GREEN, *blue* and *yellow* mixed;—ORANGE, *red* and *yellow* mixed;—PURPLE, *red* and *blue* mixed. For each colour provide *two cups*,—one for the *ground colours*; the other to mix them with the *ox-gall*, which must be used to thin them at discretion. If *too much* gall is used, the colours spread: when they keep their place on the surface of the trough, on being moved with a quill, they are fit for use. All things being in readiness the *prepared colours* are successively sprinkled on the surface of the mucilage in the trough with a brush, and are waved or drawn about with a quill or stick, according to taste. When the design is thus formed, the book, tied tightly between cutting boards of the same size, is lightly pressed with its edge on the surface of the liquid pattern, and then withdrawn and dried. The *covers* may be *marbled* in the same way, only the liquid colours must be allowed to run over them. The film of colour in the trough may be as thin as possible; and, if any remains after the marbling, it may be taken off by applying paper to it before you prepare for marbling again. This process has been called "*French marbling.*"

To *diversify* the *effect*, a little *sweet oil* is often mixed with the colours before sprinkling them on, by which means a light halo or circle appears round each spot. In like manner, *spirit of turpentine*, sprinkled on the surface of the trough, produces WHITE SPOTS. By *staining* the *covers* with any of the liquid dyes, and then dropping on them, or running over them, drops of the ordinary *liquid mordants*, a very pleasing effect may be produced. *Vinegar black*, or a *solution of green copperas*, thus applied to common leather, produces BLACK SPOTS or STREAKS, and gives a similar effect with most of the light dyes. A *solution of alum* or of *tin* in like manner produces BRIGHT SPOTS or STREAKS, and *soda* or *potash water*, DARK ONES. This style has been called *Egyptian marble.*—*Soap marbling* is done by throwing on the colours, ground with a little *white soap* to a proper consistence, by means of a brush. It is much used for book-edges, stationery, sheets of paper, ladies' fancy work, &c.—*Thread marble* is given by first covering the edge uniformly of one colour, then laying pieces of *thick thread* irregularly on different parts of it, and giving it a fine dark sprinkle. When well managed, the effect is very pleasing.—*Rice marble* is given in a similar way to the last by using *rice.*—*Tree marble* is done on leather book-covers, &c., by bending the board a little in the centre, and running the marbling liquid over it in the form of vegetation. The knots are given by rubbing the end of a *candle* on those parts of the cover.—*Wax marble* is given in a similar way to thread marble, but using *melted wax*, which is removed after the book is sprinkled and dried; or a sponge charged with *blue, green,* or *red*, may be passed over. This, also, is much used for stationery work; especially for folios and quartos. The "*vinegar black*" of the bookbinders is merely a solution of *acetate of iron*, made by steeping a few *rusty nails* or some *iron filings* in *vinegar.* All the ordinary liquid colours that do not contain strong acids or alkalies, may be used, either alone or thickened with a little gum, for marbling or sprinkling books.

Sprinkling is performed by simply dipping a stiff-haired painter's brush into the colour, and suddenly striking it against a small stick held in the left hand over the work. By this means the colour is evenly scattered without producing "*blurs*" or "*blots.*"

Paper, pasteboard, &c., in sheets, are marbled and sprinkled in a similar manner to that above described, but in this case the *gum trough* must, of course, be longer. See *Stains, Sprinkles, &c.*

MARGARIC ACID. Syn. *Magarulic Acid.* A fatty acid obtained by the saponification of oils, so named by Lecanu, on account of the pearly appearance of its crystals.

Prep. 1. Dissolve *olive oil soap* in *water*, and precipitate the solution with a *solution of neutral acetate of lead;* filter, wash, and dry the precipitate (*margarate of lead*), digest it in *ether*, and decompose the residuum by *boiling-hot hydrochloric acid;* lastly, wash the *precipitated acid*, and dissolve it in *boiling alcohol;* the solution furnishes crystals on cooling.

2. Heat *hydrated stearic acid* with its own weight of *nitric acid* for some minutes; press the fatty acid which separates between folds of paper, and purify it by repeated crystallizations from *boiling alcohol.*

3. (*Commercial.*) By the distillation of *crude stearic acid.* "The humidity at the beginning of the process must be expelled by a smart heat, otherwise explosive ebullitions are apt to occur. Whenever the ebullition becomes uniform, the fire is to be moderated." (Ure.)

Prop., &c. Margaric acid forms pearly scales, soluble in cold ether and alcohol; the solution reddens litmus; it is volatile at a high temperature, and boils before being volatilized; assisted by heat it decomposes the alkaline carbonates. It fuses at 140° Fahr. With the bases it forms salts called *margarates.*

MARGARINE. Syn. *Margarate of Oxide of Glyceryle.* The solid fatty matter of certain vegetable oils, and the principal ingredient of human and goose fat.

Prep. A *hot alcoholic solution* of either of the *above fats*, or of the *concrete portion of olive oil*, deposits, as it cools, a mixture of *margarate* and *oleate of glyceryle;* it is purified by compression between the folds of bibulous paper, and solution in *hot ether.*

Prop., &c. It greatly resembles stearine, but is more fusible and pearly looking; it melts at 116° Fahr.; dissolves in cold ether, and in alcohol; and by saponification yields glycerine and *margaric acid.*

MARGARITIC ACID. Obtained, along with *elaiodic acid* and *ricinic acid*, by the saponification of castor oil. It melts at 166° Fahr., and forms soapy salts with the alkalies (*margaritates*); the other acids are oily liquids at ordinary temperatures.

MARGARITINE. Syn. *Ricino-stearine.* The solid, white, crystalline fat, which separates from *castor oil* during cold weather. By saponification it yields glycerine and *margaritic acid.*

MARGARONE. A peculiar fatty substance, obtained by distilling a *mixture* of *quicklime* and *margaric acid.* It forms pearly crystalline scales, and is incapable of saponification.

MARINE ACID. See *Hydrochloric Acid.*

MARKETING. *Directions* for the *choice* of the principal articles of food purchased in this manner, are given under their respective names, or that of the class to which they belong; the periods at which they are in *season* will be found in "*Bills of Fare.*"

MARL. A compound of *clay* and *chalk*, with sand. It is characterized by effervescing with acids. According to the predominance of one or other of its component parts, it is called *argillaceous, calcareous*, or *sandy marl.* It is very generally employed as a *manure* for *sandy soils*, more particularly in Norfolk. See *Soils.*

MARMALADE. Originally, a conserve made of quinces and sugar; now commonly applied to the conserves of other fruit, more especially to those of oranges and lemons.

Prep. Marmalades are made either by pounding the *pulped fruit* in a mortar with an *equal* or a rather larger quantity of *powdered white sugar;* or by mixing them together by heat, passing them through a hair sieve whilst hot, and then putting them into *pots* or *glasses.* The *fruit pulps* are *obtained* by rubbing the fruit through a fine hair sieve, either at once, or after it has been softened by simmering it for a short time along with a *little water.* When heat is employed in mixing the ingredients, the evaporation should be continued until the marmalade "jellies" on cooling. See *Conserves, Confections, Electuaries, Jams, Jellies*, and *below.*

Apricot marmalade; from equal parts of pulp and sugar.

Barbary marmalade; as the last.

Citron marmalade; as orange do.

Marmalade of hips; from the pulp of hips and sugar, in the same way as *confection of hips.*

Mixed marmalade; from plums, pears, and apples, variously flavoured to palate.

Orange marmalade.—1. From oranges (either Seville or St. Michael's, or a mixture of the two), by boiling the peels in syrup until soft, then pulping them through a sieve, adding as much white sugar, and boiling them with the former syrup and the juice of the fruit to a proper consistence.

2. A still *finer marmalade* is made by melting the confection of orange peel (Ph. L.), either with, or without the addition of some orange or lemon juice, and then passing it through a sieve.

Candied orange marmalade; from candied orange peel, boiled in an equal weight each of sugar and water, and then passed through a sieve.

Quince marmalade, Diacydonium; from quince flesh or pulp, and sugar, equal parts; or from the juice (*miva cydoniorum, gelatina do.*), by boiling it to ½, adding an equal quantity of white wine, and ⅔rds of its weight of sugar, and gently evaporating the mixture.

Scotch marmalade.—1. Seville orange juice, 1 quart; yellow peel of the fruit, grated; honey, 2 *lb.;* boil to a proper consistence.

2. Seville oranges, 8 *lb.;* peel them as thinly as possible, then squeeze out the juice, boil it on the yellow peels for ½ hour, strain, add white sugar, 7 *lb.;* and boil to a proper consistence.

Marmalade of sloes. Conserve of sloes. Astringent.

Transparent marmalade. Orange marmalade, well strained or clarified while hot.

Tomato marmalade. Like apricot marmalade, adding a few slices of onions and a little parsley.

Wood sorrel marmalade; Conserva foliorum lujelæ. Wood sorrel leaves, 1 *lb.;* powdered white sugar, 3 *lb.;* beat together in a mortar. Pleasant, cooling, and acidulous; has a fine red colour.

MARMORATUM. *Finely powdered marble* and *quicklime,* well beaten together; *used* as a cement or mortar. See *Mineral Marmoratum.*

MARQUETRY. Inlaid cabinet-work. See *Ivory, Pearl, Varnishes, Japanning, &c.*

MARRIAGE. Dr. Casper, of Berlin, has calculated, that the mortality among *bachelors,* from the age of 30 to 45 years, is 27 per cent.; whilst among *married men* of the same age, it is only 18 per cent. For forty-one *bachelors* who attain the age of 40 years, there are seventy-eight *married men* who attain the same age. The *advantage* in favour of married life is still more striking in persons of advanced age. At 60 years there remain but twenty-two *bachelors* for forty-eight *married men;* at 70 years, eleven *bachelors* for twenty-seven *married;* and at 80 years, only three *bachelors* against nine *married men.* (Journ. de Chim. Med.) The duration of life is also indicative of the state of the physical health enjoyed by the parties referred to; whilst the statistical returns of the number of lunatics, point still more strongly in the same direction, in reference to the superior mental condition of the benedict over the bachelor. Similar evidence exists in reference to the gentler sex. Thus, it appears indisputable, that the *married* not only *live longer,* but also *better* than those who remain the victims of "single blessedness."

MARROW (Beef). This is extensively employed by the *perfumers* in the preparation of various pommades and other cosmetics, on account of its furnishing an exceedingly bland fat, which is not so much disposed to rancidity as the other fats. It is *prepared* for *use* by soaking and working it for some time in *lukewarm water,* and afterwards, melting it in a water bath, and straining it through a piece of muslin whilst hot. When scented, it is esteemed equal to *bear's grease* for promoting the growth of the hair.

MARRUBINE. Syn. *Marrubina,*—Lat. A vegetable principle obtained from the *marrubium vulgare* (Linn.) or *white horehound.* It is said to be bitter, tonic, febrifuge, and cholagogue. *Dose.* 4 to 21 gr.; in ague, hepatic affections, &c.

MARSH GAS. See *Carburetted Hydrogen.*

MARSH'S TEST. See *Arsenious Acid* and *Tests.*

MARSH-MALLOW. Syn. *Althæa,*—Ph. L. & E. The *root* (leaves and root,—Ph. E.) of *althæa officinalis,* Linn., or *common marsh-mallow.* (Ph. L.) It is emollient and demulcent; the *decoction* is useful in irritation of the respiratory and urinary organs, and of the alimentary canal. The *flowers* as well as the *root* are reputed pectoral.

MARTIN'S POWDER. A mixture of *white arsenic* and the *powdered stems of orobanche virginiana* (Linn.), a plant common in Virginia. An American quack remedy for cancer.

MASHES. See *Veterinary Medicine.*

MASHING. See *Brewing.*

MASS. Syn. *Massa,*—Lat. This term is commonly applied in pharmacy and veterinary medicine to certain preparations which are not "made up" into their ultimate form. Thus, we have *ball masses, pill masses, &c.;* of which, for convenience, large quantities are prepared at a time, and are kept in pots or jars, ready to be divided into *balls* or *pills,* as the demands of business may require.

MASSICOT. Syn. *Masticot, Yellow*

Protoxide of Lead; Plumbi Oxydum Flavum, Cerussa Citrina, Ochra Plumbaria Factitia,—Lat. var. The dross that forms on melted lead exposed to a current of air, roasted until it acquires a uniform yellow colour. Artists often apply the same name to white lead, roasted until it turns yellow. *Used* as a pigment.

MASTIC. Syn. *Mastich, Gum do.; Mastiche,*—Lat. The "resin flowing from the incised bark of *pistacia lentiscus,* var. *chia*" (Linn.), or *lentisk tree.* (Ph. L.) It occurs in pale yellowish, transparent, rounded tears, which soften between the teeth when chewed, and giving out a bitter, aromatic taste. Sp. gr. 1·07. It is soluble in both rectified spirit and oil of turpentine, forming varnishes. It is chiefly used as a *masticatory,* to strengthen and preserve the teeth, and perfume the breath.

MASTIC. Fine mortar or cement used for plastering walls, in which the ingredients, in a pulverulent state, are mixed up, either entirely, or with a considerable portion of linseed oil. It sets very hard, and is ready to receive paint in a few days. See *Cements.*

MASTICATION. The act of chewing food, by which it not only becomes comminuted, but mixed with the saliva, and reduced to a form fit for deglutition. It has been justly regarded by the highest authorities as the first process of digestion, and one, without which, the powers of the stomach are overtasked, and often performed with difficulty. Hence the prevalence of dyspepsia and bowelly complaints among persons with bad teeth, or who "bolt" their food without chewing it. Public attention has been recently called in one of the medical journals to the position which is there assumed as a fact, that such persons furnished a greater per centage of victims to the cholera, during the late visitation of that disease, than other members of the same classes. See *Teeth, &c.*

MASTICATORIES. Syn. *Masticatoria, Pilæ Masticatoriæ,*—Lat. Substances taken by chewing them. They are employed as intoxicants, cosmetics, and medicinals; generally with the first intention. The principal masticatory used in this country is *tobacco.* In *Turkey* and several other Eastern nations, *opium* is taken in a similar manner. In *India,* a mixture of *areca nut, betel leaf,* and *lime,* performs the same duties; whilst in some other parts of the world, preparations of the cacao are employed. As COSMETICS, *orris root, cassia, cinnamon,* and *sandal wood,* are frequently chewed to scent the breath. Among MEDICINALS, *mastic* and *myrrh* are frequently chewed to strengthen the teeth and gums; *pellitory,* to relieve the toothache; and *rhubarb, ginger,* and *gentian,* to relieve dyspepsia, and promote the appetite.

Prep. 1. (Augustin.) *Mastic, pellitory,* (both in powder), and *white wax,* of each, 1 dr.; mixed by heat and divided in 6 balls. In toothache, loose teeth, &c.

2. (W. Cooley.) *Mastic, myrrh,* and *white wax,* of each, 1 part; *rhubarb, ginger,* and *extract of gentian,* of each, 2 parts; beaten up with *tincture of tolu,* q. s.; and divided into boluses or lozenges of 10 gr. each. One or two to be chewed an hour before dinner; in dyspepsia, defective appetite, &c.

3. (Quincy.) *Mastic,* 3 oz.; *pellitory* and *stavesacre seed,* of each, 2 dr.; *cubebs* and *nutmegs,* of each, 1 dr.; *angelica root,* ½ dr.; *melted wax,* q. s. to make it into small balls. As a stimulant to the gums, and in toothache.

4. *Opium, ginger, rhubarb, mastic, pellitory of Spain,* and *orris root,* of each, 1 dr.; *musk* and *ambergris,* of each, 1 gr.; *melted spermaceti,* q. s. to mix; for 6-gr. pills. As the last, and in toothache and painful gums.

MASTICHIC ACID. Syn. *Soluble Mastic Resin.* The portion of mastic soluble in alcohol. It forms about 90% of the resin. According to Johnstone it is capable of forming salts with the acids.

MASTICINE. Syn. *Neutral Mastic Resin.* The portion of mastic which is insoluble in alcohol, and which gives that substance its peculiar toughness. It is soluble in the alcoholic solution of mastichic acid.

MASTICOT. See *Massicot.*

MATCHES (Cooper's). Syn. *Sweetening Matches.* These are made by dipping strips of *coarse linen* or *canvas* into *melted brimstone.* For *use,* the brimstone on one of them is set on fire, and the match is then at once suspended in the cask, and the bung loosely set in its place. After the lapse of 2 or 3 hours, the match is removed, and the cask filled with liquor. Some persons pour a gallon or two of the liquor into the cask before "matching" it. The object is to allay excessive fermentation. The operation is commonly adopted in the Western Counties for cyder intended for shipment, or other long exposure during transport. It is also occasionally employed for inferior and "doctored" wines. See *Antiferment, Fermentation, &c.*

MATCHES (Instantaneous Light). Of these there are several varieties, of which the one best known, and most extensively used, is the common "*congreve.*" The following formulæ include all of those which have been employed during the present century, arranged under their common names:—

Chemical Matches, Chlorate Matches.—1. Take of *chlorate of potassa*, 6 parts; *sulphur* and *powdered lump sugar*, of each, 2 parts; *powdered gum arabic*, 1 part; *vermilion*, q. s. to colour. The ingredients separately reduced to fine powder, are made into a paste with a *little water*, and the tips of the matches are then dipped into the mixture.

2. (Without Sulphur.) *Chlorate of potassa*, 3 *dr.; wheaten flour*, 1 *dr.; vermilion* and *lycopodium*, of each, ½ *dr.;* make them into a paste with a little *thin mucilage*, and dip the matches into the mixture, as before. The "slips" of wood for this purpose should have been previously dipped into *melted sulphur*, or, preferably, into a solution of *Venice turpentine*, 1 *oz.*, and *camphor*, ½ *oz.*, in *oil of turpentine*, ¼ pint.

Obs. Chlorate matches are inflamed by dipping them into a little *oil of vitriol;* or by *smart* friction. The risk of spilling the acid is avoided by placing a little asbestos in the bottle, and pouring on it as much only of that liquid as the asbestos will absorb. These matches once occupied the same place that lucifers did a few years since, and that congreves do now. The *acid bottle* and *matches* were commonly sold in a case together. That man was far in advance of his neighbours who had moral courage sufficient to induce him to discard the "tinder box" and its "noisy concomitants" for the *instantaneous-light apparatus.*

Congreves, Congreve Matches, Congreve Lights. These are the prevailing matches of the present day, and are characterized by containing phosphorus in a state of minute division.

Prep. 1. (Dr. R. Boettger.) Dissolve *gum arabic*, 16 parts, in the *least possible quantity of water*, add of *phosphorus* (in powder), 9 parts, and mix by trituration; then add of *nitre*, 14 parts; *vermilion* or *binoxide of manganese*, 16 parts, and form the whole into a paste; into this the matches are to be dipped, and then exposed to dry. As soon as the matches are quite dry, they are to be dipped into very dilute copal varnish or lac varnish, and again exposed to dry, by which means they are rendered waterproof, or at least less likely to suffer from exposure in damp weather.

2. (Dr. R. Boettger.) *Glue*, 6 parts, is soaked in a little *cold water* for 24 hours, after which it is liquefied by trituration in a heated mortar; *phosphorus*, 4 parts, is now added, and rubbed down at a heat not exceeding 150° Fahr.; *nitre* (in fine powder), 10 parts, is next mixed in, and afterwards, *red lead*, 5 parts, and *smalts*, 2 parts, are further added, and the whole formed into a uniform paste, into which the matches are dipped, as before. Cheaper than the last.

3. (M. Diesel.) *Phosphorus*, 17 parts; *glue*, 21 parts; *red lead*, 24 parts; *nitre*, 38 parts. This is said to be the composition of the best *German congreves.*

4. (M. Joblonouski.) *Gum arabic* (made into mucilage), 7 parts; *phosphorus* (in powder), 4 parts; mix, add of *gelatine*, 2 parts; *chlorate of potassa* (in powder), 2 parts; make a paste, and proceed as before.

5. (M. Joblonouski.) Put *phosphorus*, 4 parts, into a wide-mouthed phial, with enough *oil of turpentine* to cover it, add of *flowers of sulphur*, 1 part, and put the phial into hot water (using great caution) until the phosphorus is melted; then cork close, and agitate well until cold, when any supernatant spirits of turpentine must be poured off. Into this *pulpy mass* the extremities of the matches are to be dipped, and when they have become *rather dry*, they are to be again dipped into the following mixture:—*Gum arabic*, 3 parts (dissolved in a little water); *chlorate of potassa*, 2 parts; *soot*, *lamp black*, or *vermilion* (rubbed up with a few drops of alcohol), 1 part; mix, and dip the tips of the matches in the paste, as before, and dry them *cautiously* in a warm apartment.

Obs. All the above inflame, *without fulmination*, when rubbed against a rough surface, and are hence termed "*noiseless congreves*" by the makers. The *products* of the first three formulæ commend themselves for their economy and safety. Those containing *chlorate of potassa* explode more readily than those without it, but are regarded as *less* safe; whilst the extreme inflammability of those containing both *sulphur* and *phosphorus* as well as the chlorate, has now led to their disuse. The matches *formerly* sold under the name of "congreves" exploded with a cracking noise, and frequently threw out small sparks of fire, which rendered them dangerous. This arose from their containing too much chlorate of potassa, and from the quantity of the igniting ingredients applied to each match being unnecessarily large. At the present time economy in the use of the igniting composition, is the chief aim of the manufacturer.

To render the small pieces of wood or pasteboard capable of being readily ignited by the combustion of the composition with which they are "tipped," they are submitted to a preliminary process. The ends of the bundles of those formed of *wood*, after being *slightly* charred by rubbing them against a red-hot iron plate, are dipped, for a moment, into as much *white wax*, melted in a suitable vessel, as will stand the $\frac{1}{10}$th or $\frac{1}{8}$th of an inch in depth, after which, being instantly well shaken and allowed to cool, they are ready for the "phosphorus composition." Sometimes they are dipped in *camphorated spirit*, or into the solution noticed under "*chlorate matches;*" to which a little *gum benzoin* and *cascarilla* are occasionally added, by way of perfume. The *common matches* are simply dipped into melted sulphur. The manufacture of *wooden splints* for matches is now almost entirely performed by machinery. *Cigar fusees* are prepared by soaking them in *water* holding some *saltpetre*, *bichromate of potash*, or *acetate of lead* in solution, preference being usually given to the first of these articles; after which they are commonly moistened with a rough *tincture of benzoin* or *cascarilla*, by which they diffuse an agreeable odour whilst burning.

Different *colouring substances* are employed to *tinge* the composition, according to the fancy of the manufacturer, as *smalts*, *red lead*, *vermilion*, *black oxide of manganese*, *soot*, *&c.*

The *phosphorus* is *reduced* to *powder* by melting it in a phial containing some *fresh urine*, by the heat of *hot water*, and agitating the whole until cold. A *solution of pure urea* employed in the same way is still more effective, but is more expensive. *Rectified spirit* is also sometimes employed for the same purpose.

The manufacture and sale of matches, containing sulphur and phosphorus, have been forbidden in Paris.

Lucifers, Lucifer Matches. These were the forerunners of the "*congreve.*" The two are, however, commonly confounded together, although quite distinct from each other. The *igniting composition* of the "*lucifer*" consists of a *mixture* of *sulphuret of antimony* and *chlorate of potassa*, (both in very fine powder,) made into a paste with a weak *solution of gum*. The body of the match is formed of *pasteboard;* and the composition is inflamed by drawing it smartly through a piece of *emery*, *glass*, or *sand paper*, folded in the middle. The ignition is attended with a sharp noise, like that of the common varieties of congreves.

Locofocos. The popular name in America for congreve matches; from *loco foci*, instead of a fire.

Prometheans. These matches were invented and brought out, some years since, by Mr. Jones, of the once celebrated "Light House," Strand.

Prep. Take of *chlorate of potassa*, and *loaf sugar*, equal parts; *vermilion*, q. s. to colour; powder each separately, mix, make a stiff paste with a *weak solution of gum arabic*, and divide it into small pieces. A number of minute oval glass beads are now made from a small thin glass tube by means of a candle and blowpipe, one end of which is closed while soft. These tubes are dipped whilst still hot into *sulphuric acid*, and the open end is then closed by the flame and blowpipe. A *slip of paper* (1 × 2 inches) is next taken, and one of the corners cut off. A little *mucilage* is then applied, and the paper is rolled into a small cylinder, leaving a hollow at the gummed end. Into this hollow, one of the glass beads surrounded with a little of the red mixture, is now gently squeezed with the fingers, and finished off by smoothing the external surface with the finger moistened with gum water. The whole is, lastly, dried. To inflame them, the bead containing the oil of vitriol at the loaded end is broken by a smart blow, and the acid coming into contact with the chlorate mixture, causes it to burst into flame. The bead and red paste together should not be larger than a barleycorn.

MATERIA HERMAPHRODITA (of Boerhaave). The "*materia saponica*" of Scheele, and the "*extractive*" of modern chemists.

MATERIA MEDICA. A collective name of the various substances, natural and artificial, employed as medicines, or in the cure of disease. In its more extended sense, it includes the science which treats of their properties, classification, and applications. The *materia medica* of the pharmacopœia is a mere list, with occasional notes, "embracing the animal, vegetable, and chemical substances, whether existing naturally, prepared in officinal chemical preparations, or sold in wholesale trade, which we (the college) direct to be used either in curing diseases, or in preparing medicines." (Ph. L.)

MATERIA PERLATA. The white precipitate which forms in the *water used to wash diaphoretic antimony* on the addition of an *acid*.

MATICO. Syn. *Soldier's Herb; Matecô, Matica, Herba Maticæ,*—Lat. The leaves of a Peruvian plant, generally believed to be the *artanthe elongata* (Miquel.), one of the *piperaceæ*. The leaves have been employed with considerable success as a mechanical external styptic; applied to leech-bites, slight cuts and other wounds, &c., and pressed on with the fingers, they seldom fail to arrest the bleeding. Matico has also been much lauded as an internal astringent and styptic, in hæmorrhages from the lungs, stomach, bowels, uterus, &c.; but as it is nearly destitute of astringent properties, its virtues in these cases must have been inferred from its external action. As an aromatic, bitter stimulant, closely resembling the peppers, it has been proposed as a substitute for cubebs and black pepper, in the treatment of diseases of the mucous membranes, piles, &c. *Dose.* ½ to 2 dr.; in powder; or under the form of infusion, tincture, or boluses.

MATURATION. Growing ripe. Amongst *surgeons*, this term is applied to the process of *suppuration*, or that which succeeds inflammation, and by which pus or matter is collected in an abscess. Warmth, irritation, and a liberal diet promote this change; cold, sedatives, and depletion, retard it. The *maturation* of *fermented liquor* is noticed under *Malt Liquors, Wines, Brewing, &c.*

MAYDEW. Syn. *Ros Majalis,*—Lat. Collected by sponges off the grass. *Used* as a cosmetic.

MEAD. Syn. *Mellina,*—Lat. An old English liquor, made from the *combs* from which the *honey* has been drained, by boiling them in water, and fermenting the saccharine solution thus obtained. It is commonly confounded with *metheglin.* Some persons add 1 *oz.* of *hops* to each gallon; and, after fermentation, a little brandy. It is then called *sack mead.* See *Metheglin.*

MEAL. The substance of edible grain ground to powder, without being bolted or sifted. *Barley meal* and *oat meal* are the common substances of this class in England. In North America the term is commonly applied to ground Indian corn, whether bolted or not. (Goodrich.) The *four resolvent meals* of old pharmacy (*quatuor farinæ resolventes*) are those of *barley, beans, linseed,* and *rye.*

MEALS. The "periods of taking food, usually adopted, in conformity with convenience and the recurrence of hunger, are those which are best adapted to the purposes of health; namely, the *morning meal,* the *mid-day meal,* and the *evening meal.*" "That these are the proper periods for meals, is evident from the fact of their maintaining their place amid the changes which fashion is constantly introducing." "If we look at these periods in another point of view, we shall find an interval of 4 hours left between them for the act of digestion and subsequent rest of the stomach. Digestion will claim between two and three hours of the interval; the remaining hour is all that the stomach gets of rest, enough, perhaps, but not too much, nor to be justly infringed. We here see a rule of diet vividly suggested, namely, to let that '*patient drudge,*' the stomach, alone during its three hours of labour and one of rest; to put nothing more into it, while the mill is at work, nor when it is in repose gathering its strength for another grind. Tease it not, fret it not, if you would keep it in good humour; and without *its* good humour, alas for *yours!* Another inference:—the maxim '*little and often*' is obviously unsound; *moderate* and *seldom,* would be more to the purpose." (Eras. Wilson.)

MEASLES. Syn. *Rubeola, Morbilli,*—Lat. This very common disease is characterized by feverishness, chilliness, shivering, head-pains, swelling and inflammation of the eyes, defluxion of sharp tears, with painful sensibility to light, oppressive cough, difficulty of breathing, and sometimes vomiting or diarrhœa. These are followed about the fourth day by a crimson rash upon the skin, in irregular crescents or circles, and by small red points or spots, which are perceptible to the touch, and which, after 4 or 5 days, go off with desquamation of the cuticle. The fever, cough, &c., often continue for some time; and unless there have been some considerable evacuations, either by perspiration or vomiting, they frequently return with increased violence, and occasion great distress and danger.

Treat. When there are no urgent local symptoms, *mild aperients, antimonial diaphoretics,* and *diluents,* should be had recourse to; but when the inflammatory symptoms are emergent, and the lungs are weak, especially in plethoric habits, blood may be taken. The *cough* may be relieved by *expectorants, demulcents,* and small doses of *opium;* and the *diarrhœa* by the administration of the *compound powder of chalk and opium;* the looseness of the bowels, however, had better not be interfered with, unless it be extreme.

Measles are most prevalent in the middle of winter, and though common to individuals of all ages, are most frequent amongst children. The plethoric, and those of a scrofulous habit, or one which has a syphilitic taint, suffer most from them.

Like the smallpox, the measles are contagious, and seldom attack the same person more than once during life. See *Rashes.*

MEASURE. Syn. *Mensura*—Lat. The unit or standard by which we estimate extension, whether of length, superficies, or volume.

1. *English Measures:—*

Table I. *English Lineal Measures.*

Inches.	Feet.	Yards.	Poles.	Furlongs.	Miles.
1·	·083	·028	·00505	·00012626	·0000157828
12·	1·	·333	·06060	·00151515	·00018939
36·	3·	1·	·1818	·004545	·00056818
198·	16·5	5·5	1·	·025	·003125
7920·	660·	220·	40·	1·	·125
63360·	5280·	1760·	320·	8·	1·

⁎ The *unit* of the above table is the yard, of which no legal standard has existed since that established by the statute, of 1824, was destroyed by the fire which consumed the two houses of parliament, in 1834.

Table II. *English Measures of Superficies.*

Square Feet.	Square Yards.	Poles.	Roods.	Acres.
1·	·1111	·00367309	·000091827	·000022957
9·	1·	·0330579	·000826448	·000206612
272·25	30·25	1·	·025	·00625
10890·	1210·	40·	1·	·25
43560·	4840·	160·	4·	1·

Table III. *English Measure of Volume.—The* Imperial Standard, *and the relative value of its divisions, including those used in Medicine, with their* equivalents *in avoirdupois and troy weight.*

♏ Minims or drops.	fʒ Fluid Drachms.	f℥ Fluid Ounces.	O. Pints.	Oij. Quarts.	C. Gallons.	Pecks.	Bushels.	Quarters.	Equivalents in *distilled water,* at 62° Fahr., in		
									Troy grains.	Avoird. weight.	
										lb.	*oz.*
1·	·01666666	·00208333	·00010416	·00005208	·00001302	—	—	—	·91146		
60·	1·	·125	·00625	·003125	·00078125	—	—	—	54·6875		
480·	8·	1·	·05	·025	·00625	—	—	—	437·5		1
9600·	160·	20·	1·	·5	·125	·0625	·015625	·001953125	8750·	1	4
19200·	320·	40·	2·	1·	·25	·125	·03125	·00390625	17500·	2	8
76800·	1280·	160·	8·	4·	1·	·5	·125	·015625	70000·	10	
	2560·	320·	16·	8·	2·	1·	·25	·03125	—	20	
		1280·	64·	32·	8·	4·	1·	·125	—	80	
			512·	256·	64·	32·	8·	1·	—	640	

⁎ The *standard unit* of the above table is the *gallon,* which is declared, by statute, to be capable of "containing *ten pounds* avoidupois weight of *distilled water,* weighed in the air at the temperature of 62° Fahr., the barometer being at 30 inches." The pound avoirdupois contains 7000 grains, and it is declared that a *cubic inch* of *distilled water,* under the above conditions, weighs 252·458 grains; hence the capacity of the *imperial gallon* and its divisions are as follows:—

Imperial gallon = 277·274 cubic inches.
" quart = 69·3185 "
" pint = 34·65925 "
Fluid ounce = 1·73296 "
" drachm = ·21662 "

†‡† The *imperial gallon* is 1-5th *larger* than the *old wine-gallon,*—1-60th *smaller* than the *old beer-gallon,* and — 1-32nd *larger* than the *old dry-measure gallon.*

2. *French Measures :—*

TABLE IV. *French Metrical or Decimal Measures of Length.*

Names.	Eq. in Mètres.	Equivalents in					
		English Inches, at 32° Fahr.	English Long Measure, at 62° Fahr.				
			Miles.	Fur.	Yds.	Feet.	Inch.
Millimètre . . .	·001	. . ·03937					
Centimètre . . .	·01	. . ·39371					
Décimètre . . .	·1	. . 3·93708					
Mètre	1·	. . 39·37079			1	0	3·37
Decamètre . . .	10·	. . 393·70790			10	2	9·7
Hectomètre . .	100·	. . 3937·07900			109	1	1·078
Kilomètre . . .	1000.	. . 39370·79300		4	213	1	10·3
Myriamètre . .	10000·	. 393707·90000	6	1	156	0	9·17

⁂ The *standard unit* of the above table is the mètre, which has been determined to be 39·37079 inches, at 32° Fahr. (Capt. Kater); the English foot is taken at 62° Fahr. The *true length* of the *mètre,* reduced to the latter temperature, is 39·370091 English inches; a number which varies from that in the table only at the fourth decimal figure. It will be perceived that the principle of nomenclature adopted in applying the names, was to prefix the *Greek* numerals to the *decimal multiples,* and the *Latin* numerals to the *decimal subdivisions.*

TABLE V. *French Metrical or Decimal Measures of Volume.*

Names.	Eq. in Litres.	Eq. in English Cubic Inches.	Equivalents in English Measures.				
			Gall.	*Pints.*	*Oz.*	*Dr.*	*Minims.*
Millilitre . . .	·001	. . ·0610					16·9
Centilitre . . .	·01	. . ·6103				2	49
Decilitre . . .	·1	. . 6·1028			3	4	10·36
Litre	1·	. . 61·028		1	15	1	43·69
Decalitre . . .	10·	. . 610·28	2	1	12	1	16·9
Hectolitre . . .	100·	. . 6102·8	22	0	1	4	49
Kilolitre . . .	1000·	. . 61028·	220	0	16	6	40
Myrialitre . . .	10000·	. . 610280·	2201 (= 275⅛ *bushels.*)				

⁂ The *standard unit* in the above table is the *litre,* or the cube of the $\frac{1}{10}$ of a mètre. The French *centiare* contains 1 square mètre,—the *are,* 100 do.,—the *hectare,* 10,000 do. The *old Paris pint* is equal to 1·678 English imperial pint.

†‡† The capacity of solids and aëriform fluids is taken in cubic inches, or feet, in England. In France, the *stere,* or *mètre cube,* equal to 35·31658 English cubic feet, is the standard unit.

3. *Miscellaneous Measures and their Equivalents :—*

Tea or coffee spoonful . . . (average) = 1 fl. dr.
Dessert " . . . . " = 2 "
Table " . . . . " = 4 "
Wine-glassful . . . . . " = 2 fl. oz.
Tea-cupful . . . . . . " = 5 "
Breakfast-cupful . . . . . " = 8 "

Tumblerful . . . . (average) = 8 fl. oz.
Basinful . . . . . . „ = 12 „
Thimbleful . . . . = $\frac{3}{4}$ fl. dr.
Pinch (of leaves and flowers) . . . = 1 dr.
Handful „ „ . . . . = 10 „
Cubic inch of water, at 62° Fahr. . . = 252·458 gr.
„ foot „ „ . . . . = 62·32106 *lb.*

Line . . . . = $\frac{1}{12}$ inch.
Barleycorn . . . . = $\frac{1}{3}$ „
Hand . . . . = 4 „
Chain . . . . = 4 Poles or 22 Yards.

MEAT BISCUITS. *Prep.* 1. The *flour* is mixed up with a rich *fluid extract of meat*, and the dough is cut into pieces and baked in the usual manner.

2. *Wheaten flour* (or preferably the whole meal), 3 parts; *fresh lean beef* or other *flesh* (minced and pulped), 2 parts; thoroughly incorporate the two by hand-kneading or machinery, and bake the pieces in a moderately heated oven. Both the above are very nutritious; the last, more especially so. 1 *oz.* makes a pint of good soup.

MEAT (Extracts of). Some preparations of this nature have been already noticed under the heads *Essences* and *Extracts;* the following are additional and highly valuable formulæ:—

Prep. 1. (Dr. Breslau.) *Young ox-flesh* (free from fat) is minced small, and well beaten in a marble mortar, at *first* alone, and afterwards with a little *cold* or *lukewarm water;* the whole is then submitted to the action of a press, and the solid residuum is treated in the same manner, with a little more *cold water;* the juice (reddish in colour) is now heated to coagulate the albumen, strained, and finally evaporated in a water bath to the consistence of an extract. As ordinary flesh contains only 1% of kreatine, while that of the heart, according to Dr. Gregory, contains from 1·37% to 1·41%, this is the part employed by Dr. Breslau. The *product* possesses an agreeable odour and taste; and is easily soluble in water.

2. (Prof. Falkland.) *Fresh lean beef* (or other flesh) recently killed, is minced very fine, and digested, with agitation, in *cold water*, 1 pint, to which *hydrochloric acid*, 6 drops, and *common salt*, 1 *dr.*, have been added; after about an hour, the whole is thrown upon a fine hair sieve, and the liquid portion allowed to drain off without pressure, the first portions that pass through being returned until the fluid, at first turbid, becomes quite clear and transparent; when all the liquid has passed through, *cold water*, $\frac{1}{4}$ pint, is gently poured on, in small portions at a time, and allowed to drain through into that previously collected. The *product* is about $\frac{3}{4}$ pint of *cold extract of flesh*, having a red colour, and a pleasant, soup-like taste. It is administered *cold* to the invalid—a tea-cupful at a time, and must on no account be warmed, as the application of even a very slight heat causes its decomposition and the separation of a solid mass of coagulated albumen. This cold extract of flesh is not only much more nutritious than ordinary beef-tea, but also contains a certain quantity of the *red colouring matter* of blood, in which there is a much larger proportion of the iron requisite for the formation of blood particles. The hydrochloric acid also greatly facilitates the process of digestion. This formula is a modification of the one recently recommended by Liebig for the preparation of a highly nutritive and restorative food for invalids.

3. (*Extractum sanguinis bovis,*—Dr. Mauthner.) Pass *fresh blood* (caught from the slaughtered animal) through a sieve, evaporate it to dryness in a water bath, and when *cold*, rub it to powder. *Dose.* 10 to 20 gr., or more, per diem, in a little water.

Obs. The above preparations are intended to supersede the inefficient compounds—beef tea, meat soups, &c., during sickness and convalescence. MM. Breslau and Mauthner describe their extracts of flesh and blood as being peculiarly advantageous in scrofulous exhaustion, exhaustion from anæmia, diarrhœa, &c. The extract of Falkland or Liebig is represented as having been employed both in the hospitals and in private practice at Munich, with the most extraordinary success. It is said to be capable of assimilation with the least possible expenditure of the vital force.

MEATS (Preserved). See *Putrefaction.*

MECHLOIC ACID. This name has been given by Couerbe to the crystalline mass obtained by passing *chlorine gas* over *fused meconine.* It is purified by removing the chlorine by *oxide of silver.* Before being purified, it is blood red; when pure, it forms white crystals, which are strongly acid.

MECONIC ACID. Syn. *Acidum Meconicum,*— Lat. A peculiar acid, first obtained by Sertuerner from opium, in 1804.

Prep. (Gregory.) *Meconate of lime* or of *potassa,* 1 part, is dissolved in a mixture of *water,* 21 parts, and *hydrochloric acid,* 3 parts, at a temperature a little below 212° Fahr.; *acid meconate of potassa* or *lime* is deposited as the solution cools, which, on being treated a second time in the same way, yields nearly pure *meconic acid.* Its purity is ascertained by its leaving no residue when heated in a platinum or glass capsule.

Prop. Meconic acid forms beautiful pearly scales; possesses a sour astringent taste; is soluble in 4 parts of hot water, and in cold water, and in alcohol. Its solution is decomposed at a boiling heat, and also by animal charcoal. At 248° Fahr. it is decomposed, and *pyromeconic acid* formed along with other products. With the acids it forms salts called *meconates,* most of which are crystallizable. *Meconate of lime* is obtained by heating a solution of chloride of calcium with an infusion of opium made with cold water, and collecting the precipitate. *Meconate of potassa* is prepared by direct solution of the base in the impure acid obtained from meconate of lime till the liquor turns green, heat being applied, when the salt crystallizes out as the liquid cools; it may be purified by pressure, and re-crystallization.

Tests. Meconic acid is *characterized* by —1. Precipitating the sesquisalts of iron *red,* and the red colour *not* being destroyed by the action of corrosive sublimate.—2. Precipitating a weak solution of ammonio-sulphate of copper *green.* — 3. With acetate of lead, nitrate of silver, and chloride of barium, it gives white precipitates, which are soluble in nitric acid.—4. It is not reddened by chloride of gold. The above precipitates are all *meconates* of the given bases.

MECONINE. A white crystalline, odourless, neutral substance, discovered by Couerbe in opium. It remains in solution when an *aqueous infusion of opium* is precipitated by *ammonia.* It may be obtained by evaporating the *residual liquor,* and purifying the solid matter thus obtained by alternate solution in *alcohol, water,* and *ether.* It forms white prisms, and is *distinguished* from *codeia* and *morphia* by the absence of alkaline properties, and also from the latter by its fusibility, its greater solubility in water, and in not being turned blue by the sesquisalts of iron. Chlorine gas passed over fused meconine turns it blood red. Neither meconine nor meconic acid appears to exercise any important physiological action on the human frame, and are of comparatively small importance both in pharmacy and chemistry.

MECONIUM. See *Opium.*

MEDALS, *coins,* and similar objects, may be conveniently and accurately *copied* by means of electricity, but more quickly, by one or other of the following methods:—

1. (G. Osann.) Reduce *recently precipitated* and *well-washed oxide of copper* by means of *hydrogen* passed over it at a gentle heat; the operation being conducted in a glass tube, the one end is left partially open to permit of the escape of the newly formed water; as soon as the powder assumes a fine copper-red colour, it must be immediately removed, and kept in a well-stoppered bottle. For *use,* the medal is placed on a layer of smooth sand, at the bottom of a small cylinder of white iron, and the sifted copper powder is poured on to the depth of about 10 or 12 lines, and then gently compressed with a massive iron cylinder, after which the whole must be placed on an anvil, and struck with a heavy hammer till the powder is no farther compressible. The newly formed cast is then removed from the cylinder with due care, and heated to a red-white heat in a small copper-box, well luted with clay to exclude the air; after which the whole is left to cool. A solid copper medal is thus very quickly obtained. The recently reduced oxides of other metals (*silver, gold, lead, &c.*) may be substituted for oxide of copper.

2. (Shaw.) Melt a little *isinglass glue* with *brandy* (or *proof spirit*), and pour it thinly over the medal, so as to cover its whole surface; let it remain on for a day or two, or until it has become thoroughly dry and hard, when it will be fine, clear, and as hard as a piece of Muscovy glass, and will have a very elegant impression of the coin. It has also the property of resisting the effects of damp air, which occasions all other kinds of glue to soften and bend, if not prepared in this way. If the wrong side of the isinglass is breathed on, and gold-leaf immediately applied, the latter will adhere, and be seen on the other side, producing a very pleasing effect.

Obs. Medals may also be copied by surrounding them with a hoop of paper, and pouring on them *plaster of Paris* (mixed with water to the consistence of cream) to the depth of about ½ an inch. *Melted wax, stearine, fusible metal, sulphur, amorphous sulphur*, and several other similar materials, are used in the same way. See *Moulds, Sulphur, Wax, Voltatype, &c.*

MEDALLIONS. See *Medals, Bronzing, &c.*

MEDECINE NOIR. A celebrated French nostrum, consisting of a mixture of *tamarinds, manna, glauber salts*, and *senna.*

MEDICINE. However skilful the medical practitioner may be, and however judicious his treatment, both are interfered with, and their value more or less neutralized, if the remedies he orders are not administered precisely according to his instructions. "It is the duty of the attendant on the sick to follow implicitly the directions of the physician, as well in exactly complying with his orders, as in doing nothing that she has not been ordered to do. At the same time, there are exceptions to this rule, in which a suspension of the remedy, or a deviation from the order of the physician, is not only allowable, but is absolutely required. Thus, from idiosyncrasy or some other cause, the remedy in the doses ordered may have no effect, or may produce one widely different from that intended or expected. In such cases, it is evident that a strict adherence to the directions of the physician would be productive of evil; but he should be immediately apprised of the circumstance." The common practice of neglecting to administer the *doses* of medicine at the prescribed time, or after prescribed intervals, and then, to compensate for the omission, giving the medicine more frequently or in larger doses, cannot be too severely censured, as destructive to the welfare of the patient, and injurious to the credit of the physician.

For the purpose of *disguising* the *taste of medicines*, or lessening their nauseating properties, Dr. Pollio has recently recommended a means founded on the physiological fact that a *strong impression on the nerves* (whether of vision, hearing, or taste) renders that which follows less perceptible than under the usual circumstances. Instead, therefore, of applying to the mouth agreeable substances after swallowing nauseous medicines, we should prepare it beforehand, in order that the taste of the medicine may not be perceived. *Aromatic substances*, as *orange* or *lemon peel, &c.*, chewed just before taking medicine, effectually prevent *castor oil, &c.*, being tasted. In preparing the mouth for *bitters*, liquorice is the only sweet that should be used, the others creating a peculiarly disagreeable compound taste. (*Revue Médicale.*) At *page* 285, we have noticed the effect of *oil of orange peel* in correcting the nauseating qualities of copaiba. We have since been able still further to test its efficacy. See *Doses, Posology*, and *Prescribing.*

MEDULLINE. The name given by Dr. John to the *porous pith of the sun-flower.* It is soluble in nitric acid. It is a pure form of lignine.

MEERSCHAUM. Syn. *Ecume de Mer*,—Fr. A silicated carbonate of magnesia. It has a sp. gr. ranging between 2·6 to 3·4; is readily acted on by acids, and fuses before a powerful blowpipe into a white enamel. The finest qualities are found in Greece and Turkey. It is used by the Tartars for washing linen. Its principal consumption is, however, in the manufacture of *tobacco-pipes.* The Germans *prepare* their pipes *for sale* by soaking them in *tallow*, then in *white wax*, and finally, by polishing them with *shavegrass.* Genuine *meerschaum pipes* are distinguished from *mock* ones by the beautiful brown colour which they assume after being smoked for some time. Recently, some of the pipemakers have produced a composition clay pipe, which closely resembles meerschaum in appearance, and is "warranted to colour well." This composition, which is comparatively valueless, is made up into pipes of suitable patterns, which are frequently sold to the ignorant for "meerschaums."

MEGRIM. Syn. *Hemicrania*,—Lat. A pain affecting one side of the head only, often periodic like an ague, and generally of a nervous, hysterical, or bilious character. It is *clavus* when there is a strong pulsation, conveying the sensation of a nail piercing the part. See *Headache.*

MELAM. A curious insoluble powder, discovered by Liebig. It is *prepared* by fusing *sulphocyanide of ammonium* at a pretty high temperature; or, preferably, from a *mixture* of *sulphocyanide of potassium* (perfectly dry), 1 part, and *sal ammoniac*, 2 parts, treated in the same manner. The residuum in the retort, after being washed with water, is *melam.* It is a pale buff-coloured, amorphous substance, which is insoluble in water, but soluble in oil of vitriol, with partial decomposition.

MELAMINE. A basic substance discovered by Liebig. It is *prepared* by dissolving *melam* in a *mixture* of *hydrate of potassa*, 1 part, and *water*, 20 parts, evaporating the liquid until crystalline scales begin to form, and then allowing it slowly to cool. The resulting crystals are purified by re-solution and recrystallization. It forms very pale-yellow transparent crystals, which are soluble in hot water, fusible by heat, and may be volatilized with only trifling decomposition. It combines with the acids, and forms crystallizable acidulous salts.

MELAMPYRINE. A tasteless, neutral, crystallizable substance, extracted by Hünefeldt from the *melampyrum nemorosum.*

MELANCHOLY. See *Hypochondriasis* and *Insanity.*

MELANIC ACID. A black powder discovered by Piria, and formed when *salicylide of potassium* is exposed to the air until it turns black. In this state the mass consists of the *acetic* and *melanic acids.* Dr. Marcet applied the same name to an acid principle found by him in *black urine.*

MELANILINE. The action of *dry chloride of cyanogen* upon *anhydrous aniline* gives rise to the formation of a resinous substance, which is the *chlorine-compound of melaniline.* This substance, dissolved in *water* and mixed with *potassa,* furnishes *melaniline* under the form of an oily liquid, which rapidly solidifies to a beautiful crystalline mass.

MELANOCHINE. The name given by Brandes and Leber to a peculiar product resulting from the decomposition of quinine.

MELANOGALLIC ACID. See *Metagallic Acid.*

MELANOTANNIC ACID. A black substance formed by the action of *potassa,* in excess, on *tannin* or *gallic acid.*

MELASSES. See *Treacle.*

MELASSIC ACID. The acid principle existing in *melasses* or *treacle.* It appears to be acetic acid disguised by empyreumatic and extractive matter.

MELASSIC ACID. Syn. *Melasinic Acid.* A product of the decomposition of grape sugar.

Prep. Pour a hot saturated solution of *baryta* or of *caustic potassa* or *soda* on *melted grape sugar,* dissolve, and continue the heat until the mixture turns of a deep brown, then precipitate the liquid with an excess of *hydrochloric acid,* and wash the resulting black powder, first with *dilute hydrochloric acid,* and next with water.

MELINUM. See *Cadmium.*

MELISSIC ALCOHOL. A substance obtained by Brodie from *bees' wax.* By oxidation it yields "*melissic acid.*"

MELLAGO. The old name for a medicine having the consistence of honey, with a somewhat sweetish taste. *Mellago taraxaci* is fluid extract of dandelion.

MELLITES. See *Honeys* (Medicated).

MELLITIC ACID. A substance discovered by Klaproth in mellite or honey stone.

Prep. From *mellite* or *honey stone,* reduced to powder, and boiled in about 70 times its weight of *water;* the resulting solution being subsequently filtered, evaporated, and crystallized.

Prop., &c. Small colourless needles; permanent in the air; soluble in both water and alcohol, and in boiling oil of vitriol; reaction, strongly acid. It forms salts, which are called *mellitates* with the bases. Those of the *alkalies* are soluble and crystallizable; those of the *earths,* amorphous and insoluble.

MELLON. A compound of carbon and nitrogen, discovered by Liebig. It remains at the bottom of the retort, under the form of a yellow powder, when *bisulphocyanide of mercury* is exposed to heat. It may in like manner be obtained by exposing *melam, ammeline, ammelide,* or *dry sulphocyanogen,* to a red heat. It is insoluble in alcohol, water, and dilute acids, and is decomposed by concentrated acids, alkalies, and a strong red heat.

MELTING BAGS. See *Sacculi.*

MELTING POINT. The temperature at which solids assume the liquid form.

MEMORY. We have been assured by an eminent medical man now deceased, that the *long-continued* topical application of *iodine* to the scalp tends to weaken the memory; and if the application be accompanied by seclusion and darkness, to ultimately destroy it. This, he accounted for, by the statement that the memory is localized in the cineritious matter of the brain, which, like the mammæ and testes, according to Reichenau and others, is liable to absorption or emaciation from the long employment of iodine. This use of iodine has, we believe, been proposed in certain forms of madness. See *Aberration* (of mind), *Insanity, Iodine, &c.*

MENISPERMIC ACID. Boullay has applied this name to a crystalline substance found in *cocculus indicus.* It may be obtained from the *cold infusion* or *decoction* of the seeds, in a similar way to that directed under *absinthic acid.* By repeated solutions and recrystallizations from alcohol it loses its bitter taste, and becomes colourless.

MENISPERMINE. Syn. *Menispermia, Menispermina.* A neutral basic substance discovered by Pelletier and Couerbe in cocculus indicus. It may be obtained by the action of *alcohol* on the *powdered seed.*

It is freely soluble in alcohol and ether; insoluble in water; fuses at 248° Fahr.; and forms crystallizable salts with the acids. Hot nitric acid turns it into a yellow resin-like mass. *Paramenispermine* is another similar substance, but differs from the preceding by *not* forming salts with the acids. The above exercise no marked physiological action when swallowed, and possess little interest.

MENSTRUATION. Syn. *Menstruatio*,—Lat. In this country the *menses* or *catamenia* usually make their appearance in the female between the 14th and 18th year; the precise time being greatly influenced by the state of the health, and the worldly condition of the patient. The changes which then occur need not be more than referred to here. The preceding indiposition is in some cases more or less severe, and occurs at each successive period until the discharge becomes habitual and regular. In general, the whole amount lost does not exceed five or six ounces, and the period of the indisposition varies from 2 to 4 days. In a state of perfect health, except during pregnancy or lactation, the monthly recurrence of the discharge falls with great regularity, often precisely to a day, until the fortieth, forty-fifth, or even the forty-eighth year, after which it ceases altogether. Any deviation from this necessary and natural course of things, leads to a corresponding loss of health and physical comfort; and if it is extensive, the most painful and calamitous consequences ensue. To *prevent* such occurrences, care should be taken to maintain the general bodily health at the proper standard. Down beds, hot rooms, late hours, luxurious living, excessive clothing, and the like, should be avoided; but on the other hand, the opposite extreme should not be run into, and above all, anxiety, excessive exertion, and exposure to cold, should be particularly avoided both during and a few days previous to the monthly period.

The principal *diseases* connected with the *menstrual function* are—

Amenorrhœa, or *suppression of the menses*, consists of—1. Their *retention* or non-appearance at the proper period of life, by which the *symptoms* noticed under "*chlorosis*" (see *p.* 247) are induced with greater or less severity. This variety requires the same *treatment* as that disease.—2. *Suppression* arising from *accidental causes* operating at the particular period; as *exposure to cold*, *strong mental emotion*, *excessive grief*, *local constriction*, &c. In these cases, a *hot foot-bath* or *hip-bath*, with a dose of *diaphoretic medicine*, or "*something warm*" on retiring to rest, will in many cases bring on the menses in a few hours. If there is much fever, and this method is not successful, a saline purgative, or, in very severe cases, venesection may be had recourse to.—3. In *suppression* arising from the *existence* of *other diseases* the primary affection should be at once attended to.

Menorrhagia, *flooding*, or *excessive flow of the menses*, is an affection exactly the reverse of the preceding. The common *causes* are violent exertion, sudden surprises or frights, violent passion, plethora, profuse evacuations, and external injuries, as blows, bruises, &c. The *treatment*, in mild or passive cases, should include rest in the horizontal position, a light, nutritious, but non-exciting diet, the use of weak acidulous drinks, and the local application of cold, with cooling saline laxatives as occasion may require. In robust habits depletion is often necessary. In *severe cases*, a more active line of treatment must be adopted, and powerful internal astringents, as *acetate of lead* and *opium*, may be taken; remedies which should, however, be only had recourse to under proper medical advice.

MENSTRUUM. A solvent or dissolvent. The principal *menstrua* employed in chemistry and pharmacy to extract the active principles of bodies by digestion, decoction, infusion, or maceration, are *water*, *alcohol*, *oils*, and *solutions of the acids* and *alkalies*.

MENTHENE. A colourless, ethereal oil, obtained by distilling a *mixture* of *peppermint-oil camphor* and *anhydrous phosphoric acid*.

MENYANTHINE. See *Inuline*.

MEPHITIC ACID. See *Carbonic Acid*.

MEPHITIC AIR. See *Nitrogen*.

MERCAPTAN. Syn. *Hydrosulphuret of Sulphuret of Ethyle*. An ethereal liquid, discovered by Zeise.

Prep. A *solution of caustic of potassa* (sp. gr. 1·28) is saturated with *sulphuretted hydrogen*, then mixed with an equal volume of a *solution*, of the same density, of *sulphovinate of lime*, and next submitted to distillation in a chloride of sodium bath, the retort being connected with a receiver surrounded with *ice;* the distillate consists of *mercaptan* floating on some water; the former is separated, and after digestion on a little *chloride of calcium*, is agitated and rectified along with a little *red oxide of mercury*.

Prop., *&c.* Limpid, colourless, ethereal; sp. gr. 0·842; very slightly soluble in water; freely soluble in alcohol; boils at

97° Fahr.; very inflammable; colour of flame, blue. Its most remarkable properties are its intense odour of garlic (which adheres to the clothes and person of the operator with extraordinary obstinacy), and its violet action on *red oxide of mercury*, even in the cold. The product of their reaction may be obtained from the alcoholic solution in a crystalline form. Similar compounds are formed with the oxides of *copper*, *gold*, *lead*, and *silver*, when their solutions are added to an *alcoholic solution of mercaptan*.

MERCAPTAN (Methyle). This closely resembles the last, and is obtained by simply employing *sulphomethylate of potassa* instead of sulphovinate of potassa. It boils at 68° Fahr. *Amyl-mercaptan* has also been formed.

MERCURIAL BALSAM. See *Ointment of Nitrate of Mercury.*

MERCURIAL DISEASE. Syn. *Morbus Mercurialis, Hydrargyriasis,*— Lat. This results from the injudicious or excessive use of mercury, or exposure to the fumes of this metal. The common and leading *symptoms* are a disagreeable coppery taste; excessive salivation; sponginess, tumefaction, and ulceration of the gums; swollen tongue; loosening of the teeth; exfoliation of the jaws; remarkably offensive breath; debility; emaciation; ending (when not arrested) in death from exhaustion. Fever, cachexia, violent purging and griping, a species of eczema (*eczema mercuriale, lepra mercurialis*), and other forms of skin disease, are also phases of the same affection; the first of which occasionally proves fatal under the influence of sudden and violent physical exertion.

The *treatment*, in ordinary cases, may consist in free exposure to the open air, avoiding either heat or cold; the administration of saline aperients, as *Epsom salt*, *phosphate of soda*, &c.; the free use of *lemon juice and water* as a common drink; with weak *gargles* or *washes* of *chloride of soda* or *chloride of lime* to the gums, mouth, and throat. Severe cases often resist every variety of treatment, and instances are recorded in the medical journals in which the use of even small doses of mercurials, administered by the faculty, have, owing to the peculiar idiosyncracy of the patients, been followed by the most horrible sufferings, terminating in death.

MERCURY. Syn. *Quicksilver; Hydrargyrum,*—Ph. L. E. & D. *Aqua Argentea, A. Metallorum, Argentum Vivum, Hydrargyrus, Mercurius,*—Obs. Lat. The principal sources of this metal are the mines of Idria, in Carniola, and Almaden, in New Castile, where it exists under the form of *cinnabar*. From this ore the pure metal is obtained by distilling it with *lime* or *iron filings*, in iron retorts, by which the sulphur it contains is seized and retained, while the mercury rises in the state of vapour, and is condensed in suitable receivers. Quicksilver is commonly imported in cylindrical iron bottles, containing from ½ cwt. to 1 cwt. each. It is also imported in small quantities from China, contained in bamboo bottles holding about 20 *lb.* each.

Prep. Mercury, as imported, is usually sufficiently pure for medicinal purposes without any further preparation. Mere mechanical impurities, as floating dust, dirt, &c., may be got rid of by squeezing the metal through chamois leather or flannel, or by filtering it through a small hole in the apex of an inverted cone of paper. It now forms *strained mercury* (*hydrargyrum*,—Ph. L.) The Dublin College orders "*hydrargyrum purum*" to be prepared for medical purposes by putting 6 parts of *mercury* into a retort, and distilling off four parts. The whole of the mercury may, however, be safely drawn over. The product is ordered to be agitated and boiled with *hydrochloric acid*, 2 fl. dr., and *water*, 1 fl. oz., for each *lb.* of the metal, and after being well washed with water, to be dried by heat. A strong earthenware or iron retort, with a low neck or tube dipping into a basin of water, may be used for this purpose. One of the *quickest* and *best means* of *purifying mercury* is to well agitate it with a *concentrated solution of nitrate of mercury*, at the temperature of about 112° Fahr., after which it may be washed with distilled water, and dried by passing it several times through clean dry chamois leather.

Prop., *&c.* Mercury, at all common temperatures, is a heavy liquid, possessing a nearly silver-white colour, and a brilliant metallic lustre; solidifies (*freezes*) at —39° Fahr., and is then ductile, malleable, and tenacious; boils at 662° Fahr. (656°, —Ure), and escapes in colourless transparent vapour, of great density; it also volatilizes slowly at the ordinary temperature of the atmosphere, and when mixed with water at from 140° to 160° Fahr., it is volatilized in considerable quantities. (Stromeyer.) The presence of minute quantities of lead and zinc greatly retard its evaporation at its boiling heat. It unites with oxygen, chlorine, iodine, &c., forming numerous compounds. With the metals it unites to form *amalgams*. The only acids which act on metallic mercury, are the sulphuric and nitric; but for this purpose the former must be heated and concentrated. Nitric acid, however, even when dilute and in the cold, dissolves it freely. Pure mercury is unalterable in the air at ordinary temperatures. Sp. gr. 13·59 at 60° Fahr.; 15·00 when in the solid state. (Ure.)

Pur. "It is *totally* dissipated by heat, and is *entirely* dissolved by diluted nitric acid; but is insoluble in boiling hydrochloric acid. The acid poured off, and allowed to cool, is neither coloured, nor yields a precipitate with sulphuretted hydrogen" (Ph. L. 1836.) "Its sp. gr. is 13·5." (Ph. L. 1851.) "A globule moved about on a sheet of paper yields no trail; pure sulphuric acid agitated with it (in the cold) evaporates when heated, without leaving any residuum." (Ph. E.)

Tests. 1. *Metallic mercury* is detected by its volatility; and, when in a finely divided or pulverulent state, by the microscope, or by staining a piece of copper white when rubbed on it, or when heated beneath it.

2. The *salts of mercury* are recognized as follows:—

a. They are all volatilized or decomposed by ignition.

b. When intimately mixed with anhydrous carbonate of soda, and heated in a small test tube, under a layer of the carbonate, decomposition ensues, and a crust of gray sublimate forms on the cooler portion of the tube. When examined by a lens, this crust is seen to consist of minute metallic globules. By friction with a bright glass or iron rod, these are united into globules which are visible to the naked eye.

c. Protochloride of tin, added in excess to a solution containing mercury, gives a grayish precipitate of metallic mercury, which may be united into globules by heat and agitation, or more readily, by boiling with hydrochloric acid.

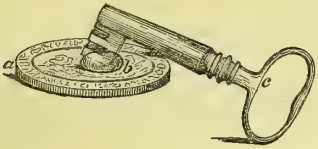
d. A perfectly clean and bright piece of copper immersed in a slightly acid solution of mercury, becomes in a short time covered with a gray or whitish stain, which assumes a silvery lustre when gently rubbed with a piece of soft cork or leather, and is removed by the subsequent application of heat. A *single drop* of liquid may be tested on a *bright copper coin* in this way.

e. The plate of copper with the deposit of mercury, obtained as above, after being washed with a weak solution of ammonia, and in distilled water, and dried by pressure between the folds of bibulous paper, may be cut into small pieces, and heated in a test-tube, in order to obtain metallic globules. When the suspected solution contains organic matter, bright copper filings may be employed, and the process modified so as to nearly resemble Rensch's test for arsenious acid. According to Orfila "scraped copper plate" is capable of detecting the presence of $\frac{1}{80000}$th part of corrosive sublimate in a solution. MM. Trousseau and Reveil state that a plate of yellow copper (brass) is even more susceptible than one of red copper.

f. (Smithson's Galvanic Pile.) This consists of a polished wire or plate of gold or copper round which a strip or thread of zinc or tin is wound in a spiral direction. The suspected liquid is acidulated with a few drops of hydrochloric acid, and after immersion for a longer or shorter period (as half an hour to an hour or two), the gold will have become white if any mercury is present. The coil of zinc or tin is then removed from the gold, and the latter, after being washed, and dried between the folds of bibulous paper, is heated in a test-tube, to obtain metallic globules, as before. *Susc.* $\frac{1}{90000}$ of corrosive sublimate.

g. (MM. Danger & Flandin.) The apparatus of these eminent chemists depends upon the same principle as the preceding. It consists of a vessel tapering at its lower part into a tube with an opening almost capillary, so that the fluid may flow out of it at the rate of about 1 drop in 5 seconds, and then be caught in a capsule for further experiment. The liquid to be tested is placed in this vessel, and a gold wire attached to the electro-positive pole of a Bunsen's battery is placed in it (observing that it passes down into the contracted part), and *another* gold wire attached to the negative pole is introduced into the opening at the lower end of the contracted part. The battery being excited in the ordinary way, a current is established which causes the precipitation of the mercury upon the gold wire attached to the negative pole, and however small may be the quantity of the mercurial compound, it is manifested by this process; and on heating the gold, or treating it by nitric acid, the mercury is removed, and may be examined in any other manner. A false, or tin stain, may be distinguished from a mercurial one by its solubility when the whitened gold is put into concentrated hydrochloric acid. *Susc.* Fully $\frac{1}{100000}$th part of corrosive sublimate, or $\frac{1}{140000}$th part of metallic mercury.

h. An ingenious extemporaneous application of the galvanic test may be made as follows:—Place a drop or two of the suspected liquid on a clean and bright gold or copper coin, and apply a *bright* key, so that it may at once touch the edge of the coin and the solution. (See *engr.*) A hydro-electric current will then be established as before, and a white spot of reduced mercury will appear on the surface of the metal, which may be recognized in the manner already explained.



a, A gold or copper coin.
b, Drop of suspected solution.
c, A bright key.

3. The *protosalts of mercury* are distinguished by the following reactions:—

a. Sulphuretted hydrogen and hydrosulphuret of ammonia give black precipitates, which are insoluble in dilute acids, hydrosulphuret of ammonia, cyanide of potassium, and hot nitric acid; but are readily dissolved with decomposition by aqua regia.

b. Potassa and ammonia give dark gray or black precipitates, which are insoluble in excess of the precipitant.

c. Hydrochloric acid and the soluble metallic chlorides occasion a precipitate, which assumes the form of a very fine powder of dazzling whiteness, insoluble in excess, but soluble in aqua regia and liquid chlorine. Caustic potassa and ammonia turn it dark gray or black.

d. Iodide of potassium gives a greenish-yellow precipitate, soluble in ether, and subliming in red crystals when heated.

4. The *salts of peroxide of mercury* are known as follows:—

a. Sulphuretted hydrogen and hydrosulphuret of ammonia, added in very small quantities, produce on agitation a perfectly white precipitate, which acquires successively a yellow, orange, and brownish-red colour, as more of the test is added; and, ultimately, when the test is added in considerable excess, an intensely black colour. This precipitate is insoluble in excess of the precipitant, potassa, cyanide of potassium, hydrochloric acid, or nitric acid, even when boiling; but it dissolves readily and completely in sulphuret of potassium, and in aqua regia with decomposition. These reactions are characteristic.

b. Ammonia gives a white precipitate.

c. Potassa gives a reddish precipitate, turning yellow, when the test is added in excess. The presence of ammonia causes the precipitate to be white, and when the solution contains much acid, both reactions are imperfect.

d. Alkaline carbonates give a brick-red precipitate.

e. Iodide of potassium gives a scarlet precipitate, which is soluble in excess, and in alcohol, and solution of chloride of sodium.

f. The alkaline bicarbonates either do not disturb the solution, or only cause a slight degree of opalescence.

5. *Solid* bodies, supposed to contain mercury, may be treated with nitric acid, the solution evaporated to dryness, and the solid residuum dissolved in water, when the filtered solution may be submitted to the usual tests. See *Bichloride of Mercury.*

Uses, &c. Mercury is applied to various purposes in the arts; as the amalgamation of gold and silver, wash gilding, the silvering of looking glasses, the manufacture of barometers and thermometers, and the preparation of several valuable medicines. In its metallic state it appears to be inert when swallowed, unless it meets with much acidity in the alimentary canal, or is in a state of minute division; its compounds are, however, all of them more or less poisonous.

Mercury has been employed in one or other of its forms in almost *all* diseases; but each of its numerous preparations is supposed to have some peculiarity of action of its own, combined with that common to all the compounds of this metal. The mercurials form, indeed, one of the most important classes of the materia medica. See *Mercurial Disease* (and *below*).

MERCURY (Acetate of). Syn. *Protacetate of Mercury; Hydrargyri Acetas, H. Acetis,*—Lat. *Prep.* 1. (Ph. D. 1826.) *Mercury,* 9 parts; *diluted nitric acid* (Ph. D.), 11 parts; dissolve, add it to a boiling solution of *acetate of potassa,* 9 parts, dissolved in *water,* 100 parts, and acidulated with *distilled vinegar;* filter the liquid whilst hot, let it cool, wash the crystals that are deposited with *cold water,* and dry them by a very gentle heat.

2. (Ph. L. 1788.) Dissolve *protoxide of mercury* in *strong acetic acid,* and concentrate the solution so that crystals may form as it cools.

3. (P. Cod.) Dissolve *protonitrate of mercury,* 1 part, in *water* (slightly acidulated with nitric acid), 4 parts, and precipitate the liquid with a solution of *acetate of soda,* gradually added, until in slight

excess; carefully wash the precipitate with *cold water*, and dry it in the shade.

Prop., &c. Small white, micaceous, flexible scales; insoluble in alcohol; soluble in about 300 parts of water; blackened by light; and carbonized by a strong heat. It has been said to be one of the mildest of the mercurials; but this cannot be the case, as it occasionally acts with great violence on both the stomach and bowels, producing much pain and prostration. *Dose.* $\frac{1}{4}$ to 1 gr., night and morning, gradually increased. The *peracetate* (*acetate of peroxide of mercury*), a similar preparation to the above, is made by dissolving red oxide of mercury in strong acetic acid. According to Robiquet, this is the basis of *Keyser's antivenereal pills*, which do not contain protacetate of mercury, as some parties have asserted.

MERCURY (Ammonio-chloride of). Syn. *White Precipitate, Lemery's do., Cosmetic Mercury, Amido-chloride of Mercury, Chloramide of do., Chloro-amidide of do., Ammoniacal Oxychloruret of do., White Oxide of do., Chloride of Ammonium and Mercury; Hydrargyri Ammonio-chloridum,*—Ph. L. *Hydrargyrum Præcipitatum Album,*—Ph. L. 1824, & Ph. E. *Hydrargyri Submurias Ammoniatum,*—Ph. D. 1826. *Calx Hydrargyri Alba,*—Ph. L. 1788. *Mercurius Præcipitatus Albus,*—Ph. L. 1745. This compound originated with Raymond Lully in the thirteenth century.

Prep. 1. (Ph. L.) *Bichloride of mercury*, 6 oz.; *distilled water*, 3 quarts; dissolve, with heat, and when the solution has cooled, add of *liquor of ammonia*, 8 fl. oz., frequently shaking it; lastly, wash the precipitate with *water*, and dry it. The formulæ of the Ph. E. & D. are nearly similar.

2. (Ph. D. 1826.) Add to the *liquor poured off from precipitated calomel* as much *solution of caustic ammonia* as may be required to throw down the metallic salt; which is then to be washed with *cold water*, and dried on bibulous paper.

3. *Corrosive sublimate* and *sal ammoniac*, of each, $\frac{1}{2}$ *lb.; water*, 3 quarts, dissolve, and precipitate with *liquor of potassa*, q. s. Some use only 5 *oz.* of sal ammoniac.

Prop., &c. A white, inodorous, light mass, or powder; insoluble in alcohol, partially soluble in boiling water, and wholly dissolved by sulphuric, nitric, and hydrochloric acids, without effervescence. It is "totally dissipated by heat. Digested with acetic acid, it yields no yellow or blue precipitate with iodide of potassium. Its powder, triturated with lime water, does not become black. When heated with solution of potash it exhales ammonia, and assumes a yellow colour." (Ph. L. 1836.) *Used* to make an ointment, which is employed in herpes, porrigo, itch, and other skin diseases, &c.; and by the lower orders, as a dusting powder to destroy pediculi, an application which, from its liberal employment, is not always a safe one. It is *highly poisonous*, and must not be swallowed.

MERCURY (Borate of). Syn. *Hydrargyri Boras,*—Lat. *Prep.* (Van Mons.) *Calomel*, 11 parts; *borate of soda*, 13 parts; triturate together; in 15 minutes add a little *water*, then gradually more, rubbing all the time; next permit the powder to settle, collect it on a filter, wash it, and dry it.

Prop., &c. A white, insoluble powder. *Dose.* 1 to 3 gr.; in similar cases to those in which calomel is given.

MERCURY (Bromide of). Syn. *Protobromide of Mercury; Hydrargyrum Bromidum,*—Lat. *Prep.* (Magendie.) By precipitating a *solution of protonitrate of mercury* by another of *bromide of potassium.* It closely resembles calomel in both its appearance and properties. *Dose.* 1 to 5 gr.

MERCURY (Bibromide of). Syn. *Perbromide of Mercury; Hydrargyri Bibromidum,*—Lat. *Prep.* 1. Formed by dissolving *precipitated peroxide of mercury* in *hydrobromic acid.*—2. (Magendie.) *Bromine* and *mercury*, equal parts; mix, and sublime. Soluble. It resembles the biniodide in its action. *Dose.* $\frac{1}{20}$ to $\frac{1}{8}$ gr.

MERCURY (Chloride of). Syn. *Protochloride of Mercury, Calomel; Hydrargyri Chloridum,*—Ph. L. *Hyd. Chlor. Mite,*—Ph. U. S. *Hyd. Submurias,*—Ph. L. 1824. *Calomelas,*—Ph. E. & D.; & Ph. L. 1788. *Dichloride of Mercury, Subchloride of do.,*—Berzelius, Graham, and others. *Submuriate of Mercury, Sweet Mercury, S. Precipitate of do., S. Sublimate of do., Aquila Alba, Drago Mitigatus, Hydrargyrum Muriaticum Mite, Manna Metallorum, Mercurius Dulcis, Panchymagogum Minerale,*—Obs. var. This substance is one of the best known, and probably the most valuable of all the mercurials; but is, unfortunately, burdened with a long list of synonyms, which those who have endeavoured to introduce the nomenclature of modern chemistry into pharmacy, have in no small degree contributed to confuse.

Prep. 1. (Ph. L.) Mercury, 2 ℔; *sulphuric acid*, $21\frac{1}{2}$ fl. oz. (3 ℔, — Ph. L. 1836); mix, boil to dryness (in a cast-iron vessel), and when the resulting *bi-*

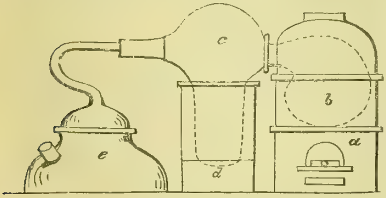
persulphate has cooled, add of *mercury*, 2 ℔, and triturate the ingredients in an earthenware mortar until they are well mixed; then add of *chloride of sodium*, 1½ ℔, and again triturate until the globules are no longer visible; next sublime the mixture, reduce the sublimate to the finest possible powder, diligently wash it with *boiling distilled water*, and dry it. *Prod.* 117 to 118% of the weight of mercury employed.

2. (Ph. E.) *Mercury*, 4 oz., is dissolved in a mixture of *oil of vitriol*, 2 fl. oz. 3 fl. dr., and *nitric acid*, ½ fl. oz., by the aid of heat; when cold, *mercury*, 4 oz., is added, and the remainder of the process is conducted as before.

3. (*Calomelas Sublimatum*, — Ph. D.) *Persulphate of mercury*, 10 parts; *mercury*, 7 parts; *dry chloride of sodium*, 5 parts; triturate, &c., as before, and afterwards resublime it into a large chamber or receiver.

4. (*Apothecaries' Hall, London.*) *Quicksilver*, 50 *lb.*, and *oil of vitriol*, 70 *lb.*, are boiled to dryness in a cast-iron vessel; of the *dry salt*, 62 *lb.* are triturated with *quicksilver*, 40½ *lb.*, until the globules are extinguished, when *common salt*, 34 *lb.*, is added, and after thorough admixture, the whole is sublimed, &c., as before. *Prod.* 96 to 100 *lb.*

5. (*Jewel's patent process.*) The receiver, which is capacious, is filled with *steam* so that the calomel vapour is condensed in it in a state of extremely minute division. The *engr.* represents the apparatus now usually employed when this plan is adopted. The *product* is extremely white, and of the finest quality. It is sometimes called "*hydrosublimed calomel*" and "*hydrosublimate of mercury.*" The "*flowers of calomel,*" of old pharmacy, were prepared in a nearly similar manner.



a, Furnace.
b, An earthenware retort, having a short and wide neck, containing the ingredients for making calomel.
c, An earthen receiver having 3 tubulatures.
d, A vessel containing water.
e, A steam boiler.

6. (Soubeiran.) The crude *calomel mixture* is heated in an *earthern tube* in a furnace, and a *current of air* is directed uninterruptedly into the tube by means of a small ventilator. This sweeps away, as it were, the vapours of calomel, and in a straight tube will carry them a distance of 60 feet, to avoid which the end of the recipient is immersed in water, by which means the calomel is moistened and falls down. (Compt. Rend. 1842, 665.) This plan, slightly modified, is now extensively adopted in this country.

7. (*Precipitated Calomel; Calomelas Præcipitatum.*) Digest *pure quicksilver*, 9 parts, in *nitric acid* (sp. gr. 1·20 to 1·25), 8 parts, until *no more metal will dissolve*, applying heat as the effervescence ceases; then mix the hot liquid *quickly* with a *boiling solution* of *common salt*, 8 parts, dissolved in *water* (slightly acidulated with hydrochloric acid), 64 parts; lastly, well wash the precipitate in *boiling distilled water*, and dry it. The *product*, when the process is skilfully managed, is perfectly white and pure. The formula of the Ph. D. 1826, is essentially similar.

Prop. A heavy, white, tasteless powder; insoluble in water, alcohol, and cold dilute nitric acid; volatilizes at a temperature below redness, and yields a white or yellowish-white sublimate; hot nitric acid oxidizes and dissolves it; alkalies and their carbonates, and lime water, decompose it, with the production of the black oxide; caustic ammonia converts it into a dark slate-gray coloured powder (*black precipitate*, — Kane). Sp. gr. 7·14 (Boullay; 7·156,—Pelouze & Fremy; 7·176,—Ure).

Pur. Calomel is frequently contaminated with small quantities of the bichloride or subnitrate of mercury. The *first* may be detected by digesting a little of it in alcohol, decanting the clear portion, and testing it with a drop or two of liquor of potassa, when a reddish precipitate will be formed, if any bichloride be present. The *subnitrate* may be detected by digestion in dilute nitric acid, and the addition of a little liquor of potassa, as before, when a similar precipitate will fall down if it be contaminated with this salt. "It is pulverulent, whitish, and sublimes (entirely) by heat. It becomes black on the addition of potassa, then heat being applied, it runs into globules of mercury. Neither nitrate of silver, lime water, nor sulphuretted hydrogen being added to the water in which it has been washed or boiled, throws down anything." (Ph. L.) "Ether agitated with it, filtered, and then evaporated to dryness, leaves no crystalline residuum, and what may be left is not turned yellow with liquor of potassa." (Ph. E.)

Tests. See *Mercury.*

Uses. Calomel is one of the milder mercurials, and in this respect, takes its position immediately after *blue pill, quicksilver with chalk,* and the *gray oxide;* but it probably ranks before all the other salts of mercury. Universal experience appears to show it to be a most valuable *alterative,* when judiciously administered. With this intention it is given in *doses* of ¼ to 1 gr., generally combined with antimonials, as in Plummer's pill, and repeated every night, or every other night, for some time, followed by a mild saline aperient in the morning. As a *purgative,* 2 to 5 gr., either combined with or followed by other purgatives, as jalap, rhubarb, senna, colocynth, Epsom salt, &c. As a *vermifuge,* 2 to 5 gr. overnight, followed by a sufficient dose of castor oil next morning. *Combined with opium,* it is frequently used in various complaints to produce salivation, or bring the system under the influence of mercury. It is also employed as a *sedative* and *errhine,* and in a vast number of other indications. It is, indeed, more *frequently* used, and in a *greater variety* of complaints, than probably any other medicine.

Obs. Of the two methods of preparing calomel, that by *precipitation* is not only the best, but the most economical. That by *sublimation,* is, however, the one generally adopted in England. Mr. Brande states that "a small portion of chloride of sodium is *apt* to remain combined with it, which *might* affect its medical uses." Such a contamination is not found in carefully prepared "precipitated calomel," although we doubt whether the quantity of it which exists in any of the samples we have met with, (being merely a trace,) would at all interfere with its therapeutical action; more especially when it is recollected that alkaline chlorides are present in, not merely the primæ viæ, but also in every part of the animal body. The late Mr. Fownes, a chemist who was unsurpassed in the accuracy of his researches, and the caution and delicacy with which he expressed his opinions, once assured us that calomel was more easily and cheaply prepared of the best quality by precipitation than by sublimation; and that if from careless manipulation it occasionally contained a minute quantity of common salt, this was of much less importance than the contamination of corrosive sublimate which was frequently present in samples of sublimed calomel.

To produce a superior article of calomel in the *dry way* is a somewhat difficult task, and the process frequently fails in the hands of inexperienced operators. The solution of the quicksilver is best made in an iron vessel, and the sublimation should be conducted (*preferably*) in an earthenware retort with a *short* but *very wide* neck, and fitted to a spacious receiver, having a large flat bottom, also of earthenware, and containing a little *cold water.* On the *small scale,* the heat may be applied by means of a sand-bath. The form above given for *calomel, by precipitation,* produces a large product, perfectly free from corrosive sublimate and subnitrate of mercury, and is consequently free from the objections frequently raised against that mode of preparing it.

"The form in which calomel sublimes depends much upon the dimensions and temperature of the subliming vessels. In small vessels it generally condenses in a crystalline cake, the interior surface of which is often covered with beautiful quadrangular prismatic crystals, transparent, and of a texture somewhat elastic or horny. In this state it acquires, by the necessary rubbing into powder, a decidedly yellow or buff colour, more or less deep, according to the degree of trituration it has undergone. If, on the contrary, the calomel be sublimed into a very capacious and cold receiver, it falls in an impalpable and perfectly white powder, which requires only one elutriation to fit it for use; it then remains perfectly colourless." (Brande.)

The long-continued action of steam on calomel in a state of minute division, is attended by the formation of a small quantity of corrosive sublimate. (Righini.) Boiling water, hot air, and light, also produce a like effect.

MERCURY (Bichloride of). Syn. *Perchloride of Mercury, Corrosive Sublimate, Oxymuriate of Mercury, Chloro-hydrargyric Acid; Chloride* or *Protochloride of Mercury,*—Berzelius; Graham. *Hydrargyri Bichloridum,*—Ph. L. *Sublimatus Corrosivus,*—Ph. E. *Sublimatum Corrosivum,*—Ph. D. *Hydrargyri Oxymurias,*—Ph. L. 1824. *Hydrargyrus Muriatus,*—Ph. L. 1788. *Mercurius Corrosivus Sublimatus,*—Ph. L. 1746. *Hydrargyri Murias Corrosivus,*—Ph. D. 1826. *Muriate of Mercury, Corrosive do. do., White Mercury,*—Obs. var. This is the "corrosive sublimate" of the shops.

Prep. 1. (Ph. L.) *Mercury,* 2 ℔; *sulphuric acid,* 21½ fl. oz. (3 ℔,—Ph. L. 1836); boil to dryness, and rub the residuum of *bipersulphate of mercury,* when cold, with *chloride* *of sodium*, 1½ lb, in an earthenware mortar; lastly, sublime by a gradually increased heat.

2. (Ph. E.) *Quicksilver*, 4 oz.; *sulphuric acid*, 2 fl. oz. 3 fl. dr.; *pure nitric acid*, ½ fl. oz.; dissolve, add of *chloride of sodium*, 3 oz., and sublime, as before.

3. (Ph. D.) *Persulphate of mercury*, 2 parts; *dried chloride of sodium*, 1 part; triturate, &c., as before.

Prop. The corrosive sublimate of commerce occurs in white, semi-transparent, crystalline masses, of considerable density; it possesses an intense coppery taste; is soluble in about 19 parts of cold, and in 3 parts of boiling water ("in its own weight,"—Ure); the boiling solution deposits its excess of salt in long white prisms as it cools; soluble in 7 parts of cold alcohol (2¼ parts,—Ure), and in 3½ parts of boiling alcohol; very soluble in ether, which has even the property of withdrawing it from its aqueous solutions; the addition of hydrochloric acid, sal ammoniac, or camphor, increases its solubility in all these menstrua. It is decomposed by contact with nearly all metallic bodies, and in solution, by various organic substances, and by exposure to light. Sp. gr. 5·2 (5·14,—Ure; 5·14 to 5·42,—Liebig). It melts at about 509° Fahr., and boils and volatilizes at a higher temperature.

Pur. "Crystalline, liquefies by heat, and quickly (and entirely) sublimes. It is (entirely) soluble in water, rectified spirit, and ether. What is precipitated from the watery solution, on the addition of potassa, soda, or lime-water, is reddish; but when these are added more abundantly it is yellowish. This (yellow substance), when heated, evolves oxygen, and runs into globules of mercury." (Ph. L.)

Tests. By the tests noticed at *p.* 769, the presence of corrosive sublimate as a *persalt of mercury* is, under most circumstances, readily detected. To show that this persalt exists under the form of *bichloride* we must apply the tests for chlorine or hydrochloric acid. If, on filtering the solution, acidulating it with dilute nitric acid, and testing it with nitrate of silver, a cloudy white precipitate be formed, which is insoluble in excess of the precipitant, and in nitric acid, but soluble in ammonia water, and blackened by lengthened exposure to light, corrosive sublimate is shown to be present in the substance examined. Calomel, the only compound of mercury with chlorine besides corrosive sublimate, is an *insoluble* powder, which could not, therefore, be found in the *filtered* liquid. Calomel or the white precipitate formed by the *protosalts of mercury* with hydrochloric acid and the soluble chlorides, is soluble in excess of chlorine, and is not only insoluble in liquor of ammonia, but is *immediately* blackened by it.

For the purpose of *demonstrating* the *presence of corrosive sublimate* in a *highly coloured liquid* or one *loaded* with *organic matter*, it is necessary to agitate it for some minutes with an equal volume of *ether*. After repose for a short time the ethereal solution is decanted, and allowed to evaporate spontaneously. The residuum (if any) contains the corrosive sublimate, which after being dissolved in *distilled water*, is readily recognized by the above characteristics.

When the substance under examination consists of food, or the contents of the digestive canal, or of animal tissue, it is in general necessary to destroy the organic matter in a nearly similar way to that described under "*testing for arsenious acid*." The process adopted by M. Devergie for this purpose consists in dissolving the substance in *concentrated hydrochloric acid*, and passing a *stream of chlorine* through the liquid.—M. Flandin first carbonizes the mass with ⅓ or ½ its weight of *concentrated sulphuric acid*, at 212° Fahr., and then saturates the acid in the cold, with *dry chloride of lime*, added in fragments, assisting the action by stirring, and further adding, by degrees, as the matter thickens and becomes white, a sufficient quantity of *distilled water*.—M. Lassaigne boils the suspected mixture for some time with a *solution of chloride of sodium*; a method which, according to Orfila, is not sufficiently delicate to withdraw minute portions of mercury from flesh.—M. Millon agitates organic liquids (more especially *blood*, *milk*, &c.) in large flasks containing *gaseous chlorine*, which is frequently renewed. — M. Orfila either dissolves the matter in *aqua regia*, and passes a *stream of chlorine* through the liquid, or he carbonizes it by means of *concentrated sulphuric acid*, in close vessels.—M. Personne proceeds by a similar method, but avoids raising the temperature of the substances operated on.—M. Reveil employs either the last method or that of M. Millon. In all cases it is advisable to operate in close vessels, on account of the volatility of the bichloride. M. Orfila's apparatus consists of a mattras, provided with a bent tube, the one end of which is plunged into a jar of cold distilled water. The corrosive sublimate is found both in the volatilized matter, and in the carbonized residuum;

and is extracted from the latter by boiling it for 15 or 20 minutes in *aqua regia*.

When the organic matter has been destroyed by any of the above processes, and a colourless and filtered solution in *distilled water* obtained, the usual tests may be at once applied. But in this way, we can only detect the presence of mercury, but are unable to decide in what way it has entered the system, although we may infer it from other circumstances. It is, therefore, *absolutely necessary*, in all medico-legal investigations, to previously employ ether (see *above*), in order that we may be enabled to examine the deleterious matter in its original form, or that in which it was swallowed.

Uses, &c. Bichloride of mercury is employed as an alterative, diaphoretic, and resolvent, in the chronic forms of secondary syphilis, rheumatism, scrofula, cancer, old dropsies, numerous skin diseases, &c.; and *externally*, as a caustic, in cancer, and made into an ointment, lotion, or injection, in a vast number of skin diseases, ulcers, gleet, &c., and as a preventive of contagion. It acts quicker than the other preparations of mercury, and it is less apt to induce salivation; but it has been said that its effects are less permanent. *Dose.* $\frac{1}{16}$ to $\frac{1}{4}$ gr., either made into a pill, or in solution. It is *highly poisonous*, and must be exhibited and handled with the greatest caution. Its use is contra-indicated in cases complicated with pulmonary affections or nervous derangement.

Pois.—1. *Symptoms.* Strong coppery or metallic taste; intense pain in the mouth, pharynx, œsophagus, stomach, and intestines; nausea, vomiting (often bloody), diarrhœa, and (sometimes) violent dysentery (these evacuations are generally more frequent than in poisoning by other metallic compounds). After a certain time, there is generally an abatement of the severity of the symptoms; the circulation becomes slower, the pulse small and thready, the respiration gentle, and the skin cold; syncope then supervenes, and great general insensibility, always commencing at the pelvic extremities; and sometimes convulsions occur; the secretion of urine is generally diminished, sometimes even entirely suppressed; but the patients always urinate if the sublimate has been employed in a very diluted state, and if drinks have been administered. Death often appears to result from the shock to the nervous system, from intense exhaustion, or from mortification or intense inflammation of the primæ viæ. Poisoning by *corrosive sublimate* is distinguished from that by *arsenic*, by "the countenance being flushed, and even swollen; whereas, in poisoning by arsenic, it is usually contracted and ghastly" (Christison); and by "the whitened condition of the epithelium of the mouth." (Pereira.)

2. *Antidotes.—White of egg, hydrated persulphuret or protosulphuret of iron*, and *gluten*, are each of them powerful antidotes. White of egg has proved efficacious in numerous cases. (Christison, Thénard, Ure, and others.) It requires the white of one egg to decompose 4 gr. of corrosive sublimate. (Peschier.) The recently precipitated protosulphuret of iron is, however, according to M. Mialhe, the antidote *par excellence*, not only to corrosive sublimate, but to the salts of lead and copper. The *gluten of wheat* has also been recommended (Taddei); or what is equally efficacious, *wheat flour* mixed up with water. When any of the above are not at hand, copious draughts of *milk* may be substituted. *Iron filings* have been occasionally used as an antidote. All these substances should be taken in considerable quantities; the dose should be frequently repeated, and the *general treatment* similar to that in cases of poisoning by arsenic. (See *p.* 93-4.) Vomiting should be, in all cases, immediately induced, to remove, if possible, the poisonous matter from the stomach.

Obs. In preparing corrosive sublimate, as well as calomel, by the common process, the solution of the mercury is usually made in an iron pot, set in a furnace under a chimney, to carry off the fumes; and the sublimation is conducted in an earthen alembic placed in a sand bath; or in an iron pot, covered with a semi-spherical earthen head. Corrosive sublimate may also be made by the direct solution of the *red oxide of mercury* in *hydrochloric acid*, or by bringing its constituents together in the state of vapour. The latter plan was patented by the late Dr. A. T. Thomson. See *Hydrargyro-chlorides, Hydrated Sulphuret of Iron, Mercury, &c.*

MERCURY (Bichloride of,—Albuminated). Syn. *Hydrargyri Bichloridum cum Albumine*,—Lat. *Prep.* From *bichloride of mercury* (in fine powder), 1 dr.; *rectified spirit*, 4 fl. dr.; dissolve, and add, gradually, the *strained white of* 2 *eggs* (previously diluted with an equal volume of *water*), triturating all the time; next place the mortar in *water*, nearly boiling, and continue stirring the mixture until it acquires a sufficient consistence; lastly, spread it on plates, and dry it in warm air. Milder than corrosive sublimate, but equally effective in double doses.

MERCURY (Bichloride of,—Ioduretted). Syn. *Hydrargyri Bichloridum Ioduretum*,—Lat. *Prep.* (Lassaigne.) Add a *solution of corrosive sublimate* to an *alcoholic solution of iodine* until the colour disappears, then gently evaporate and crystallize. An exceedingly active preparation. *Dose.* $\frac{1}{16}$ to $\frac{1}{8}$ gr. See *Iodo-chloride of Mercury.*

MERCURY (Cyanide of). Syn. *Bicyanide of Mercury, Percyanide of do., Cyanuret of do.; Hydrargyri Bicyanidum,*—Ph. L. 1836. *Hyd. Cyanuretum,*—Ph. D. 1826. *Prussiate of Mercury, Hydrocyanate of do., Cyanodide of do., Prussian Mercury, Hydrargyri Hydrocyanas, Hydrargyrum Borussicum, &c.,*—Obs. var. There is only one compound of cyanogen and mercury, the names of which, as applied by different parties, vary according to their view of the atomic weight of the metal, in a similar way to those of the chlorides, oxides, &c.

Prep. 1. (Ph. L. 1836.) *Percyanide of iron* (pure prussian blue), 8 oz.; *binoxide of mercury*, 10 oz.; *distilled water*, 4 pints; boil for half an hour, filter, evaporate, and crystallize; wash what remains frequently with *boiling distilled water*, and again evaporate that crystals may form. This is Proust's process.

2. (Ph. D. 1826.) *Prussian blue* (pure), 6 parts; *nitric oxide of mercury*, 5 parts; *distilled water*, 40 parts; as the last.

3. (Winckler.) Saturate *dilute hydrocyanic acid* with *binoxide of mercury;* evaporate and crystallize. Pure.

Prop., &c. Heavy, colourless, inodorous, square prisms; tasting strongly metallic; soluble in 8 parts of cold water; slightly soluble in alcohol. Those made by the first two formulæ are of a pale yellow colour. It is "transparent and totally soluble in water. This solution, on the addition of hydrochloric acid, evolves hydrocyanic acid, known by its smell; and a glass moistened with a solution of nitrate of silver, and held over it, gives a deposit soluble in boiling nitric acid. When heated it evolves cyanogen, and runs into globules of metallic mercury." (Ph. L. 1836.) It has been administered in some hepatic and skin diseases, and has been proposed as a substitute for corrosive sublimate. (Parent.) It has been said to act directly on the skin and bones, and to have proved useful in allaying the pain of nodes and in dispersing them. (Mendaga.) It is, however, principally used as a source of cyanogen and hydrocyanic acid. *Dose.* $\frac{1}{16}$ to $\frac{1}{4}$ gr. (beginning with the smaller quantity), made into pills with crum of bread, or in alcoholic solution; as a *gargle* or *lotion*, 10 gr., to water, 1 pint; as an *ointment*, 10 or 12 gr., to lard, 1 oz.

MERCURY (Ferrocyanide of). Syn. *Hydrargyri Ferrocyanidum,*—Lat. A white powder which separates from a *solution of a salt of mercury* on the addition of *ferrocyanide of potassium.* It suffers decomposition almost as soon as precipitated.

MERCURY (Hydrochlorate of). See *Bichloride of Mercury.*

MERCURY (Hydrocyanate of). See *Cyanide of Mercury.*

MERCURY (Iodate of). Syn. *Hydrargyri Iodas,*—Lat. *Prep.* Precipitate a *solution of mercury in nitric acid* with a solution of *iodate of potassa.* A yellow powder resembling Turpeth's mineral.

MERCURY (Iodide of). Syn. *Protiodide of Mercury, Ioduret of do., Green Iodide of do.; Subiodide of do.,*—Berzelius; Graham. *Hydrargyri Iodidum,*—Ph. L. *Hyd. Iod. Viride,*—Ph. D. *Prep.* 1. Precipitate a *solution of protonitrate of mercury* by another of *iodide of potassium;* wash the precipitate, first in a *solution of chloride of sodium*, and then in *pure water;* lastly, dry it in the shade.

2. (Ph. L.) *Mercury*, 1 oz.; *iodine*, 5 dr.; triturate together, gradually adding of *rectified spirit*, q. s. (about 1 to 2 fl. dr.), until globules are no longer seen; dry the powder by a gentle heat, in the shade, as quickly as possible, and preserve it in a well-stopped black-glass vessel. The formula of the Ph. D. is similar.

Prop., &c. A heavy, greenish-yellow powder; insoluble in water, alcohol, and a solution of common salt; soluble in ether, and slightly so in an aqueous solution of iodide of potassium. "Freshly prepared it is yellowish. Heat being cautiously applied it sublimes in red crystals, which quickly turn yellow, and, on access of light, blacken. It is insoluble in a solution of chloride of sodium." (Ph. L.) The process of the Ph. L. does not answer when larger quantities than 4 or 5 *oz.* are prepared at once; owing to the great heat generated by the reaction of the ingredients, and the consequent volatilization of a portion of the iodine, by which the colour of the product suffers. *Dose.* $\frac{1}{2}$ to 1 gr., made into pills; "in syphilis and scrofula, especially where they occur in the same individual." (Pereira.) It is also used *externally*, in the form of ointment. It is *very poisonous.*

MERCURY (Biniodide of). Syn. *Periodide of Mercury, Deutiodide of do., Red Iodide of do.; Iodide* or *Proti-*

tiodide of do.,—Berzelius; Graham. *Prep.* 1. (Ph. L. 1836.) *Mercury*, 1 oz.; *iodine*, 10 dr.; *rectified spirit*, q. s. (2 or 3 fl. dr.); triturate until the globules of mercury disappear, and the mixture assumes a scarlet colour, then dry it in the *shade*, and preserve it in a well-stoppered vessel.

2. (Ph. E.) *Mercury*, 2 oz.; *iodine*, 2½ oz.; *spirit*, q. s.; triturate together as last, dissolve the product, by brisk ebullition, in *concentrated solution of chloride of sodium*, 1 gall., filter whilst boiling hot, wash the crystals that are deposited as the solution cools, and dry them.

3. (Ph. D.) *Bichloride of mercury*, 1 *oz.; hot distilled water*, 25 fl. oz.; dissolve; *iodide of potassium*, 1¼ oz.; *water*, 5 fl. oz.; dissolve; when the solutions are cold, mix them, collect the precipitate on a paper filter, drain it, wash it with *distilled water*, 10 fl. oz., and dry it at a heat not above that of boiling water.

Prop., &c. A bright scarlet powder, soluble in alcohol, and in the solutions of several of the iodides and chlorides. It is also soluble in cod-liver oil, and in several other fixed oils. (Pharm. Journ., xiii, 188.) *Dose.* $\frac{1}{16}$ to $\frac{1}{4}$ gr., dissolved in alcohol or made into a pill; in the same cases as the subiodide, from which it differs chiefly in its greater energy, and *poisonous* qualities.

Obs. The last is the most convenient process; but the Edinburgh formula produces the most sightly preparation. The treatment with a solution of common salt, may, however, be applied to biniodide of mercury prepared by any other process. Not more than 4 or 5 *oz.* can be conveniently prepared at a time by direct admixture of the ingredients, as in the first process, for the reasons already stated. "By heat, cautiously applied, it is (entirely) sublimed in scales, which soon become yellow, and afterwards, when they are cold" (or at once if touched by a hard body), "red. It is partially soluble in boiling rectified spirit, and the solution affords crystals as it cools. It is alternately dissolved and precipitated by iodide of potassium and bichloride of mercury. It is completely soluble in a solution of chloride of sodium." (Ph. L. 1836.) "Entirely soluble in 40 parts of a concentrated solution of muriate of soda at 212°, and is again deposited in fine red crystals on cooling." (Ph. E.)

The bright yellow powder that forms when a mixed solution of *protonitrate* and *pernitrate of mercury* (the latter in excess) is treated with another of *iodide of potassium*, is said to be "*sesquiodide of mercury.*" It should be purified by digestion in a concentrated solution of common salt, and then washed and dried.

MERCURY (Iodo-chloride of). Syn. *Iodo-hydrargyrate of Chloride of Mercury; Hydrargyri Iodo-chloridum*,—Lat. *Prep.* (Boutigny.) *Crystals of calomel* are suspended in a stoppered bottle, at the bottom of which is placed some *iodine;* after a time the crystals assume a red colour, and are then removed, and preserved in a well-stoppered bottle.

MERCURY (Iodo-bichloride of). Syn. *Chlor-iodide of Mercury, Iodo-hydrargyrate of Bichloride of do.; Hydrargyri Chloro-iodidum, Hyd. Iodo-bichloridum*,—Lat. *Prep.* 1. (Caventou.) *Biniodide of mercury* is dissolved in *rectified spirit* holding an equal weight of *bichloride of mercury* in solution, and the liquid is either gently concentrated so that crystals may form, or it is at once evaporated to dryness.

Obs. The last two preparations possess considerable remedial power in certain complaints, but their precise action has not yet been determined. They are said to combine the properties of their constituents, but to be more active than either of them. *Dose.* $\frac{1}{20}$ to $\frac{1}{10}$ gr. M. Recamier has recommended the last one as a powerful discutient. It is principally used in the form of ointment.

MERCURY (Iodo-cyanide of). See *Iodo-cyanide of Mercury and Potassium.*

MERCURY (Muriates of). See *Chlorides of Mercury.*

MERCURY (Nitrates of). Nitric acid varies in its action upon mercury, according to the temperature. When *cold* and somewhat diluted, only salts of the protoxide or gray oxide are formed; and these are either neutral or subsalts, just as the acid or the metal happens to be in excess. When, however, the nitric acid is concentrated and hot, the mercury is raised to its highest state of oxidation, and a salt of the binoxide or red oxide is produced. Both classes of salts are apt to be decomposed by a large quantity of water, giving rise to insoluble, or sparingly soluble compounds, containing an excess of base, which are rendered more and more basic as the washing is prolonged, or the temperature of the water raised. No less than six solid compounds of nitric acid and the oxides of mercury are named by chemical writers, of which only two, or at most three, are of practical importance.

MERCURY (Protonitrate of). Syn. *Nitrate of Mercury, Nitrate of Suboxide of Mercury, Neutral do.; Hydrargyri Nitras, Hyd. Protonitras*,—Lat. *Prep.* 1. By digesting *mercury*, in excess, in *cold dilute nitric acid*, observing to remove the short prismatic crystals within a short time after they are formed; these when drained, and redissolved in *water slightly acidulated with nitric acid*, furnish crystals of pure "*neutral protonitrate of mercury*" by cautious evaporation.

2. (P. Cod.) *Quicksilver* and *nitric acid* (sp. gr. 1·320), equal parts; mix in a wide-bottomed glass matrass, and after digestion for 24 hours in a cool situation, remove the crystals which have formed, wash them with a little *nitric acid*, drain them, and preserve them from the air in a stoppered bottle.

Obs. When the above salt is triturated with an excess of chloride of sodium, and water subsequently added, the whole of the mercury is thrown down as calomel, and the filtered supernatant liquid does not contain corrosive sublimate. If this last salt is detected, the salt examined contained peroxide of mercury; and if any basic nitrate of the protoxide was present, the newly formed calomel has a green or gray colour. *Dose.* $\frac{1}{16}$ to $\frac{1}{8}$ gr. It is seldom used internally. A *solution* is sometimes employed as a mild caustic to ulcers; and, more dilute, as a *lotion* in lepra, porrigo, psoriasis, &c.; or made into an *ointment*, in the same diseases. The "*acid nitrate of mercury*" (*hydrargyri nitratis acidum*) of the P. Cod. is made by dissolving *quicksilver* in twice its weight of *nitric acid* (sp. gr. 1·320), and evaporating the solution to 3-4ths of its original weight. Dr. H. Bennett's preparation under the same name is made with similar proportions, but *strong nitric acid* is used, with heat. It is therefore an *acid pernitrate.* Both are employed as *liquid caustics.*

MERCURY (Pernitrate of). Syn. *Nitrate of Peroxide of Mercury; Hydrargyri Pernitras*,—Lat. *Prep.* 1. (*Neutral.*) This can only be obtained by solution of *red oxide of mercury* in excess of *nitric acid.* The solution evaporated in a bell-jar over sulphuric acid or lime, yields crystals which are neutral. The same compound is obtained as a crystalline powder when the *syrupy liquid* is dropped into *strong nitric acid.*

2. (*Bibasic pernitrate of mercury, Dipernitrate of do.*) By dissolving *quicksilver* in excess of *nitric acid*, with heat, until the solution, when diluted with distilled water, ceases to give a precipitate with common salt. It is now a mixed solution of the neutral and bibasic pernitrates; but by evaporation crystals of the latter salt only are deposited. The *acid solution* (before evaporation) is used as a caustic in cancerous, syphilitic, and other ulcerations; but it frequently produces intense pain, and occasionally, the usual constitutional effects of mercury. It was *formerly* given in similar cases to those in which the bichloride is now employed. *Dose.* (Of the dry salt) $\frac{1}{20}$ to $\frac{1}{12}$ gr. This last is the preparation ordinarily referred to under the name "*pernitrate of mercury.*"

MERCURY (Subnitrate of). Syn. *Tribasic Pernitrate of Mercury; Dinitrate of do.? Hydrargyri Subnitras*,—Lat. This compound is prepared by saturating *strong nitric acid* with *mercury*, by heat, throwing the solution into *cold water*, and collecting, and drying the precipitate. It is also formed when the *crystallized pernitrate of mercury* is put into *hot water.*

Obs. This preparation is a heavy, yellow powder, but the shade varies according to the heat of the water employed to effect the precipitation, until, at the boiling temperature, the colour is a dull red. It is extensively employed for the *extemporaneous* preparation of the *ointment of nitrate of mercury*, according to the formula on the following label which accompanies each bottle:—"*Hydrarg. subnitras.*" "*Two scruples, mixed with one ounce of simple cerate, make the ung. hydrarg. nit. of the London Pharmacopœia.*" We need scarcely add that this statement, so unblushingly uttered, is a dangerous falsehood. An ointment so made possesses neither the quantity of mercury nor of nitric acid employed in the pharmacopœia preparation, besides wanting many of its most sensible and valuable properties. (Cooley, Chem., iv, 374.)

MERCURY (Oxides of). Of these compounds there are two, which are, perhaps, more clearly distinguished by names indicative of their colour, than by their more recent synonymes.

MERCURY (Protoxide of). Syn. *Oxide of Mercury, Gray Oxide of do., Black Oxide of do.; Dioxide* or *Suboxide of do.*,—Brande; Graham. *Hydrargyri Oxydum*,—Ph. L. 1836. *Hyd. O. Cinereum*,—Ph. L. 1824. *H. O. Nigrum*,—Ph. D. 1826. *Prep.* 1. (Ph. L. 1836.) *Calomel*, 1 oz.; *lime water*, 1 gall.; mix, agitate well together, decant the clear liquid after subsidence, and well wash the sediment with *distilled water;* lastly, drain and dry it, wrapped in bibulous paper, in the air.

2. (Ph. D. 1826.) *Sublimed calomel*, 1 part; *liquor of potassa* (warm), 4 parts; triturate together, &c., as last.

3. (Donovan; Liebig.) Briskly triturate *calomel* in a mortar with *pure potassa*, in

excess; wash it with *cold* water, and dry it in the shade.

Prop., &c. A very dark gray or black powder, rapidly suffering decomposition by exposure to light and air, becoming olive coloured, from a portion being resolved into metallic mercury and binoxide. "Digested for a short time in dilute hydrochloric acid, it remains undissolved, and the filtered liquid is not affected by liquor of potassa, or by oxalate of ammonia. It is totally soluble in acetic acid, and *entirely* dissipated by heat." (Ph. L. 1836.) *As a medicine*, pure protoxide of mercury is *one* of the mildest of the mercurials, and is used both internally and externally; but chiefly, as a fumigant, or made into an ointment. *Dose.* ½ gr. to 3 gr. twice a day.

Obs. The compound sold for the above in the shops, has usually a dirty gray colour, and contains much undecomposed calomel. The beautiful blue-black, or dark slate-blue powder prepared by decomposing calomel with liquor of ammonia, or a mixture of the liquors of ammonia and potassa, as recommended by Mr. Tyson, is not pure protoxide of mercury, and differs from the old preparation known as "Hahnemann's black oxide of mercury" only in containing variable proportions of the *proto-ammonio-chloride*, and in possessing much more power than the pure protoxide.

MERCURY (Binoxide of). Syn. *Deutoxide of Mercury, Peroxide of do., Red Oxide of do.; Oxide* or *Protoxide of do.*,—Berzelius; Brande; Graham. There are several methods by which this substance may be prepared. The following are those which have been ordered at different times in the pharmacopœias:—

1. By Precipitation,—*Hydrargyri Binoxydum*, Ph. L. 1836. *Bichloride of mercury*, 4 oz.; *distilled water*, 6 pints; dissolve, and add of *liquor of potassa*, 28 fl. oz.; drain the precipitate, wash it in distilled water, and dry it by a gentle heat.

Obs. A bright orange-red powder. It usually contains a little combined water; hence its readier solubility in acids than the oxide prepared by heat. "When heated sufficiently it yields oxygen, and the mercury either runs into globules, or is totally dissipated. It is *entirely* soluble in hydrochloric acid." (Ph. L. 1836.) The preparation of the shops has frequently a brick-red colour, and contains a little *oxychloride of mercury*, arising from too little alkali being used.

2. By Calcination of Metallic Mercury,—*Red Precipitate per se, Calcined Mercury, Coagulated do.; Hydrargyrus Calcinatus*, Ph. L. 1788. The *mercury* is placed in a glass vessel having a narrow mouth and a broad bottom, and exposed to a heat of about 600° Fahr., until it is converted into red scales.

Obs. This process is very tedious and unsatisfactory, as it requires considerable attention, and generally occupies *several weeks* to complete it. It is now obsolete. The *product* has the form of small brilliant scales of a ruby red-colour.

3. By Calcination of Nitrate of Mercury,—*Nitric Oxide of Mercury, Red Precipitate; Hydrargyri Nitrico-oxydum*, Ph. L. *Hyd. O. Rubrum*, Ph. E. & D. *Hydrargyrus Nitratus Ruber*, Ph. L. 1788. *Mercury*, 3 *lb.; nitric acid*, 18 fl. oz. (1½ *lb.*, Ph. L. 1836); *water*, 2 quarts; dissolve by a gentle heat, evaporate to dryness, powder, and calcine this in a shallow vessel, with a gradually increased heat, until red vapours cease to arise. The processes of the Ph. E. and D. are similar, except that the Dublin College directs the evaporation and calcination to be performed in the same vessel, *without powdering* or *stirring* the mass.

Obs. Bright red crystalline scales, which usually contains a little undecomposed pernitrate of mercury; in other respects it resembles the last two preparations. It is more generally used as an *escharotic* and in *ointments*, than the precipitated oxide. It is volatilized by heat without the evolution of nitrous vapours. "It consists of crystalline, shining, red scales; at an intense heat it sublimes and gives out no acid vapours. It is (entirely) soluble in hydrochloric and in nitric acid." (Ph. L.) "Neither lime water nor sulphuretted hydrogen produce any change in water in which it has been boiled." (Ph. L. 1836.) According to Mr. Brande, it contains about 2½ per cent. of nitric acid. According to Mr. Barker, the process of the Ph. D. yields the finest coloured product; but Mr. Brande states, that "the nitrate requires to be *constantly* stirred during the process, which is usually performed in a cast-iron pot." (Man. of Chem.) On the *large scale* the evaporation is generally conducted in a shallow earthen dish, and as soon as the mass becomes dry, a second dish is inverted over it, and the calcination is continued, without disturbance, until the process is concluded. The heat of a sand bath is employed. 100 *lb.* of *mercury* and 48 *lb.* of *nitric acid* (sp. gr. 1·48) yield 112 *lb.* of *red precipitate.* (Brande.)

Uses, &c. Red oxide of mercury, whether obtained by calcination or precipitation, possesses the same general properties. It is very slightly soluble in water, but sufficiently so to give that fluid an alkaline reaction and a metallic taste. The test of purity given in the Ph. L. 1836, therefore, requires some qualification. It was formerly employed in *medicine* to induce salivation; but is now chiefly used as an escharotic, either in the form of powder or made into an ointment. *Dose.* ⅛ to 1 gr., combined with opium. It is very *poisonous.*

MERCURY (Oxide of,—Hahnemann's). See *Hahnemann's Soluble Mercury.*

MERCURY (Oxide of,—Nitric). See *Binoxide of Mercury.*

MERCURY (Oxide of,—Sulphuric). See *Subsulphate of Mercury.*

MERCURY (Oxymuriate of). See *Bichloride of Mercury.*

MERCURY (Panacea of). Calomel.

MERCURY (Phosphate of). Syn. *Hydrargyri Phosphas, Hydrargyrum Oxydulatum Phosphoricum,*—Lat. *Prep.* Add a *solution of protonitrate of mercury* (slightly acidulated with nitric acid) to a *solution of phosphate of soda,* and wash and dry the precipitate which forms. In its physical characters it closely resembles calomel, than which it is said to be more appropriate in certain cases, especially in secondary syphilis. Alkalies turn it black. *Dose.* ¼ to 1 gr., made into a pill with sugar and aromatics.

MERCURY (Potassio-tartrate of). Syn. *Pressavin's Vegeto-mercurial Salt; Hydrargyri Potassio-tartras,*—Lat. *Prep.* (Van Mons.) To a *boiling saturated solution of nitrate* (protonitrate) *of mercury* add, drop by drop, a *boiling saturated solution of bitartrate of potassa,* as long as a precipitate forms; wash this in *cold water,* dissolve it in *boiling water,* and set the solution aside to crystallize. *Dose.* ½ to 2 gr. It forms the basis of the once celebrated *liqueur de Pressavin,* but is now seldom used. According to Soubeiran, its composition is variable.

MERCURY (Precipitates of).—*Black Precipitate,* Hahnemann's soluble mercury. —*Green do.* (mercurius præcipitatus viridis, lacerta viridis), from equal parts of *quicksilver* and *copper,* separately dissolved in *nitric acid,* the solutions mixed, evaporated to dryness, and then calcined until red fumes cease to arise. Caustic.—*Red do.,* nitric oxide of mercury.—*White do.,* ammonio-chloride of mercury.

MERCURY (Submuriate of). Calomel.

MERCURY (Submuriate of,—Ammoniated). See *Ammonio-chloride of Mercury.*

MERCURY (Subsulphate of). Syn. *Yellow Subsulphate of Mercury, Subpersulphate of do., Tribasic Persulphate of do., Turpeth Mineral, Turbith do., Queen's Yellow; Hydrargyri Subsulphas, H. S. Flavus, Turpethum Minerale; H. Oxydum Sulphuricum,*—Ph. D. 1826. *Prep.* 1. Dissolve *mercury* in an equal weight of *oil of vitriol* by boiling them to dryness, fling the mass into *hot water,* and wash and dry the resulting yellow powder.

2. (Ph. D. 1826). *Persulphate of mercury,* 1 part; *warm water,* 20 parts; triturate together in an earthen mortar, wash well with *distilled water,* drain, and dry it.

Prop., &c. A heavy, lemon-yellow powder, soluble in 2000 parts of cold, and about 600 parts of boiling water. By long-continued washing with very hot water, it loses all its remaining acid, and is at length converted into red oxide of mercury. *Dose.* As an *alterative,* ⅛ to ½ gr.; as an *emetic,* 3 to 5 gr.; as an *errhine,* 1 gr., mixed up with a pinch of liquorice powder or mild snuff. It is a *powerful poison,* and one of the least useful of the mercurial preparations.

Obs. The temperature of the water employed to decompose the persulphate influences the shade of colour of the resulting subsulphate, in a similar manner to that pointed out under the subnitrate. A *sulphate of the gray oxide* (frequently called subsulphate) falls as a white crystalline powder when sulphuric acid is added to a solution of protonitrate of mercury. It is now superseded as a pigment by chrome yellow and orpiment, which are not only more beautiful, but cheaper preparations.

MERCURY (Persulphate of). Syn. *Bipersulphate of Mercury; Hydrargyri Bipersulphas; Hyd. Persulphas,* — Ph. D. 1826. *Prep.* (Ph. D. 1826.) Dissolve *mercury,* 6 parts, in a mixture of *sulphuric acid,* 6 parts, and *nitric acid,* 1 part, by boiling them in a glass vessel, and continue the heat until the mass becomes perfectly dry and white. *Used* to make calomel.

Obs. When 2 parts of mercury are gently heated in 3 parts of sulphuric acid, *protosulphate* of mercury is formed; but if the solution be effected by a strong heat, and the liquid be evaporated to dryness, a *bisulphate of the peroxide* (bipersulphate) results. When this sulphate is thrown into hot water, decomposition ensues, the yellow *subsulphate of mercury* is precipitated, and a portion of the bisulphate, together with some free sulphuric acid, remains in solution. (Liebig.) The above sulphates should be entirely volatilized by heat.

MERCURY (Sulphurets of). Two sulphurets of mercury are used in pharmacy and the arts :—

MERCURY (Protosulphuret of). Syn. *Black Sulphuret of Mercury, Sulphide of do., Subsulphide of do., Amorphous Sulphuret of do.; Hydrargyri Sulphuretum, H. S. Nigrum,*—Lat. This falls as a black precipitate when a *solution of protonitrate of mercury* is treated with *sulphuretted hydrogen* or *hydrosulphuret of ammonia.*

MERCURY (Sulphuret of,—with Sulphur). Syn. *Ethiop's Mineral; Hydrargyri Sulphuretum cum Sulphure,*—Ph. L. 1836. *Hyd. S. Nigrum,*—Ph. L. 1824 & Ph. D. 1826. *Hydrargyrus cum Sulphure,*—Ph. L. 1788. *Æthiops Mineralis,* Ph. L. 1745. *Prep.* (Ph. L. 1836 & Ph. D. 1826.) *Quicksilver* and *sulphur*, equal parts, triturated together (in a stone-ware mortar,—Ph. D.) until globules are no longer visible.

Prop., &c. A heavy, insoluble, black powder. It is frequently met with imperfectly prepared, and sometimes adulterated. It is said to be a mixture of bisulphuret of mercury and sulphur, in variable proportions, depending on the length of the trituration. On the *large scale*, it is generally made by melting the ingredients together, and afterwards reducing the mass to fine powder in a mill or mortar. It is said to be vermifuge and alterative, and has been used in some cutaneous and glandular diseases, but appears to be nearly inert. *Dose.* 5 to 30 gr.

Pur. If it contains *free mercury*, it will stain a piece of bright copper or gold *white* when rubbed on it; if it contains *charcoal, blacklead,* or *bone black*, these will remain behind when it is heated; the presence of *black sulphuret of antimony* may be detected by boiling it in hydrochloric acid, and testing the filtered liquid. The sp. gr. indicates whether it contains the proper quantity of mercury. When pure "it is totally dissipated by heat (without incandescence), no charcoal or phosphate of lime being left." (Ph. L. 1836.)

MERCURY (Bisulphuret of). Syn. *Red Sulphuret of Mercury, Factitious Cinnabar, Vermilion; Sulphide* or *Sulphuret of Mercury,*—Brande; Graham. *Hydrargyri Bisulphuretum,*—Ph. L. *Cinnabaris,*—Ph. E. *Hyd. Sulphuretum Rubrum,*—Ph. L. 1824 & Ph. D. *Cinnabaris Factitia,*—Ph. L. 1746. *Prep.* (Ph. L.) *Quicksilver*, 24 oz.; *sulphur*, 5 oz.; melt together, and continue the heat till the mixture swells up, then cover the vessel, remove it from the heat, and when cold, powder, and sublime it. The formulæ of the other Colleges are similar.

Prop., &c. Bisulphuret of mercury has a dark-red semi-crystalline appearance in the mass, but acquires a brilliant scarlet colour by powdering. It is tasteless, odourless, and insoluble. It is chiefly used as a pigment; but it is occasionally employed in medicine as a diaphoretic and vermifuge, and in some cutaneous diseases, and gout. *Dose.* 10 to 30 gr.; as a *fumigation* about ½ dr. is thrown on a plate of iron heated to *dull* redness. For the last purpose it is inferior to the gray oxide of mercury, owing to the more irritating nature of its vapour.

When pure, "it is totally dissipated by heat; and on potassa being added to it, runs into globules of mercury. It is insoluble in nitric or hydrochloric acid, but dissolves in a mixture of them. Spirit, water, or acetic acid digested on it, acquires no colour, nor is either of these menstrua afterwards affected by iodide of potassium." (Ph. L. 1836.) See *Vermilion.*

MERCURY (Tartrate of). Syn. *Prototartrate of Mercury; Hydrargyri Tartras,*—Lat. *Prep.* 1. (Swediaur.) By boiling *gray oxide of mercury* in a *solution of tartaric acid* until saturated, and then evaporating so that crystals may form as the liquid cools.

2. By adding a *solution of tartrate of potassa* to a *cold solution of protonitrate of mercury in water slightly acidulated with nitric acid,* as long as a precipitate forms. *Dose.* ½ to 2 gr.

MERCURY (Alkalized). See *Mercury and Chalk.*

MERCURY (Ammoniated). See *Ammonio-chloride of Mercury.*

MERCURY BASE. When red oxide of mercury is digested in a large excess of *pure caustic ammonia*, a yellow compound is obtained, possessing powerful basic properties. When heated to 260° Fahr., it becomes brown and anhydrous, and then is capable of forming well-defined compounds with the acids, and absorbing carbonic acid with avidity from the air, like baryta or lime. It is insoluble in water, alcohol, and ammonia, and is unaffected by cold liquor of potassa.

MERCURY (Calcined). See *Binoxide of Mercury.*

MERCURY (Coagulated). See *Binoxide of Mercury.*

MERCURY (Corneous). Native calomel.

MERCURY (Cosmetic). See *Ammonio-chloride of Mercury.*

MERCURY (Hahnemann's Soluble).

Syn. *Black Precipitate of Mercury, Hahnemann's Black Oxide of do.; Hydrargyri Præcipitatum Nigrum, Hydrargyrum Oxydulatum Nigrum, Mercurius Solubilis Hahnemanni,*—Lat. *Prep.* 1. By dropping *weak liquor of ammonia* into a *solution of protonitrate of mercury,* as long as the precipitate formed is of a black colour; the powder is washed, dried in the shade without artificial heat, and then preserved from the light and air.

2. (Ph. Bor. 1847.) *Solution of protonitrate of mercury* (recent; sp. gr. 1·1), 9¼ oz.; *distilled water,* 2 ℔; mix, filter, and add to the solution *liquor of ammonia* (sp. gr. 0·960), ½ oz., diluted with *water,* 4 fl. oz.; collect the powder immediately on a filter, wash it with *water,* 5 fl. oz., and dry it, &c., as before. A very black powder. *Dose.* ¼ to 1 gr.

MERCURY OF LIFE. Oxychloride of antimony.

MERCURY (Prussian). See *Cyanide of Mercury.*

MERCURY (Purified). See *page* 768.

MERCURY (Sweet). See *Calomel.*

MERCURY AND AMMONIA (Chloride of). Syn. *Sal Alembroth; Hydrargyri et Ammonii Chloridum,* — Lat. *Prep.* (P. Cod.) From *bichloride of mercury* and *sal ammoniac,* equal parts, triturated together. "The object in adding the sal ammoniac here, is to render the corrosive sublimate more soluble in water. The action of the latter is not otherwise altered." (Redwood.) It is chiefly used for lotions and injections.

MERCURY AND AMMONIA (Nitrate of). Syn. *Ward's Mercurial Salt; Ammonio-nitrate of Mercury; Hydrargyri et Ammoniæ Nitras,*—Lat. *Prep.* To *nitric acid,* 4 parts, contained in a spacious bolthead or matrass, add, gradually, *sesquicarbonate of ammonia,* 2 parts; afterwards add of *quicksilver,* 1 part, and digest in a gentle heat, until the solution is complete; then gradually increase the heat, and add a little more *quicksilver* at intervals, until no more will dissolve; lastly, evaporate the liquid until a pellicle forms, and set it aside to crystallize. More active than the simple nitrate. It is the basis of Ward's "*white drop.*"

MERCURY AND ANTIMONY (Sulphuret of). Syn. *Hydrargyri et Antimonii Sulphuretum, H. et Stibii S., Hydrargyrum Stibiato-sulphuretum, Æthiops Antimonialis,*—Lat. *Prep.* (Ph. Austr. 1836, *Hamb.* 1845, Saxon. 1837, &c.) *Quicksilver* and *sulphur,* of each, 1 part; *powdered sulphuret of antimony,* 3 parts; triturate in a warm mortar (adding a *little hydrosulphuret of ammonia*) until the globules are extinguished. See *Ethiops of Antimony.*

MERCURY AND POTASSIUM (Iodide of). Syn. *Iodo-hydrargyrate of Potassium, I. of Iodide of Potassium; Hydrargyri et Potassii Iodidum,* — Lat. *Prep.* 1. (M. Boullay.) *Biniodide of mercury, iodide of potassium,* and *water,* equal parts; dissolve by heat, and crystallize by evaporation or refrigeration, or gently evaporate to dryness.

2. (Puche.) From *biniodide of mercury* and *iodide of potassium,* equal parts, triturated together. *Dose.* $\frac{1}{16}$ to ⅛ gr., dissolved in water; in the same cases as the biniodide, and in chronic bronchitis, hooping-cough, inflammatory sore-throat, &c.

MERCURY AND POTASSIUM (Iodocyanide of). Syn. *Hydrargyro-iodocyanide of Potassium; Hydrargyri et Potassii Iodocyanidum,*—Lat. *Prep.* To a *concentrated solution of bicyanide of mercury* add a *rather strong solution of iodide of potassium,* and dry the precipitate by a gentle heat.

Prop., &c. Small, white, pearly, crystalline plates or scales. It is chiefly used as a test of the purity of hydrocyanic acid. When put into this liquid it is instantly turned red if any mineral acid is present.

MERCURY AND QUININE (Chloride of). Syn. *Hydrargyri et Quinæ Chloridum,*—Lat. *Prep.* (M'Dermott.) From *bichloride of mercury,* 1 part; *hydrochlorate of quinine,* 3 parts; separately formed into *saturated* solutions with *water,* and then mixed; the crystalline precipitate is collected, and dried by a gentle heat. *Dose.* ⅛ to ½ gr., made into a pill with crum of bread; daily as an alterative in debilitated habits; or combined with opium, thrice daily, to produce salivation.

MERCURY (with Chalk). Syn. *Quicksilver with Chalk, Mercurial Powder; Hydrargyrum cum Cretâ,* — Ph. L. E. & D. *Gray Powder, Alkalized Mercury, Mercurius Alkalisatus, Æthiops Absorbens,*—Lat. var. *Prep.* (Ph. L. & E.) *Quicksilver,* 3 oz.; *prepared chalk,* 5 oz.; triturated together until globules are no longer visible.

2. (Ph. D.) *Quicksilver,* 1 *oz.; prepared chalk,* 2 *oz.;* as last.

3. (Ph. D. 1826.) As *quicksilver and magnesia,* Ph. D. 1826, but using *precipitated chalk.* This is about twice as strong as the *quicksilver and chalk* of the present pharmacopœias.

Prop., &c. A gray powder. "When pure, part is evaporated by heat; what remains is colourless, and totally soluble in acetic acid with effervescence; this solution is not coloured by sulphuretted hydrogen. These substances can scarcely be so diligently triturated that no globules shall be visible." (Ph. L. 1836.) As commonly met with, this powder contains too little mercury. When properly prepared, it effervesces when digested in *cold dilute acetic acid*, and the dark undissolved portion, when dried, should be equal to ⅜ths of the weight of the powder employed; this residuum should also be totally dissipated by heat, without incandescence, and readily and entirely soluble in nitric acid; when examined by the microscope it should exhibit minute globules of mercury unmixed with foreign matter.

Uses. Quicksilver with chalk is a very mild mercurial, and also possesses antacid properties. It is much used in the syphilitic affections of infancy, in disordered or deficient action of the liver, clay-coloured stools, purging, &c.; and as an alterative in chronic glandular enlargements, &c. *Dose.* 5 to 20 gr., for an adult; 1 to 3 gr., for children.

Obs. To hasten the extinction of the globules, sufficient water is commonly added to form a portion of the chalk into a pasty mass. Mr. Tyson has proposed the following substitute for the preparation of the Pharmacopœias:—*Calomel*, 4 oz.; *liquor of potassa*, 6 fl. oz., or q. s.; triturate together, add of *liquor of ammonia*, ½ fl. oz., and again triturate; decant the clear liquid, well wash and gently dry the bluish powder, and mix it with twice its weight of *prepared chalk*. See *Protoxide of Mercury.*

MERCURY (with Magnesia). Syn. *Hydrargyrum cum Magnesiâ*,—Ph. D. *Prep.* 1. (Ph. D.) From *mercury*, 1 *oz.; carbonate of magnesia*, 2 *oz.;* triturated together until the globules disappear.

2. (Ph. D. 1826.) *Quicksilver* and *manna*, of each, 8 parts; triturate together (adding enough *water* to make a paste) till the globules disappear, then add of *carbonate of magnesia*, 1 part, mix, and further add of *warm water*, 64 parts; again well mix, and after repose, decant the clear; repeat the washing with *fresh water*, a second, and a third time, then add 3 parts more of *carbonate of magnesia*, mix well, and dry the whole on bibulous paper. *Uses* and *dose* the same as those of mercury and chalk.

MERCURY (with Gum). Syn. *Hydrargyrum cum Acaciâ*,—Lat. *Prep.* (P. Cod.) *Mercury*, 1 part; *gum*, 2 parts; make a mucilage with 1-4th the *gum*, rub the mercury with it till extinguished, add the *remainder of the gum* with *water*, q. s., mix well, dry by a gentle heat, and pulverize. *Dose, &c.* As the last.

MERCURY (with Sugar). Syn. *Mercurius Saccharatus, Hydrargyrum Saccharatum*,—Lat. *Prep.* From *quicksilver* and *white sugar*, of each, 1 oz.; *oil of tansey*, ½ fl. dr.; triturate till the globules disappear. *Dose.* ½ to 1 dr.; as a vermifuge. The Ph. E. 1744 orders *oil of juniper* instead of oil of tansey.

MESMERISM. Syn. *Animal Magnetism.* The French government, about 70 years since, appointed a committee to investigate the merits of this agent or influence, among whom were Bailly, Franklin, Lavoisier, and other persons of equally high scientific qualifications and unblemished integrity. An English translation of their report was published in 1785, from which we make the following extract:—"This pretended agent is not magnetism; for, on examining the assumed grand reservoir of the fluid by a needle and electrometer, neither magnetism nor electricity could be detected. We tried it upon ourselves and others without effect; and on blindfolding those who possessed great susceptibility of its influence, all its ordinary effects were produced when *nothing* was done but when they imagined they were magnetized, whilst none of its effects were produced when they were really magnetized but imagined nothing was done." "The effects, therefore, are *purely imaginary;* and although they have wrought some cures, they are *not without danger*, for the convulsions sometimes spread among the feeble of body and mind, and especially among women. And, finally, there are parts of the operations which may readily be turned to vicious purposes; and, in fact, *immoral practices* have already grown out of them." Our personal observations in connection with this subject, extending over a period of many years, have confirmed the truthfulness of the opinions so fairly stated by the committee of Continental philosophers just referred to. Every impartial investigator must, indeed, soon discover the whole of the pretended powers of animal magnetism, electro-biology, or mesmerism, to be a mockery and a delusion, the influence of which, whether for evil or good, entirely depends on the weak or disordered mental organization of its dupes. A short time since we heard one of the oldest and most successful lecturers on this subject, admit the whole to be an imposture; and he explained the way in which the "startling effects" were accomplished.

They all depended on his vigorous power of arresting the attention of the party and leading the imagination in a certain direction; points on which, Love, the polyphonist, and other conjurers and ventriloquists, infinitely excelled him. "Unfortunately, some lamentable attempts have been made, during the last few years, to revive mesmerism in London; not by quacks and impostors, but by regular practitioners, and even by persons who enjoy no inconsiderable share of public respect and favour. They have, however, reaped the bitter fruits of their credulity and folly; and the mania has again subsided, and will now probably remain dormant." The admirable exposures which have, from time to time, appeared in the columns of the '*Lancet*,' have done much to effect this desirable object.

MESITILOLE. An oily liquid obtained by distilling *acetone* along with about half its volume of *Nordhausen* or *fuming sulphuric acid.* It is lighter than water, is very inflammable, and has a feeble garlic odour.

MESITYLE. Syn. *Mesitule.* This name has been applied by Kane to the theoretical organic radical or salt-basyle, of which acetone is presumed to be the hydrated oxide. *Chloride of mesityle* is made by acting on acetone with perchloride of phosphorus; and this compound, by the action of pure potassa water, yields chloride of potassium and *oxide of mesityle. Mesitylene* is obtained with other products when acetone is distilled with fuming sulphuric acid. (Kane.)

MESLIN. A mixture of various kinds of grain. (Brande.)

MESOXALIC ACID. A compound formed with other products when a saturated solution of alloxanate of baryta or strontia is heated to the boiling point.

Prep. A *solution of alloxan* is slowly added to a *boiling solution of acetate of lead,* and the heavy granular precipitate is collected, washed, and decomposed by *sulphuretted hydrogen;* the filtered solution yields crystals by evaporation.

Prop., &c. Very acid taste and reaction. Its salts are called *mesoxalates.* Those with baryta and lime are only slightly soluble in water. *Mesoxalate* of silver is insoluble, and suffers decomposition, with effervescence, when gently heated.

METACETONE. Syn. *Propione.* A colourless, ethereal liquid obtained by distilling a mixture of *sugar,* 1 part, and *finely-powdered quicklime,* 8 parts, at a heat of about 285° Fahr., and adding *water* to the product, when the *metacetone* separates. It is insoluble in water, and boils at 212° Fahr.

METACETONIC ACID. Syn. *Propionic Acid.* This compound is obtained along with other products during the distillation of a mixture of *metacetone, bichromate of potassa,* and *sulphuric acid.* It closely resembles acetic acid, from which, however, it is distinguished by the high solubility of its soda salt. *Metacetonate of baryta* yields *pure metacetonic acid* by destructive distillation.

METAGALLIC ACID. Syn. *Melangallic Acid.* Obtained by heating *dry gallic acid* or *tannic acid,* by a quick fire, to about 490° Fahr., or until it froths, melts, and becomes black and solid, then dissolving the residuum in an *alkali,* filtering, and precipitating by an *acid.* An insoluble, black powder.

METAL. Syn. *Metallum,*—Lat. See *Metals.*

METALDEHYDE. The colourless, transparent, prismatic crystals that form in *aldehyde* when kept at ordinary temperatures. It is soluble in alcohol and ether, insoluble in water, and sublimes, without fusion, at a temperature a little above 212° Fahr.

METALLICA. Preparations of the metals. One of the divisions of the Ph. L.

METALLIC TRACTORS (Perkins'). These were formed of two small rods of different metals, and resembled, in principle, the galvanic rings of the present time. They were used by simply drawing them over the affected part. They were introduced as a method of curing diseases, by Dr. Perkins, of Norwich, Connecticut, towards the end of the last century, and their employment was called "*Tractoration*" or "*Perkinism.*" They have now long sunk into disuse.

METALLIC TREES. See *Vegetation* (Metallic).

METALLIZING (by electricity). See *Voltatype.*

METALLO-CHROMES. A name given by Nobili to extremely thin films of *peroxide of lead* deposited by electrolytic action upon plates of polished steel, so as to produce an iridescent play of colours. The effect is often very beautiful.

METALLOIDS. A name sometimes applied to the *non-metallic inflammable bodies,* as sulphur, phosphorus, &c., and to the metallic bases of the alkalies and earths.

METALLURGY. The art of working in metals, from the state of ore to the manufactured implement or utensil. It is now usually restricted to the separation of metals from their ores or combinations. "This art," says Dr. Ure, "which supplies industry with the instruments most essential to its wants, is alike dependent upon the sciences of *chemistry* and *mechanics;* upon the *former,* as directing the smelting processes best adapted to disentangle each metal from its mineralizer; upon the *latter,* as furnishing the means of grinding the ores, and separating the light stony parts from the rich metallic matter."

"Notwithstanding the striking analogy which exists between common chemical and metallurgic operations, since both are employed to insulate certain bodies from each other, there are essential differences which should be carefully noted. In the *first* place, the *quantity* of *materials* being *always very great in metallurgy,* requires corresponding adaptations of apparatus, and often produces peculiar phenomena; in the *second* place, the *agents to be employed* for treating great masses, must be selected with a view to economy, as well as chemical action. In *analytical chemistry,* the main object being exactness of result, and purity of product, little attention is bestowed upon the value of the reagents, on account of the small quantity required for any particular process. But in *smelting metals* upon the *great scale,* profit being the sole object, cheap materials and easy operations are *alone* admissible." (Dict. Arts, Man. & Mines, Ed. 4, ii, 146.)

The above admirable remarks from the pen of so distinguished a chemist and mineralogist, at once point out a criterion of the value of all metallurgical operation, and will serve to lead the spirit of enterprise and experiment in the right direction. The limits of this work do not permit of more than a general reference to the leading operations of metallurgy under this head. These are—*digging, picking* or *sorting, stamping* or *crushing,* and *washing,* included under the general term "*dressing ores;*"—*roasting* or *calcination,* which is either performed with the fuel in contact with the ore, or in reverberatory furnaces; and the *liquation or reduction to the reguline form.* The application of these processes is noticed under the leading metals. Those who desire to study them more minutely are referred to the authority quoted above.

METALS. Syn. *Metalla,*—Lat. Metals are elementary or undecompounded bodies which are distinguished by their weight, lustre, fusibility, power of conducting heat and electricity, &c., and the numerous compounds which they furnish by combination with one another, and with other bodies. When their solutions are electrolysed, the metals always appear at the electro-negative surface, and are hence termed *electro-positive bodies,* or *cations.*

The characteristics and leading chemical properties of the metals are noticed under each of them in its alphabetical place, and a list of them is given in the table of *elements* at *page* 360. The following table exhibits some other useful particulars:—

Table *of some of the properties of the Metals.*

Names arranged in the order of their			
Ductility.	Malleability.	Power of conducting Heat.	Power of conducting Electricity.
Gold.	Gold.	Gold.	Copper.
Silver.	Silver.	Platinum.	Gold.
Platinum.	Copper.	Silver.	Silver.
Iron.	Tin.	Copper.	Zinc.
Copper.	Platinum.	Iron.	Platina.
Zinc.	Lead.	Zinc.	Iron.
Tin.	Zinc.	Tin.	Tin.
Lead.	Iron.	Lead.	Lead.
Nickel.	Nickel.		Mercury.
			Potassium.

METAMARGARIC ACID. A compound formed along with *metoleic acid* by the action of *sulphuric acid* on twice its weight of *olive oil,* in the cold. It is a solid substance, which closely resembles ordinary margaric acid.

METAMERIC. Isomeric. See *Isomerism.*

METANTIMONIC ACID. The name given by M. Fremy to that variety of antimonic acid obtained by decomposing *pentachloride of antimony* (See *p.* 71). It differs from common antimonic acid in being *bibasic*, and forming two different classes of salts with the acids. The *acid metantimoniate of potassa* is the only reagent which yields a precipitate with the soda salts, and is therefore of great value in chemical analysis. It is *prepared* by fusing *antimonic acid* with excess of *potassa,* in a silver crucible, dissolving the fused mass in a little *cold water*, and allowing it to crystallize in vacuo. The resulting crystals (*metantimoniate of potassa*) by solution in *pure water*, are resolved into free potassa and the *acid salt.* (Fremy.)

METAPECTIC ACID. See *Pectine.*

METAPECTINE. See *Pectine.*

METAPHOSPHORIC ACID. See *Phosphoric Acid.*

METASTYROL. A peculiar substance into which *styrol* is converted by exposure, in a sealed glass tube, for about half an hour, to a temperature of about 400° Fahr. It is a transparent, glassy, fusible substance, which, by distillation at a high temperature, is again reduced into the form of liquid styrol.

METHEGLIN. Syn. *Hydromeli, H. Vinosum, Mellis Vinum,*—Lat. *Prep.* From *honey,* 1 cwt.; *warm water,* 24 gall.; stir well until dissolved; the next day, add of *yeast,* 1 pint; and *hops,* 1 *lb.*, previously boiled in *water,* 1 gall.; along with *water,* q. s. to make the whole measure 1 barrel; mix well, and ferment the whole with the usual precautions adopted for other liquors. It contains on the average from 7% to 8% of alcohol. *Mead* and *metheglin* are frequently confounded together. (See *p.* 758.)

METHIONATE OF BARYTA. *Prep.* Saturate *ether* with *anhydrous sulphuric acid,* at the ordinary temperature of the atmosphere, dilute with *water,* neutralize with *carbonate of baryta,* and when nearly about to crystallize, add an equal bulk of *alcohol; methionate of baryta* will be precipitated, and may be purified by re-solution and crystallization. Resembles chlorate of potassa, and is soluble in water.

METHIONIC ACID. A sour liquid, obtained from *methionate of baryta,* in the same way as ethionic acid is from ethionate of baryta. Its salts have been little studied.

METHYLAL. A peculiar ethereal liquid obtained along with other products by distilling a mixture of *pyroxylic spirit, water, oil of vitriol,* and *binoxide of manganese.*

METHYLAMINE. Syn. *Methylammonia.* A gaseous substance prepared by distilling *cyanate of methyle* with a *concentrated boiling solution of hydrate of potassa,* and collecting the product in a receiver surrounded with ice; the distillate is saturated with *hydrochloric acid,* and evaporated to dryness; the crystalline residuum (*chloride of methylammonium*) yields pure *gaseous methylamine* by distillation along with *quicklime,* which must be collected over mercury.

Methylamine has a slight fishy odour and is inflammable, by which it is distinguished from ammonia. Its most remarkable property is its extreme solubility in water, which, at 53·5° Fahr., absorbs above 1000 times its own bulk of this gas. It is liquid at —18° Fahr., and has the sp. gr. 1·08. *Bimethylamine* (bimethyl-ammonia), *trimethylamine* (trimethyl-ammonia), *hydrated oxide of tetremethyl-ammonium, methylamine urea,* and other compounds similar to those formed by ethylamine, have been obtained.

METHYLE. Syn. *Methule, Methylene.* The hypothetical radical of pyroxylic spirit and the methyl-series. It forms a number of compounds analogous to those of ethyle.

METHYLE (Chloride of). *Prep.* From *pyroxylic spirit,* 1 part; *chloride of sodium,* 2 parts; and *oil of vitriol,* 3 parts; heated together, and the evolved gas collected over water. It has a peculiar odour, and a sweetish taste, and burns with a pale flame fringed with green. Sp. gr. 1·731 to air 1.

METHYLE (Cyanide of). *Prep.* A mixture of *sulphomethylate of baryta* and *cyanide of potassium* (both dry) is heated in a retort connected with a well-cooled receiver; the distillate is rectified *first* from *red oxide of mercury,* to remove hydrocyanic acid, and next from *anhydrous phosphoric acid,* to remove water. It is an ethereal, aromatic liquid, boiling at 170½° Fahr., and decomposed by hot caustic potassa.

METHYLE (Hydruret of). Syn. *Hydride of Methyle.* Marsh gas. See *Carburetted Hydrogen.*

METHYLE (Iodide of). *Prep.* From a *mixture* of *phosphorus,* 1 part; *iodine,* 8 parts; and *pyroxylic spirit,* 13 parts; distilled together. A highly volatile, colourless, heavy liquid, insoluble in water, and boiling at 112° Fahr. Sp. gr. 2·237. Its diluted vapour is said to form an excellent inhalation in pulmonary affections and ulcerated lungs; it has also been recommended as an application to scrofulous ulcers. Iodine may be detected in the urine and saliva within a few minutes after smelling it. *Bromide, fluoride,* and *sulphide of methyle* have also been formed.

METHYLE (Oxide of). Syn. *Wood-spirit Ether, Methylic do., Methyl-ether, Hydrate of Methylene.* A gaseous substance obtained from a *mixture of pyroxylic spirit* and *oil of vitriol*, equal volumes, heated together in a flask or retort; the evolved gas (*oxide of methyle*) after being passed through a *strong solution of potassa*, is collected over mercury.

Prop., &c. Colourless, inflammable, liquefies at 2·5° Fahr.; it has an agreeable odour, and it imparts it to water, which absorbs about 35 volumes of this gas. It forms several compound ethers, of which the following are the principal:—

Acetate of Oxide of Methyle, Methylo-acetic Ether. From *pyroxylic spirit,* 2 parts; *glacial acetic acid* and *oil of vitriol*, of each, 1 part; distilled together. It closely resembles ordinary acetic ether; boils at 136° Fahr.; sp. gr. 0·919. It has lately been highly recommended as a diffusible stimulant, and as having a strong tendency to diminish expectoration in phthisis, &c.

Chloro-carbonate of Oxide of Methyle. By the direct action of the *gaseous acid* on *pyroxylic spirit.*

Formiate of Oxide of Methyle, Methylo-formic Ether. A very volatile liquid formed by heating a mixture of equal parts of *sulphate of oxide of methyle* and *dry formiate of soda.*

Nitrate of Oxide of Methyle, Methylo-nitric Ether. A mixture of *pyroxylic spirit,* 1 part, and *oil of vitriol,* 2 parts, is poured upon *nitrate of potassa* (in fine powder), 1 part, contained in a tubulated retort connected with a tubulated receiver containing some *ice-and-salt,* and surrounded with the same, and furnished with a tube to carry off the incondensable gases; the distillate is collected and rectified several times from a mixture of *chloride of calcium* and *litharge,* the product not being collected the last time until the boiling point rises to 150° Fahr. A colourless, neutral liquid, feebly odorous, and burning with a yellow flame; its vapour, heated to 300° Fahr., explodes with tremendous violence. Sp. gr. 1·182.

Oxalate of Oxide of Methyle, Methylo-oxalic Ether. From a *mixture* of *oxalic acid, oil of vitriol,* and *pyroxylic spirit,* distilled together; on the liquid distillate being exposed to the air, part evaporates, and the remainder forms crystalline plates; these, after pressure between the folds of porous paper, are rectified from a little *oxide of lead.* It melts at 124° Fahr., and then resembles ordinary oxalic ether; boils at 322° Fahr. It is soluble in alcohol, ether, and pyroxylic spirit, and in water with decomposition. See *Oxamethylene.*

Sulphate of Oxide of Methyle, Methylo-sulphuric Ether. This is obtained by distilling a *mixture* of *pyroxylic spirit,* 1 part, and *oil of vitriol,* 8 parts; the distillate is agitated with *water,* and rectified from *caustic baryta* (in powder). It is an oily liquid, smelling strongly of garlic, and boiling at 370° Fahr.; sp. gr. 1·324. It is decomposed by water, slowly in the cold, but rapidly and with violence at 212°, pyroxylic spirit and *sulphomethylic acid* being formed. The caustic earths and alkalies also decompose it, with the production of *pyroxylic spirit,* and *sulphomethylate* of the base.

METHYLE (Hydrated Oxide of). See *Pyroxylic Spirit.*

METHYLE ETHER. See *Oxyde of Methyle.*

METHYLE (Zinc). This for the most part resembles zinc-ethyle, and is formed in a similar manner.

METHYLENE. See *Methyle.*

METOLEIC ACID. A liquid oily acid resulting from the decomposition of *sulpholeic acid* by *water.*

MEZEREON. Syn. *Garou; Mezereum,* —Ph. L. E. & D. The "bark of the root" of "*daphne mezereum*" (Linn.) or spurge olive. (Ph. L.) It is employed as a sudorific and alterative, in syphilis, rheumatism, scrofula, and chronic cutaneous diseases, usually in conjunction with sarsaparilla. It has also been used as a masticatory, in toothache, paralysis of the tongue, &c. On the Continent it is used as a *vesicant.* For this purpose it is softened by soaking it in *hot vinegar,* and is then bound on the part, and renewed after intervals of some hours, until vesication is produced. See *Decoctions.*

MICE. See *Rats* and *Vermin.*

MICROCOSMIC SALT. Syn. *Phosphate of Soda and Ammonia, Tribasic do.*

Prep. 1. *Phosphates of soda* and *ammonia,* equal parts; *water,* q. s.; dissolve separately, mix the solutions, evaporate, and crystallize. A slight excess of phosphate of ammonia aids the crystallization.

2. (Fownes.) *Phosphate of soda,* 6 parts; *water,* 2 parts; liquefy by heat, and add of *sal ammoniac* (in powder), 1 part; common salt separates, and after its removal the liquid is concentrated so that crystals may form. *Used* as a flux in blow-pipe assays.

MICROSCOPE. The value of the microscope in chemistry and the collateral sciences, is now so generally acknowledged, that it would be folly to do more than merely to allude to the subject here. Yet the student and busy practitioner who is desirous of possessing himself of one of these useful instruments, is often at a loss where to make his purchase, and after being disgusted with the inferior quality of some, and startled at the high prices of others, sits himself down and abandons the intention altogether. Happily for these parties, Mr. Highley, of 32, Fleet Street, has lately supplied this desideratum, by the production of an instrument under the title "*Hospital Microscope*," which is unique of its kind, and, in the words of its proprietor, "combines economy with simplicity, elegance of form, and excellence of workmanship." It is, indeed, a boon, not only to the professional man, but to every person who feels interested in investigating the forms and structures of that minute, but illimitable world, which lies beyond the reach of unassisted vision. We advise parties who desire to possess a really valuable and useful microscope, to call at Mr. Highley's and judge for themselves.

Under the head "*lens*" we have said a few words on the subject of *simple microscopes*, to which we refer the reader. We may here add, that the *crystalline lens* of the eye of the *common minnow* may be employed instead of the drop of water or Canadian balsam there referred to.

The use of a *brilliant port-fire* has been lately adopted with considerable success as a substitute for the *lime-light* of the oxy-hydrogen microscope. A clear and powerful light is thus produced at very little expense and trouble, adapted to all the more usual applications of the instrument.

MILDEW. Syn. *Rust, Blight.* The mouldy appearance on the leaves of plants produced by innumerable microscopic fungi. The hop, wheat, and the choicest garden fruit-trees are those most commonly attacked. The *causes* are said to be excess of moisture, and absence of the free circulation of air and sunshine. On the *small scale*, finely powdered sulphur is occasionally dusted over the parts affected, as a remedy.

MILIARY FEVER. Syn. *Miliaria,*—Lat. Among the other *symptoms* are—anxiety and frequent sighing, the perspiration has a strong and peculiar smell, and there is a sensation of pricking on the neck and breast, followed by an eruption of small red pimples, which in two or three days become white vesicles, dry up, peel off, and are succeeded by others. The moist weather of spring and autumn are the periods in which it is most prevalent; and delicate females, particularly in child-bed, are those most liable to its attacks. Sometimes it assumes a malignant character. The *treatment* of this affection consists chiefly in combating the depression of the system by a supporting diet; but everything that heats or stimulates the skin should be avoided. The apartment should be kept cool and well ventilated, and cooling saline laxatives and bitter tonics, with cooling drinks, should also be had recourse to.

MILK. Syn. *Lac,*—Lat. The value of milk as an article of food is clearly shown by the fact of it being sufficient to support, and to increase the growth of the young of every species of the mammalia; at once supplying materials for the formation of the osseous, fleshy, and liquid portions of the body. "The substances present in milk are wonderfully adapted to its office of providing materials for the rapid growth and development of the animal frame. It contains an azotized matter, *caseine*, nearly identical in composition with muscular flesh, *fatty principles*, and a peculiar *sugar*, and, lastly, various *salts*, among which may be mentioned *phosphate of lime*, held in complete solution in a slightly alkaline liquid.

"The white, and almost opaque, appearance of milk is an optical illusion. Examined by a microscope of even moderate power, it is seen to consist of a perfectly transparent fluid, in which float about numbers of minute transparent globules; these consist of fat surrounded by an albuminous envelope, which can be broken mechanically, as in the churning, or dissolved by the chemical action of caustic potassa, after which, by agitating the milk with ether, the fat can be dissolved." (Fownes.)

Comp. Cow's MILK, of average quality, contains from 10% to 12% of *solid matter* when evaporated to dryness by steam heat, and has the mean sp. gr., 1·030; while that of the *skimmed milk* is about 1·035; and of the *cream*, 1·0244. (Ure.) The average CREAM of *cow's milk* contains 4·5% of *butter;* 3·5% of *curd*, and 92% of *whey.* (Berzelius.) The SKIMMED MILK consists of *water*, 92·9%; *curd*, 2·8%; *sugar of milk*, 3·5%; *lactic acid, lactate of potash*, and a trace of *lactate of iron*, 0·6%; *muriate* and *phosphate of potash*, and *earthy phosphates* (lime), 0·2%. (Berzelius.)

The following analysis of *fresh milk* is by M. Haidlen:—

Water	873·00
Butter	30·00
Caseine . . .	48·20
Milk-sugar . . .	43·90
Phosphate of lime . .	2·31
„ magnesia .	·42
„ iron . .	·07
Chloride of potassium .	1·44
„ sodium .	·24
Soda in combination with caseine . . .	·42
	1000·

Prop. These are well known. Perfectly fresh milk is slightly alkaline, but soon becomes acid on exposure to the air, and after a time white coagula of caseum, or *curds*, separate from it. This change is immediately effected by the addition of rennet or an acid. That from the first, when dried and pressed, constitutes *cheese.* When rennet ceases to produce coagula, the addition of some acetic acid causes the separation of a further quantity, which is termed *serai* or *zieger.* (See *Cheese.*)

Pur. The milk of London, until recently, was, perhaps, the very worst, and the most adulterated of any in the world. Now happily, owing to the facility of transport afforded by the numerous railways, good milk is as plentiful and nearly as cheap in the metropolis as in the other large towns of the kingdom. The *common frauds* practised by the milk-dealers, are the *addition of water* and the *subtraction of part of the cream.* Sometimes *potato flour* or *farina* is added to the milk to give it a creamy or rich appearance, and this addition is still more frequently made to cream, to increase its consistence and quantity. The method of detecting the first two of these frauds is noticed under "*Lactometer.*" The presence of *potato starch* may be determined by boiling some of the milk with a little vinegar, and after separating the coagula by a strainer, and allowing the liquid to become cold, testing it with solution or tincture of iodine. If it turns *blue,* starch, flour, or some other amylaceous substance has been used to adulterate it. In most cases it will be sufficient to apply the test to the unprepared suspected milk.

It has frequently been stated that chalk, plaster of Paris, gum, gelatine, sugar, flour, mucilage of hemp-seed, the brains of animals, and other similar substances, are often added to London milk; but there is no reason to suppose there is any truth in these assertions, as some of these articles are too costly to be used, and the presence of others would so alter the flavour or appearance of the milk, or would so soon exhibit themselves by subsidence, as to lead to their detection. The "*farm-yard milk*" hawked about the suburbs of London at 2*d.* per quart, contains more than one-half water, and is generally the production of consumptive cows, which are fed almost exclusively on brewers' grains. The milk employed for baths in some of the Metropolitan hospitals also finds its way into the milk-pails of these itinerant dairymen, who appear to act upon the principal that "nothing should be wasted."

Pres. Milk may be preserved in stout bottles, well-corked, and wired down, by heating them, in this state, to the boiling point in a water-bath, by which means the oxygen of the small quantity of inclosed air becomes decomposed. It must be afterwards stored in a cool situation. By this method, which is also extensively adopted for the preservation of *green gooseberries, green peas, &c.*, milk will retain its properties unaltered for years. A few grains of *carbonate of magnesia,* or still better, of *bicarbonate of potassa* or *soda,* may be advantageously dissolved in each bottle before corking it.

Under *Bethel's patent* the milk or cream is scalded, and when cold, strongly charged with *carbonic acid gas,* by means of a soda-water machine, and the corks are wired down in the usual manner. The bottles should be kept inverted, in a cool place.

An *excellent method* of *preventing milk turning sour,* or *coagulating,* is to add to every pint of it about 10 or 12 gr. of *carbonate* or *bicarbonate of soda.* Milk thus prepared may be kept for eight or ten days in temperate weather. This addition is harmless, and, indeed, is advantageous to dyspeptic patients. According to D'Arcet, $\frac{1}{2000}$th part of the bicarbonate is sufficient for the purpose. An excess of alkali used in this manner may be detected by the milk turning turmeric paper brown, even after it has been kept some hours, and by the ash obtained by evaporating a little to dryness and then heating it to dull redness, effervescing with an acid. (See *below.*)

⁂ Milk should not be kept in *lead* or *zinc vessels,* as it speedily dissolves a portion of these metals, and becomes poisonous.

Obs. The principal difference between *cows' milk* and *human milk* consists in the former containing more *caseine* (cheese), and less *sugar of milk* than the latter. Prof. Falkland, who has practically investigated the subject, has prepared a *nutritive* *fluid* for *infants* from cows' milk, closely resembling that of the healthy adult woman. His process is, however, unnecessarily complicated, and, therefore, unsuited to those who would have to employ it in the nursery. To remove this objection, we have adopted the following formula;—*Sugar of milk*, ½ *oz.; hot water*, ¼ pint; dissolve, and when the liquid has become *quite cold*, add it to *fresh cows' milk*, ¾ pint, and stir them together. This quantity, prepared morning and evening, will constitute the proper food for an infant of from 5 to 8 months old. More may be allowed it, if it "craves" it; but there must be no "cramming." At first it will be advisable to remove a *little* of the cream from the milk before adding to it the saccharine solution; but after a few days this will be found to be unnecessary, and, indeed, injurious. One very important particular to be attended to, is the employment of *pure* cows' milk, obtained from a healthy grass-fed animal only. With this precaution, and the use of a *good biberon*, the infant will thrive nearly as well, as on the breast of any human female, excepting its mother's.

Human milk (*lac humanum*), unlike cows' milk, coagulates with difficulty, a fact which has been passed over unnoticed by the majority of writers on the subject. It is sweeter than cow's milk. Some of its properties vary with the food. A drop placed on the nail flows slowly down if it is good.

Asses' milk closely resembles human milk in colour, smell, and consistence, but it contains rather less cream.

Ewes' milk (*lac ovillum*) closely resembles cows' milk, than which, however, it is slightly richer in cream.

Goats' milk, for the most part, resembles cows' milk, but its consistence is much greater, and it contains much more solid matter.

Mares' milk (*lac equinum*), in consistence, is between that of cows' and human milk. Its cream is not converted into butter by agitation. See *Butter, Cheese, Dairy, Lactic Acid, &c.*

MILK (Almond). See *Emulsions.*

MILK (Arrow-root). *Prep.* From *arrow-root*, 1 table-spoonful; first wetted and stirred with a little *cold water*, afterwards adding, gradually, of *boiling water*, ¼ pint; and, lastly, of *boiling milk*, ½ pint; with *sugar, spice, wine, &c.*, to palate. Very nutritious, and excellent in chronic diarrhœa. Some persons employ all milk.

MILK (Artificial). *Prep.* 1. *Asses' milk.* See *p.* 99, and *above.*

2. *Goats' Milk.* (A. T. Thomson.) *Fresh mutton suet* (minced), 1 *oz.;* tie it in a muslin bag and boil it in *cows' milk*, 1 quart; lastly, add of *sugar candy*, 2 dr. In scrofulous emaciation, and in the latter stages of phthisis. The proportion of suet in the above may be advantageously increased a little. The *lac cum sero* of Guy's hospital is a similar preparation.

3. *Human Milk.*—*a.* See *above.*

b. (Rosenstein.) *Almonds* (blanched), 2 in number; *white sugar*, 1 dr.; *water*, 4 fl. oz.; make an emulsion, strain, and add of *fresh cows' milk*, 6 fl. oz. As a substitute for the breast in nursing.

MILK (Chalybeated). Syn. *Lac Ferratum*,—Ph. E. 1744. *Cows' milk*, in which a *red-hot iron* has been repeatedly quenched. Tonic; in debility and diarrhœa.

MILK (Chocolate). *Prep.* Dissolve *chocolate* (scraped), 1 *oz.*, in *boiling new milk*, 1 pint. Nutritious; but apt to offend delicate stomachs.

MILK (Coffee). *Prep.* 1. *Coffee*, 1 *oz.; boiling water*, ¼ pint; infuse for 10 or 15 minutes in a warm situation, and add the strained liquid to *boiling milk*, ¾ pint.

2. *Coffee*, 1 *oz.;* tie it loosely in a piece of muslin, and simmer it for 15 minutes in *milk*, 1 pint. Both the above have been recommended for persons of spare habits, and for those disposed to affections of the lungs, more especially for the asthmatic.

MILK (Elephant's). Syn. *Urine d'Elephant*,—Fr. *Prep.* From *gum benzoin*, 2 *oz.; rectified spirits of wine*, 1 pint; dissolve, add of *boiling water*, 2½ pints, agitate for 5 minutes in a strong corked bottle, and when cold, strain, and add of *lump sugar*, 1½ *lb.*

MILK (Preserved). Syn. *Milk Powder; Lactis Pulvis, Lac Pulveratum*,—Lat. *Prep.* 1. *Fresh skimmed milk*, 1 gall.; *sesquicarbonate of soda* (in very fine powder), 1½ dr.; mix, evaporate to 1-3rd by the heat of steam or a water-bath, with constant agitation, then add of *powdered white sugar*, 3½ *lb.*, and complete the evaporation at a reduced temperature; reduce the dry mass to powder, add the *cream* (well drained) which was taken from the milk, and after thorough admixture put the whole into well-stoppered bottles or tins, which must be at once hermetically sealed.

2. (Legrip.) *Carbonate of soda*, ½ dr.; *water*, 1 fl. oz.; dissolve, add of *fresh milk*, 1 quart; *sugar*, 1 *lb.;* reduce it by heat to the consistence of a syrup, and finish the evaporation on plates by exposure in an oven.

Obs. About an ounce of the powder

agitated with a pint of water, forms an agreeable and nutritious drink, and a good substitute for milk at sea. It may also be used for tea or coffee in the solid form. This process, which is very old, has been recently *patented.* See *Milk* (above), and *Putrefaction.*

MILK (Sago). Syn. *Lac Sago,*—Lat. *Prep.* (Dr. A. T. Thomson.) *Sago,* 1 *oz.; cold water,* 1 pint; macerate ½ an hour, pour off the water, add of *milk,* 1½ pint, and boil slowly until the sago is dissolved. Very nutritious; also in lieu of arrow-root milk.

MILK (Vanilla). Syn. *Lac Vanillæ,*—Lat. *Prep.* 1. *Essence of vanilla,* 12 drops; *lump sugar,* 1 *oz.;* triturate, and add gradually, *new milk,* 1 pint.

2. (Beral.) *Vanilla sugar,* ½ *oz.; milk,* 16 oz.; dissolve.

MILK OF ROSES. Syn. *Lac Rosæ,*—Lat. *Prep.* 1. (*English.*)—*a. Almonds* (blanched), 1 *oz.; oil of almonds,* and *white soft soap,* of each, 1 dr.; *rose water,* 1 pint; make an emulsion.

b. From *liquor of potassa* and *oil of almonds,* of each, 1 fl. oz.; *hot water,* 2 fl. oz.; agitate together until mixed, then add of *rose water* and *distilled* or *filtered soft water,* of each, ¼ pint, and again agitate well.

c. As the last, but using half a teaspoonful of *salt of tartar* for the liquor of potassa.

d. (Redwood.) *Blanched almonds,* 8 *oz.; rose water,* 3 pints; make an emulsion, add of *white Windsor soap, white wax,* and *oil of almonds,* of each, ½ *oz.;* previously melted together by a gentle heat, triturate until united, and strain; lastly, add a solution of *oil of bergamot,* ½ *oz.; oil of lavender,* 1 dr.; and *attar of roses,* ½ dr.; (dissolved in) *rectified spirit,* 12 oz.

2. (*French.*)—*a.* From *rose water,* 1 quart; *tinctures of benzoin* and *styrax,* of each, 1 fl. oz.; *spirit of roses,* ¼ fl. oz.; *rectified spirit,* 2 fl. oz.; mix.

b. (Augustin.) *Tincture of benzoin,* ½ fl. oz.; *liquor of carbonate of potassa,* 2½ fl. dr.; *rose water,* ½ pint; agitate well together. As a lotion in acne.

c. (Giannini.) *Tincture of benzoin,* 1 dr.; *tincture of balsam of Peru,* 20 drops; *rose water,* 1 pint; as the last.

d. (Schubarth.) *Almond paste,* 3 dr.; *rose water,* ½ pint; *tincture of benzoin,* ½ fl. oz. As before. The addition to the last 3 of a little *rectified spirit* is an improvement.

3. (*German.*) From *dilute solution of diacetate of lead* (Goulard water), and *spirit of lavender,* of each, 1 fl. oz.; *rose water,* 6 fl. oz.; *soft water,* 1 pint.

Obs. All the above are used as cosmetic washes, and to remove scurf, pimples, and eruptions, in slight cases.

MILK OF SULPHUR. See *Sulphur* (Precipitated).

MILK BLOTCH. See *Porrigo.*

MILK FEVER. Syn. *Febris Lactea,*—Lat. A febrile condition of the system that sometimes occurs at the time the milk begins to be secreted after parturition. It often assumes a malignant character. See *Puerperal Fever.*

MILK SCALL or *Milk Crust.* See *Porrigo* and *Crusted Tetter.*

MILLEPEDS. Syn. *Millepedes.* Several small insects (*crustaceans*) have been included under this name:—*Armadillo officinalis, a. vulgaris,* common or pill milleped;—*oniscus asellus,* carpenter, or common wood-louse;—*porcellio scaber,* or sclater. These were formerly included in the pharmacopœias, but are now discarded. They were reputed diuretic, anti-icteric, &c. Those still sold in France under the name of *cloportes préparés,* are pill millepeds, which have been killed by tying them loosely in a piece of muslin, and then suspending them over the vapour of boiling spirit. They are afterwards dried.

MILLET. Syn. *Milium,*—Lat. There are several varieties of millet, all of which are imported. That commonly referred to under the name is the produce of *panicum miliaceum* (Linn.) The husked seeds (*milium mundatum*) are used to make gruel, and are ground for flour. *Barbadoes millet* or *Guinea corn,* is produced by *sorghum bicolor* (Willd.);—*Indian* or *Turkey millet* (durra, jooar; milium Indicum) by *sorghum vulgare* (Willd.);—*Yellow Indian millet,* by *sorghum saccharatum* (Willd.) In some parts of the world *millet flour* is used for bread, but it is chiefly cultivated as food for domestic animals.

MIMOTANNIC ACID. Syn. *Tanningenic Acid.* Names given to the astringent matter of *catechu.*

MINCE MEAT. *Prep.* From *stoned raisins, currants, sugar,* and *suet,* of each, 2 *lb.: sultana raisins* and *boiled beef* (lean and tender), of each, 1 *lb.; apples,* 4 *lb.; juice of* 2 *lemons;* the *rind of* 1 *lemon,* chopped very fine; *mixed spice,* ¼ *lb.; candied citron* and *lemon peel,* of each, 2 *oz.; brandy,* a glassful or two; the whole chopped very fine. It may be varied by adding other *spice* or *flavouring,* and by the addition of *eggs,* or the substitution of *chopped fowl* or *veal* for beef, according to the taste of the cuisinier.

MINDERERUS'S SPIRIT. See *Acetate of Ammonia* and *Solutions.*

MINERAL ALKALI. See *Soda.*

MINERAL CHAMELEON. *Prep.* From a mixture of *binoxide of manganese* and *potash* or *nitre*, equal parts, heated to redness. It must be preserved in a well-corked bottle until required for use.

Prop., &c. When dissolved in water its solution, at first green, passes spontaneously through all the coloured rays to the red, when, if potassa be added, the colour retrogrades until it reaches the original green. The addition of oil of vitriol, or of chlorine, renders the solution colourless. The addition of a weak acid, or even boiling or agitating the liquid, turns it from green to red. See *Manganeseous Acid.*

MINERAL GREEN. See *Green Pigments.*

MINERAL MARMORATUM, *Mineral Metalline, Mineral Succedaneum.* See *Teeth* (Stopping for).

MINERAL WHITE. See *White Pigments.*

MINERAL YELLOW. See *Yellow Pigments.*

MINERALIZERS. Substances which, by association with metallic bodies, deprive them of their usual properties, and impart to them the character of ores. Their removal belongs to metallurgy. The term *mineralized* has been applied to caoutchouc, gutta percha, bitumen, &c., which has been combined with sulphur, silica, or metallic matter. See *Metallurgy, Caoutchouc, &c.*

MINIM. Syn. *Minimum,*—Lat. A measured drop, of which 60 are equal to a fluid drachm. The size of drops vary so greatly with different liquids, and are also so much influenced by the size and shape of the vessels from which they are poured, that they afford no reliable measure of quantity for medicinal purposes. The *poured drop* has, in some cases, only ⅓rd the volume of the *measured drop* or *minim;* whilst, in others, it is nearly 3 times as large. According to Mr. Durande, "liquids which contain a small proportion of water, afford a small drop; while, on the contrary, liquids containing a large quantity of water, furnish a large drop." "Among liquids containing a large proportion of water, those which are not charged with remedial substances, give a larger and heavier drop than the same liquids when containing extraneous bodies in solution." (Journ. Phil. Col. of Pharm., i, 165.) In *all* cases in which the word *drop* is mentioned in this work a *minim* is intended, and the quantity should be determined by means of a *graduated minim measure.*

MINIUM. See *Red Pigments.*

MINT. Syn. *Spearmint, Green do.; Mentha Viridis,*—Ph. L. "The recent and the dried flowering herb" of *mentha viridis,* (Linn.) It is aromatic and carminative, but its flavour is less agreeable than that of peppermint. It is employed in flatulence, colic, nausea, diarrhœa, &c.; also to make sauce.

MIRRORS. See *Amalgams, Silvering, Speculum Metal, &c.*

MISCARRIAGE. See *Abortion.*

MITES. See *Acarus.*

MITHRIDATE. Syn. *Damocrates's Confection; Mithridatium, Confectio Damocratis,*—Lat. "This composition originally consisted of but few ingredients; viz., 20 *leaves of rue,* 2 *walnuts,* 2 *figs,* and a *little salt.* Of this we are informed that Mithridates took a dose every morning, to guard himself against the effects of poison. It was afterwards altered, and the number of the ingredients increased to sixty-one. In this more complex form it contained opium, and was, in effect, an aromatic opiate, of which the confection of opium of the present day may be considered as a simplification. The *mithridate* is still prepared in some shops, and is occasionally, though very rarely, prescribed." (Med. Lex.) "The above formulæ" (for *confection* or *electuary of catechu*) "may be considered as the representatives, in our modern pharmacopœias, of the once celebrated recipes for *confectio damocratis* and *theriaca andromachi.*" (Redwood.) The formula of the Ph. L. 1746 would more than fill one of our columns. It contained nearly 50 ingredients, with 2 gr. of *opium* in each ounce. *Mithridate* was formerly conceived to be good for nearly every disease, and an antidote for every known poison.

MIXTURE. Syn. *Mistura,*—Lat. A compound liquid medicine, taken in divided doses.

Mixtures are usually extemporaneous preparations, and in prescribing them, care should be taken not to bring together substances that decompose each other, nor to order heavy powders, that speedily separate from the body of the liquid by subsidence. *Emulsions, juleps,* and *mucilages* are now included in the "*misturæ* of the London Pharmacopœia.

Mixtures are usually *dispensed* in flat octagonal 6 or 8-oz. bottles, with long necks; or in regular "octagons," with short necks, having the doses marked on the glass, to which the strength of the medicine is made to correspond.

The remarks respecting "*draughts*," at *page* 334, equally apply here. By putting the active ingredients of *six* draughts into a 6-oz. mixture bottle, and filling it up with *distilled water*, a mixture will be made of corresponding properties, of which the *dose* will be 2 table-spoonfuls. When the formula for the draughts includes a decoction or infusion as the vehicle instead of water, *four* of them only must be taken, which will then fill the 6-oz. bottle, and the proper *dose* will be 3 table-spoonfuls, or a small wine-glassful.

The following formulæ embrace the whole of the "*misturæ*" of the British pharmacopœias, as well as a few others in general use. These will serve as examples for the like preparations of medicinals which are not included in the list. (See also *Draughts, Emulsions, Juleps, Waters, &c.*)

MIXTURE (Absorbent). See *Antacid Mixture.*

MIXTURE (Acacia). See *Gum Mixture.*

MIXTURE (Acetate of Ammonia). Syn. *Minderus's Mixture; Mistura Ammoniæ Acetatis,*—Lat. *Prep.* From *solution of acetate of ammonia*, 1½ fl. oz.; *nitre*, 40 gr.; *camphor mixture*, 6 fl. oz.; *rose syrup*, ½ fl. oz. *Dose.* 1 to 3 table-spoonfuls, every third or fourth hour, as a diaphoretic in inflammatory fevers, &c.

MIXTURE (Alkaline). See *Antacid Mixture.*

MIXTURE (Almond). Syn. *Emulsion of Almonds, Milk of do., Mistura Amygdalæ,*—Ph. L. E. & D. *M. Amygdalarum,*—Ph. L. 1824, & Ph. E. *Lac Amygdalæ,*—Ph. L. 1788. *Emulsio Communis,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Confection of almonds*, 2¼ oz.; *distilled water*, 1 pint; gradually add the water to the confection while triturating, until they are mixed; then strain the liquid through linen.

2. (Ph. E.) From *almond confection*, 2 oz., and *water*, 1 quart; as the last. Or, from *sweet almonds* (blanched), 10 dr.; *white sugar*, 5 dr.; *mucilage*, ½ fl. oz. (or *powdered gum*, 3 dr.); made into an emulsion with *water*, 1 quart.

3. (Ph. D.) *Sweet almonds* (blanched), 5 *dr.; refined sugar*, 2 *dr.; powdered gum*, 1 *dr.; distilled water*, 8 *fl. oz.;* as the last.

Obs. The last formula produces the article usually employed in dispensing in the shops. The addition of a little more sugar renders it pleasanter; and 2 or 3 *bitter almonds*, as in the formula of the Ph. D., 1826, or 1 or 2 fl. dr. of *rose* or *orange-flower water*, may occasionally be added to diversify the flavour. *Dose.* 2 or 3 table-spoonfuls, ad libitum; as a demulcent and emollient in coughs and colds, or as a vehicle for more active medicines.

MIXTURE (Ammoniacum). Syn. *Emulsion of Ammoniacum, Milk of do., Mistura Ammoniaci.*—Ph. L. & D. *Lac Ammoniaci*, —Ph. L. 1788. *Prep.* 1. (Ph. L.) *Prepared ammoniacum*, 5 dr.; *distilled water*, 1 pint; rub the ammoniacum with the water, gradually added, until they are perfectly mixed.

2. (Ph. D.) *Ammoniacum*, ¼ *oz.; water*, 8 *fl. oz.;* as the last, but straining through muslin.

Obs. The last formula produces the best and most effective mixture, owing to the use of the raw instead of the strained drug. *Dose.* 1 to 2 table-spoonfuls, either alone or combined with squills or ipecacuanha; as an expectorant and demulcent in chronic coughs, humoral asthma, &c.

MIXTURE (Anodyne). Syn. *Mistura Anodyna, Julepum Calmans,*—Lat. *Prep.* 1. *Prepared chalk*, 2 dr.; *syrup of poppies*, 1 oz.; *fœtid spirit of ammonia*, 1½ dr.; *oils of dill* and *aniseed*, of each, 3 drops; *water*, 4½ fl. oz. *Dose.* A teaspoonful 3 or 4 times a day, in the diarrhœa and colic of infancy.

2. (P. Cod.) *Syrup of opium*, 2 dr.; *syrup of orange flowers*, 6 dr.; *lettuce water*, 4 fl. oz. To allay pain, induce sleep, &c. *Dose.* 1 table-spoonful.

3. (*Vicat's.*) *Ammoniated alcohol*, ¾ fl. oz.; *powdered opium*, 1 dr.; *powdered camphor*, ½ dr.; *proof spirit*, 1½ fl. oz.; digest, with agitation, for 3 or 4 days, and filter. In toothache arising from caries, and as a lotion to the temples in headache.

MIXTURE (Antiemetic). Syn. *Mistura Anti-emetica,*—Lat. *Prep.* 1. *Creasote*, 12 drops; *acetate of morphia*, 1½ gr.; *camphor*, 10 gr.; *rectified spirit*, ½ fl. oz.; *syrup of orange peel*, 1½ fl. oz.; *distilled vinegar*, 4 fl. oz. In sea-sickness, &c. *Dose.* 1 table-spoonful on the approach of vomiting, and repeated at intervals of ½ an hour until the vomiting ceases.

2. (Dr. Barker.) *Compound tincture of camphor*, 1 fl. dr.; *burnt brandy*, 1 fl. oz.; *sugar*, ½ oz.; *infusion of mint*, 6 fl. oz. *Dose.* ½ to 1 table-spoonful every ¼ hour, until the vomiting ceases.

MIXTURE (Antacid). Syn. *Absorbent Mixture, Alkaline do., Mistura Alkalina, M. Antacida,*—Lat. *Prep.* 1. *Liquor of potassa* and *spirit of nutmeg*, of each, 2 fl. dr.; *tincture of rhubarb*, 3 fl. dr.; *tincture of opium*, 1 fl. dr.; *water*, 5 fl. oz. In dyspepsia, heartburn, &c., accompanied with flatulence.

2. *Spirit of sal volatile* and *orange-flower water*, of each, 1 fl. oz.; *simple syrup*, 1½ fl. oz.; *water*, 2½ fl. oz. In acidity, &c., accompanied with langour and low spirits.

3. *Sesquicarbonate of ammonia*, 2 dr.; *syrup of orange peel* and *tincture of gentian*, of each, 1 fl. oz.; *water*, 4 fl. oz.. In dyspepsia, heartburn, &c., arising from excessive indulgence in spirituous or fermented liquors. It also possesses considerable stimulating properties, and will *partially* remove the fit of drunkenness.

4. (Collier.) *Prepared chalk*, 2 dr.; *tincture of ginger*, 2 fl. dr.; *compound tincture of cardamoms*, 1½ fl. oz.; *pimento water*, 6 fl. oz. In diarrhœa accompanied with acidity.

5. (Collier.) *Chalk mixture*, 5 fl. oz.; *tinctures of catechu* and *cinnamon*, of each, ½ fl. oz. In chronic diarrhœa.

6. (Ryan.) *Liquor of potassa*, 2 fl. dr.; *tincture of opium*, 1 fl. dr.; *calcined magnesia*, 1 dr.; *oil of peppermint*, 5 drops; *lime water*, 8 fl. oz. In dyspepsia accompanied with acidity, flatulence, and constipation.

MIXTURE (Anticroupal). Syn. *Mistura Senegæ*,—Lat. *Prep.* (Jadelot.) *Infusion of senega*, 4 oz.; *syrup of ipecacuanha*, 1 oz.; *oxymel of squills*, 3 dr.; *tartarized antimony*, 1½ gr.; mix. By spoonfuls in croup.

MIXTURE (Antiepileptic). Syn. *Mistura Antiepileptica*,—Lat. *Prep.* (M. Lemoine.) *Liquor of ammonia*, 12 drops; *syrup of orange flowers*, 1 oz.; *distilled water of linden flowers*, 2 oz.; *do. of cherry laurel*, ½ oz.; mix. According to M. Lemoine, this is a specific in epilepsy. *Dose.* 1 table-spoonful, or more.

MIXTURE (Antihysteric). Syn. *Mistura Antihysterica*,—Lat. *Potion Antihysterique*,—Fr. *Prep.* (Dr. Josat.) *Cyanuret of potassium*, 1¾ gr.; *distilled lettuce water*, 4½ fl. oz.; *syrup of orange flowers*, 1½ fl. oz. *Dose.* 1 or 2 tea-spoonfuls every ten minutes when the fit is expected; *during the fit* it may be given in double doses. Dr. Josat declares its efficacy to have been indisputably proved, in upwards of 55 cases.

2. (Magendie.) *Cyanide of potassium*, 2 gr.; *lettuce water* (distilled), 4 oz.; *syrup of marshmallow*, 2 oz. Resembles the last.

3. (Dr. Paris.) *Assafœtida*, 1 dr.; *peppermint water*, 5 fl. oz.; make an emulsion and add of *ammoniated tincture of valerian*, 2 fl. dr.; *tincture of castor*, 3 fl. dr.; *sulphuric ether*, 1½ fl. dr. *Dose.* 1 table-spoonful, 3 or 4 times a day, or oftener.

4. (P. Cod.) *Syrup of wormwood*, 1 oz.; *tincture of castor*, ½ dr.; *valerian water* and *orange-flower water*, of each, 2 oz.; *ether*, 1 dr. As the last.

MIXTURE (Antimonial). See *Contra-stimulant Mixture.*

MIXTURE (Antipertussic). Syn. *Mistura Antipertussiens*,—Lat. *Prep.* 1. *Cochineal* (powdered), 2 dr.; *carbonate of potassa*, 1 dr.; *boiling water*, 8 fl. oz.; infuse for 1 hour, strain, and add of *lump sugar*, 1½ *oz.*

2. (Dr. Bird.) *Extract of hemlock*, 12 gr.; *alum*, 25 gr.; *syrup of red poppies*, 2 fl. dr.; *dill water*, 3 fl. oz.

3. (Dr. Reece.) *Tincture of assafœtida*, 1 fl. dr.; *tincture of opium*, 10 or 12 drops; *powdered ipecacuanha*, 10 gr.; *water*, 2 fl. oz. *Dose.* A tea-spoonful every 3 hours, in hooping cough, for a child 2 or 3 years old, and other ages in proportion.

MIXTURE (Antiscrofulous). Syn. *Mistura Antiscrofulosa*,—Lat. *Prep.* From *tincture of bichloride of gold*, 30 drops; *tincture of iodine*, 40 drops; *tincture of gentian*, 1 fl. dr.; *simple syrup*, 7 fl. dr.; *rose water*, 5 fl. oz. *Dose.* A dessert-spoonful 3 or 4 times daily, in a wine-glassful of water; observing to shake the bottle before pouring out the liquid. The writer of this article has seen repeated instances of the excellent effects of this medicine in scrofula, syphilis, and various glandular diseases, even under all the disadvantages of a salt-meat diet, and confinement on shipboard.

MIXTURE (Antispasmodic). Syn. *Mistura Antispasmodica*,—Lat. *Prep.* 1. *Tincture of castor*, 6 fl. dr.; *sulphuric ether* and *laudanum*, of each, 1 fl. dr.; *syrup of saffron*, 1 fl. oz.; *cinnamon water*, 4 fl. oz.

2. (Dr. Collier.) *Assafœtida* and *camphor mixtures*, of each, 2½ fl. oz.; *tincture of valerian*, 1 fl. oz.

3. (P. Cod.) *Lime* or *linden flower water* and *orange flower water*, of each, 2 oz.; *syrup of orange flowers*, 1 oz.; *ether*, ½ dr. *Dose.* (Of each of the above) 1 to 2 table-spoonfuls.

MIXTURE (Aperient). Syn. *Mistura Aperiens*,—Lat. *Prep.* 1. (Abernethy.) *Sulphate of magnesia*, 1 oz.; *manna*, ½ oz.; *infusion of senna*, 1½ fl. oz.; *tincture of senna*, ½ fl. oz.; *mint water*, 2 fl. oz.; *distilled water*, 4 fl. oz.; mix. This is the true "*Abernethy Black Draught.*"

2. (Dr. Christison.) *Sulphate of magnesia*, 1½ oz.; *water*, 4 fl. oz.; dissolve, and add of *tincture of senna*, 1 fl. oz.; *infusion of roses*, 4 fl. oz. *Dose.* A wine-glassful hourly until it begins to operate.

3. (Dr. Collier.) *Sulphate of iron*, 20 gr.;

Epsom salt, 1 oz.; *pennyroyal water*, 1 pint; dissolve. *Dose.* A wine-glassful twice a day, in atonic amenorrhœa.

MIXTURE (Aromatic). Syn. *Mistura Aromatica*,—Lat. *Prep.* 1. (P. Cod.) *Syrup of clove gillyflowers*, 1 oz.; *spirit of cinnamon*, ½ oz.; *confection of hyacinth*, 2 dr.; *peppermint water* and *orange-flower water*, of each, 2 oz.

2. (Guy's Hosp.) *Aromatic confection* (Ph. L., in powder), 3 dr.; *peppermint water*, 9 fl. oz. Sometimes a little *tincture of calumba* is added.

3. (St. B. Hosp.) *Aromatic confection*, 2½ dr.; *water*, 5 fl. oz.; *pimento water*, 3 fl. oz.; mix. The last two are excellent aromatic absorbents in diarrhœa, heartburn, flatulence, acidity, &c. *Dose.* 1 or 2 table-spoonfuls every 2 or 3 hours, or as required.

MIXTURE (Arsenical). Syn. *Mistura Arsenicalis*,—Lat. *Prep.* From *liquor of arsenite of potassa* (Ph. L.), 2 fl. dr.; *compound tincture of cardamoms*, 4 fl. dr.; *cinnamon water*, 2 fl. oz.; *pure water*, 3 fl. oz.; mix. *Dose.* A small table-spoonful, twice a day, after a full meal; in agues, periodic headaches, lepra, psoriasis, chronic rheumatism, &c. It should be exhibited with caution, and its effects watched; and after 5 or 6 days, the dose should be reduced to half the quantity.

MIXTURE (Assafœtida). Syn. *Emulsion of Assafœtida, Milk of do.; Mistura Assafœtidæ*,—Ph. L. 1836 & D. 1826. *Lac Assafœtidæ*,—Ph. D. 1807. *Lac Asæ Fœtidæ*,—Ph. L. 1788. *Prep.* 1. (Ph. L. 1836.) *Assafœtida*, 5 dr.; *water*, 1 pint; mix gradually, triturating all the time.

2. (Ph. D. 1826.) *Assafœtida*, 1 dr.; *pennyroyal water*, 8 fl. oz. As the last. Stimulant and antispasmodic. *Dose.* 1 to 3 table-spoonfuls; chiefly in hysteria. It is also used as an enema in flatulent colic, worms, hooping-cough, and the convulsions of children.

MIXTURE (Astringent). Syn. *Mistura Astringens*,—Lat. *Prep.* 1. (Pradel.) *Tannin*, 12 gr.; *tincture of rhatany*, 1 dr.; *simple syrup*, 7 dr.; *mucilage*, 1 oz.; *camphor mixture*, 4 oz.

2. (A. T. Thomson.) *Extract of catechu*, 2 dr. (or *tincture*, 1 oz.); *cinnamon water*, 8 oz.; dissolve. *Dose.* 1 to 3 table-spoonfuls, after every liquid dejection, in diarrhœa and dysentery.

MIXTURE (Atrophic). Syn. *Mistura Atrophica*,—Lat. *Potion Atrophique*,—Fr. *Prep.* (Magendie.) *Iodide of potassium*, 4 dr.; *lettuce water*, 8 oz.; *peppermint water*, 2 dr.; *syrup of marshmallow*, 1 oz. *Dose.* 1 table-spoonful, twice a day; in hypertrophy (enlargement) of the heart. Sometimes 1 to 2 dr. of *tincture of foxglove* is added to the mixture.

MIXTURE (Barley). Syn. *Mistura Hordei*,—Lat. See *Decoctions.*

MIXTURE (Brandy). Syn. *Mixture of Spirit of French Wine; Mistura Spiritûs Vini Gallici*,—Ph. L. *Egg-flip, Egg-hot*,—Vulgo. *Prep.* (Ph. L.) *Brandy* and *cinnamon water*, of each, 4 fl. oz.; *yelks of 2 eggs; white sugar*, ½ oz.; *oil of cinnamon*, 2 drops; mix. A valuable stimulant and restorative, in low fevers, and in extreme exhaustion from hemorrhages, &c.; but scarcely a fitting subject for the labours of the College of Physicians, since almost every cook and housewife could produce a better compound than the product of the college formula.

MIXTURE (Camphor). Syn. *Camphor Julep, Camphor Water; Mistura Camphoræ*,—Ph. L. & D. *Emulsio Camphoræ*,—Ph. E. *Mistura Camphorata*,—Ph. L. 1788. *Julepum è Camphorâ*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Camphor*, ½ dr.; *rectified spirit*, 10 drops; triturate together, gradually adding of *water*, 1 pint; and strain through linen.

2. (Ph. D.) *Tincture of camphor*, 1 fl. oz.; *distilled water*, 3 pints; agitate well together, and after 24 hours, filter through paper.

3. (Ph. E.) See *Emulsions.*

Uses, &c. Camphor julep is chiefly used as a vehicle for other medicines. *Dose.* ½ to 1 wine-glassful.

MIXTURE (Camphor,—with Magnesia). Syn. *Mistura Camphoræ cum Magnesiâ*,—Ph. E. & D. *Aqua Camphoræ*,—Ph. U. S. *Prep.* 1. (Ph. E.) *Camphor*, 10 gr.; *carbonate of magnesia*, 25 gr.; triturate together, then gradually add of *water*, 6 fl. oz.; still continuing the trituration.

2. (Ph. D.) *Camphor*, 12 gr.; *carbonate of magnesia*, ½ dr.; *water*, 6 fl. oz.; as last.

3. (Ph. U. S.) *Camphor*, 2 dr.; *rectified spirit*, 40 drops; triturate, add of *carbonate of magnesia*, 4 dr., and again triturate, adding, gradually, of *water*, 32 fl. oz. Antacid, antispasmodic, and anodyne. *Dose.* 1 to 2 table-spoonfuls. Used *without* straining. It is stronger than the simple mixture.

MIXTURE (Carminative). Syn. *Mistura Carminativa*,—Lat. *Prep.* (Dr. Paris.) *Calcined magnesia*, ½ dr.; *peppermint water*, 2½ fl. dr.; *compound tincture of lavender*, ½ fl. dr.; *spirit of caraway*, 4 fl. dr.; *syrup* *of ginger*, 2 fl. dr.; mix. Antacid and carminative. For 1 or 2 doses.

MIXTURE (Cascarilla, — Compound). Syn. *Mistura Cascarillæ Composita*,—Ph. L. 1836. *Prep.* (Ph. L. 1836.) *Infusion of cascarilla*, 17 fl. oz.; *vinegar of squills*, 1 fl. oz.; *compound tincture of camphor*, 2 fl. oz. *Dose.* 1 to 3 table-spoonfuls 2 or 3 times a day; in chronic cough and asthma, and in the catarrh of elderly people.

MIXTURE (Cathartic). See *Aperient Mixture, Senna do., &c.*

MIXTURE (Chalk). Syn. *Cretaceous Mixture; Mistura Cretæ*,—Ph. L. E. & D. *M. Cretacea*,—Ph. L. 1788. *Julepum è Cretâ*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Prepared chalk*, ½ oz.; *sugar*, 3 dr.; *mixture of acacia* (mucilage), 1½ fl. oz.; triturate together, then add of *cinnamon water*, 18 fl. oz.

2. (Ph. E.) *Prepared chalk*, 10 dr.; *white sugar*, 5 dr.; *mucilage*, 3 fl. oz.; *spirit of cinnamon*, 2 fl. oz.; *water*, 1 quart; as the last.

3. (Ph. D.) *Prepared chalk*, 2 dr.; *syrup* and *mucilage*, of each, ½ oz.; *cinnamon water*, 7 fl. oz.

Obs. The above are antacid and absorbent. *Dose.* 1 to 3 table-spoonfuls, either alone or combined with aromatic confection; in heartburn, and in diarrhœa after every liquid motion. In the latter affection, a little *tincture of catechu* or *laudanum* is often added; and when there is vomiting or nausea, either *peppermint* or *spearmint water* is generally substituted for the whole or a part of the simple water ordered in the above formulæ.

MIXTURE (Cinchona). Syn. *Bark Mixture; Mistura Cinchonæ*,—Lat. *Prep.* (Copland.) *Confection of roses*, ½ oz.; *boiling decoction of bark*, 8 fl. oz.; triturate, in 10 minutes strain, and add *diluted sulphuric acid*, 1½ fl. dr.; *spirit of nutmeg*, 4 fl. dr. Febrifuge, tonic, and stomachic. *Dose.* 1 to 3 table-spoonfuls, 2 or 3 times a day.

MIXTURE (Colchicum). Syn. *Gout Mixture; Mistura Antarthritica, M. Colchici*,—Lat. *Prep.* (Sir C. Scudamore.) *Magnesia*, 1½ dr.; *vinegar of colchicum* and *syrup of orange-peel*, of each, 4 fl. dr.; *peppermint water*, 3 fl. oz. A table-spoonful every 3 or 4 hours during the fit of gout.

MIXTURE (Contra-stimulant). Syn. *Mistura Contra-stimulans, Julepum C., M. Antimonii Potassio-tartratis*, — Lat. *Prep.* (Laennec). *Tartar emetic*, 3 gr.; *infusion of orange-leaves*, 8 fl. oz.; *syrup of do.*, 1 fl. oz. *Dose.* A wine-glassful, or more, every 2 hours; in inflammation of the lungs, hooping-cough, &c.

MIXTURE (Cough). Syn. *Mistura Bechica*,—Lat. *Prep.* 1. *Almond mixture*, 4 fl. oz.; *oxymel of squills*, 1 fl. oz.; *ipecacuanha wine* and *syrup of tolu*, of each, ½ fl. oz.

2. *Tincture of tolu*, ½ fl. oz.; *paregoric elixir* and *tincture of squills*, of each, 1 fl. oz.; *syrup of poppies*, 2 fl. oz.; *water*, 3½ fl. oz.

3. *Mixture of ammoniacum*, 4 fl. oz.; *syrup of squills*, 2 fl. oz. In the coughs of old persons.

4. *Antimonial wine*, 3 fl. dr.; *syrup of poppies*, 1½ fl. oz.; *water*, 4 fl. oz. In dry husky coughs. *Dose* (of each of the above), 1 table-spoonful, 2 or 3 times a day, or oftener.

5. (*Dr. Munro's.*) *Paregoric*, ½ fl. oz.; *sulphuric ether* and *tincture of tolu*, of each, ¼ oz. *Dose.* A tea-spoonful, in water, night and morning, or when the cough is troublesome.

6. (*Dr. Radcliff's.*) *Syrup of poppies*, *syrup of squills*, and *paregoric*, equal parts. *Dose.* As the last. In all cases the bowels should be kept gently moved by some mild aperient.

MIXTURE (Creasote). Syn. *Mistura Creasoti; M. Creazoti*,—Ph. E. *Prep.* (Ph. E.) *Creasote* and *acetic acid*, of each, 16 drops; mix, then add of *compound spirit of juniper* and *syrup*, of each, 1 fl. oz.; *water*, 14 fl. oz.; and agitate well together. *Dose.* ½ to 1 wine-glassful, in nausea and vomiting; especially to prevent or relieve sea-sickness.

MIXTURE (Demulcent). Syn. *Mistura Demulcens*,—Lat. See *Almond Mixture, Gum do., &c.*

MIXTURE (Diaphoretic). Syn. *Mistura Diaphoretica*,—Lat. *Prep.* 1. *Solution of acetate of ammonia*, 3 fl. oz.; *antimonial wine*, 2 fl. dr.; *tincture of henbane*, 1½ fl. dr.; *camphor mixture*, 3 fl. oz. *Dose.* 1 table-spoonful every 3 or 4 hours; in fevers, &c.

2. To the last add of *sweet spirit of nitre*, ½ fl. oz. As above.

MIXTURE (for Diarrhœa). See *Chalk Mixture, &c.*

MIXTURE (Diuretic). Syn. *Mistura Diuretica*,—Lat. *Prep.* 1. *Nitrate of potassa*, 2 dr.; *sweet spirit of nitre*, 3 fl. dr.; *syrup of squills*, 1½ fl. oz.; *peppermint water*, 4 fl. oz.

2. (A. T. Thomson.) *Infusion of foxglove*, 5½ fl. oz.; *tincture of foxglove*, ½ fl. dr.; *acetate of potassa*, 2 dr.; *spirit of juniper*, ½ fl. oz.; *tincture of opium*, ½ fl. dr. In dropsy. *Dose.* 1 to 2 table-spoonfuls,

every 2 or 3 hours. The last must be used with caution.

MIXTURE (Emetic). Syn. *Mistura Emetica,*—Lat. *Prep.* 1. (Copland.) *Sulphate of zinc,* 40 gr.; *ipecacuanha wine* and *tincture of serpentary,* of each, 4 fl. dr.; *tincture of capsicum,* 40 drops; *oil of chamomile,* 12 drops; *peppermint water,* 4½ fl. oz. As an excitant emetic; in cases of poisoning by narcotics, &c.

2. (Magendie.) *Coloured emetine,* 4 gr. (or *white emetine,* 1 gr.); *acetic acid,* 8 drops; mix, and add of *infusion of orange-leaves* or *lime flowers,* 3½ fl. oz.; *syrup of marsh mallows,* 1 fl. oz.

3. (A. T. Thomson.) *Ipecacuanha,* ½ dr.; *tartar emetic,* 1 gr.; *tincture of squills,* 1 fl. dr.; *water,* 6 fl. oz. *Dose.* 1 to 2 table-spoonfuls, followed by half the quantity every 10 or 15 minutes, until vomiting is produced; at the same time assisting the action of the medicine by drinking copiously of warm water.

MIXTURE (Emmenagogue). See *Steel Mixture, &c.*

MIXTURE (Expectorant). Syn. *Mistura Expectorans,*—Lat. (Collier.) *Oxymel of squills* and *mucilage,* of each, 1 oz.; *syrup of marsh-mallows,* 2 oz.; *camphor julep,* 3 fl. oz. *Dose.* 1 to 2 table-spoonfuls 2 or 3 times a day; in coughs, hoarseness, asthma, &c.

2. (A. T. Thomson.) *Almond mixture,* 5 fl. oz.; *ipecacuanha wine* and *tincture of squills,* of each, 1 fl. dr.; *syrup of tolu,* 6 fl. dr. *Dose.* 1 table-spoonful; in humoral asthma, catarrh, &c., when the cough is urgent.

MIXTURE (Febrifuge). Syn. *Mistura Febrifuga,*—Lat. See *Mixture of Acetate of Ammonia, Diaphoretic do., &c.*

MIXTURE (Gentian,—Compound). Syn. *Mistura Gentianæ Composita,*—Lat. *Prep.* (Ph. L. 1836.) *Compound infusion of gentian,* 12 fl. oz.; *compound infusion of senna,* 6 fl. oz.; *compound tincture of cardamoms,* 2 fl. oz. Tonic, stomachic, and aperient. *Dose.* 2 to 3 table-spoonfuls; in dyspepsia accompanied with constipation.

MIXTURE (Gregory's). See *Powders.*

MIXTURE (Griffith's). See *Steel Mixture.*

MIXTURE (Guaiacum). Syn. *Emulsion of Guaiacum, Milk of do.; Mistura Guaiaci,* —Ph. L. & E. *Lac G.,*—Ph. L. 1788. *Prep.* (Ph. L.) *Gum guaiacum,* 3 dr.; *white sugar,* ½ oz.; *gum acacia,* 2 dr.; (all in powder); triturate together, and to these, whilst rubbing, gradually add of *cinnamon water,* 1 pint.

2. (Ph. E.) *Guaiacum,* 3 dr.; *sugar,* ½ oz.; *mucilage,* ½ fl. oz.; *cinnamon water,* 19½ fl. oz.; as before. *Dose.* 1 to 3 table-spoonfuls, 2 or 3 times a day; in chronic rheumatism, gout, &c.

MIXTURE (Gum). Syn. *Mucilage; Mistura Acaciæ,*—Ph. L. *Mucilago,*—Ph. E. *Mucilago Acaciæ,*—Ph. D. *Mucilago Arabici Gummi,*—Ph. L. 1788 and Ph. D. 1826. *Prep.* 1. (Ph. L.) *Gum acacia* (in powder), 10 oz.; *boiling distilled water,* 1 pint; rub the gum with the water, gradually poured in, until solution is complete.

2. (Ph. E.) *Gum,* 9 oz.; *cold water,* 1 pint; macerate, with occasional stirring, until dissolved, then strain through linen or calico.

3. (Ph. D.) *Gum* (coarsely powdered), 4 *oz.; water* (cold), 6 fl. oz.; dissolve, and strain through flannel.

Uses, &c. Mucilage of gum acacia is chiefly employed to render oily and resinous substances miscible with water. "*Oils* require about ¾ their weight; *balsams* and *spermaceti,* equal parts; *resins,* 2 parts; and *musk,* 5 times its weight," for this purpose. (Montgomery.) The *Gum Mixture,* Ph. E. will be found under "*Emulsions.*"

MIXTURE (Hydrocyanic). Syn. *Mixture of Prussic Acid; Mistura Acidi Hydrocyanici,*—Lat. *Prep.* From *medicinal prussic acid,* 15 drops; *simple syrup* (pure), 1 fl. oz.; *distilled water,* 5 fl. oz. *Dose.* 1 table-spoonful 2 or 3 times daily. Each dose contains 1¼ drops of medicinal prussic acid. The bottle should be shaken before pouring out the dose. Magendie's formulæ for this mixture are omitted because the acid which he orders is not kept in the shops in England.

MIXTURE (Iron). See *Steel Mixture.*

MIXTURE (Marshmallow). Syn. *Mistura Althææ,*—Ph. E. *Decoctum Althææ,* —Ph. E. 1839. *Prep.* (Ph. E.) *Marshmallow root* (dried), 4 oz.; *stoned raisins,* 2 oz.; *water,* 5 pints; boil to 3 pints, strain through linen, and after the sediment has subsided, decant the clear portion.

2. (Ph. D.) See *Decoctions.* Demulcent. *Dose.* A few spoonfuls ad libitum, so as to take 1 to 3 pints in the 24 hours; in strangury, calculus, coughs, fevers, &c.

MIXTURE (Musk). Syn. *Mistura Moschi,*—Ph. L. 1836. *M. Moschata,*—Ph. L. 1788. *Julepum è Moschâ,*—Ph. L. 1746. *Prep.* (Ph. L. 1836.) *Musk, powdered gum,* and *sugar,* of each, 3 dr.; triturate them well together, then add, gradually, of *rose water,* 1 pint, still continuing the trituration. Each fluid ounce contains 9 grains of musk. In order to produce a good mixture, the quantity of gum should be more than doubled. *Dose.* 2 to 4 table-spoonfuls, as a stimulant, antispasmodic, and anodyne; in hysteria, epilepsy, chorea, tetanus, low fevers, &c. A little ammonia is a common and useful addition.

MIXTURE (Myrrh). Syn. *Emulsion of Myrrh; Mistura Myrrhæ*,—Lat. *Prep.* (Copland.) *Myrrh*, 1½ dr.; add to it gradually, triturating all the time, *decoction of liquorice*, 6 fl. oz.; and strain. *Dose.* 1 to 2 table-spoonfuls, twice or thrice a day, combined with carbonate of soda, dilute hydrochloric acid, or paregoric; in debility, and diseases of the digestive organs.

MIXTURE (Narcotic). Syn. *Mistura Narcotica, M. Febrifuga*,—Lat. *Prep.* 1. *Tincture of henbane*, 2 fl. dr.; *solution of acetate of ammonia*, 3 fl. oz.; *water*, 2¾ fl. oz.; mix. *Dose.* 1 to 2 table-spoonfuls, to relieve pain, procure sleep in fevers, &c.

2. (W. Cooley.) *Laudanam*, 1½ fl. dr.; *syrup of poppies, sulphuric ether*, and *spirit of cinnamon*, of each, 1 oz.; *tincture of henbane*, 2½ fl. dr.; *tincture of capsicum*, 4 fl. dr.; *water*, 2 fl. oz. *Dose.* 1 to 2 table-spoonfuls at the commencement of the hot fit of ague.

MIXTURE (Oleo-balsamic). Syn. *Mistura Oleo-balsamica*,—Lat. *Prep.* (Hamb. Cod.) *Oils of cedrat, cinnamon, cloves, lavender, mace*, and *marjoram*, of each, 20 drops; *oil of rue*, 10 drops; *balsam of Peru*, ½ dr.; *rectified spirit*, 10 oz.; digest and filter.

MIXTURE (Purgative). Syn. *Mistura Cathartica, M. Laxativa, M. Purgans*,—Lat. *Prep.* 1. From any of the *purging salts* (Epsom, glauber, tasteless, &c.), 2 *oz.; infusion of senna*, 5 fl. oz.; *syrup of orange-peel*, 1 fl. oz.; *tincture of ginger*, ½ fl. oz.; *spirit of pimento*, 2 fl. dr.; mix. *Dose.* 1 to 3 table-spoonfuls, early in the morning; as an aperient in stomach complaints, &c.

2. (Dr. Copland.) *Manna*, 1½ oz.; *cream of tartar*, ½ oz.; *whey*, 1 quart. By wine-glassfuls, as an aperient drink, in fevers, &c.

3. (Corvisart.) *Borotartrate of potassa* (soluble tartar), 1 oz.; *tartar emetic*, ½ gr.; *sugar*, 2 oz.; *water*, 1½ pint; dissolve. By wine-glassfuls, until it begins to operate. This has been called "*Napoleon's medicine*," from its having been frequently taken by that emperor. See *Mixtures of Scammony, Senna, &c.*

MIXTURE (Saline). Syn. *Mistura Salina*,—Lat. See *Draughts* and *Lemonade.*

MIXTURE (Scammony). Syn. *Scammony Milk; Mistura Scammonii*,—Lat. *Prep.* 1. (Ph. E.) *Resin of scammony*, 7 gr.; *unskimmed milk*, 3 fl. oz.; gradually mix, triturating all the time, so as to form an emulsion. Purgative. *Dose.* One-half.—2. (*Planche's Purgative Potion.*) To the last add of *white sugar*, ¼ oz.; *cherry laurel* (or bitter almond) *water*, 4 or 5 drops. The above are the most tasteless and pleasant purgatives of an active character known.

MIXTURE (Senna,—Compound). Syn. *Black Draught, Abernethy's do., Cathartic Mixture; Mistura Sennæ Composita*,—Lat. *Prep.* 1. *Infusion of senna*, ¾ pint; *tincture of senna*, 1½ fl. oz.; *Epsom salts*, 4 *oz.; carbonate of ammonia*, ½ *dr.; sugar*, 3 *oz.;* agitate until the solids are dissolved.

2. *Senna*, 13 *oz.; boiling water*, 2 quarts; digest for 4 hours in a hot place, then press out the liquor in a tincture press, and add of *compound tincture of senna*, ¾ pint; *Epsom salts*, 1 *lb.*

3. *East India senna*, 2 *lb.; boiling water*, 9 quarts; *tincture of senna* and *Epsom salt*, of each, 3¼ *lb.;* as the last.

4. *Senna*, 8 *lb.; boiling water*, 9 gall.; *Epsom salt*, 16 *lb.; tincture of senna*, 1½ gall.; *treacle* and *colouring*, of each, 1 quart.

5. (Guy's Hosp.) *Senna* and *mint*, of each, 1¾ oz., (say, 1½ *oz.*); *boiling water*, 1 quart; *Epsom salt*, 7½ oz., (say, ½ *lb.*)

6. (Redwood.) *Infusion of senna*, 18 oz.; *tincture of senna*, 3 oz.; *sulphate of magnesia*, 6 oz.; *extract of liquorice* and *spirit of sal volatile*, of each, ¾ oz.; *oil of cloves*, 6 drops.

Obs. As the above mixture contains very little spirit, and from its great consumption, being made in large quantities at a time, it frequently spoils before the whole is sold, especially in hot weather. To avoid this, 1½ dr. of *cloves* and 3 dr. of *mustard seed*, both bruised, may be added to every gall. of the strained liquor at the same time with the salts, spirit, and colouring, after which it must be shaken up repeatedly for a few days, and then allowed to repose for a few days more, when it will become quite clear. It may be filtered through a flannel bag, but there is much loss and delay, owing to the consistence of the liquid. It is *purgative* in *doses* of 1 to 1½ fl. oz.

It is a singular circumstance, that although an enormous quantity of this preparation is consumed in these countries, there is no standard formula for it in the British pharmacopœias. See *Aperient Mixture, &c.*

MIXTURE (Steel). Syn. *Mistura Chalybeata*,—Lat. Two compounds of this class are officinal:—

1. *Griffith's Mixture, Compound Iron do.; Mistura Ferri, M. F. Protoxydi; M. F. Composita*,—Ph. L. E. & D. *Prep.*—*a.*

(Ph. L. & E.) *Carbonate of potassa*, 1 dr.; *powdered myrrh*, 2 dr.; *spirit of nutmeg*, 1 fl. oz.; triturate together, and whilst rubbing, add gradually, of *sugar*, 2 dr.; *rose water*, 18 fl. oz.; mix well; then add of *sulphate of iron* (powdered), 50 gr., and place it at once in a bottle, which must be kept closely corked.

b. (Ph. D.) *Powdered myrrh* and *sugar*, of each, 1 *dr.; carbonate of potassa*, ½ *dr.; essence of nutmeg*, 1 fl. dr.; *rose water*, 7 fl. oz.; *sulphate of iron*, ½ *dr.;* (dissolved in) *rose water*, 1 fl. oz. *Dose.* 1 to 2 oz., 3 or 4 times a day, as a mild and genial chalybeate tonic and stimulant; in amenorrhœa, chlorosis, debility, &c., when there is no determination of blood to the head.

2. *Heberden's Mixture, H. Ink; Atramentum Heberdii; Mistura Ferri Aromatica*,—Ph. D. *Prep.* (Ph. D.) *Pale cinchona bark*, 1 *oz.; calumba root*, 3 *dr.;* (both in coarse powder;) *cloves* (bruised), 2 *dr.; iron filings*, ½ *oz.; peppermint water*, 16 fl. oz.; digest in a close vessel for 3 days, agitating frequently, then strain, and add of *tincture of cardamoms* (comp.), 3 fl. oz.; *tincture of orange-peel*, 3 fl. dr. Bitter, stomachic, and aromatic. *Dose.* 1 or 2 table-spoonfuls, or more, 3 or 4 times a day. It is very slightly chalybeated.

MIXTURE (Tonic). Syn. *Strengthening Mixture; Mistura Tonica*,—Lat. *Prep.* 1. *Infusion of cascarilla*, 5 fl. oz.; *tincture of orange-peel*, 7 fl. dr.; *aromatic sulphuric acid*, 2 fl. dr.

2. (Collier.) *Decoction of bark*, 5½ fl. oz.; *tincture of do*, 3 fl. dr.; *aromatic confection*, 20 gr.; *aromatic spirit of ammonia*, 1 fl. dr.

3. (Thomson.) *Infusion of calumba*, 5½ fl. oz.; *compound tincture of cinnamon* and *syrup of orange-peel*, of each, 2 fl. dr. *Dose.* 1 to 3 table-spoonfuls, 2 or 3 times a day; in debility of the digestive organs, loss of appetite, to check nausea and vomiting, &c.

MIXTURE (for Worms). Syn. *Mistura Anthelmintica, M. Vermifuga*,—Lat. *Prep.* 1. (Collier.) *Sulphate of iron*, 20 gr.; *infusion of quassia*, 8 fl. oz. *Dose.* Two table-spoonfuls every morning fasting.

2. (Copland.) *Valerian*, 2 dr.; *worm-seed*, 4 dr.; *boiling water*, 8 fl. oz.; macerate 1 hour, strain, and add of *assafœtida*, 1 dr., previously triturated with the *yelk of one egg*. As the last.

3. (Richard.) *Root of male fern*, 1 oz.; *water*, 9 fl. oz.; boil to 6 fl. oz., strain, and add of *sulphuric ether*, 1 dr.; *syrup of tansy*, 1 fl. oz. In tape worm; as above.

MIXTURE (Zinc). Syn. *Mistura Zinci, M. Z. Sulphatis*,—Lat. *Prep.* (Collier.) *Sulphate of zinc*, 5 gr.; *sulphate of quinine*, 10 gr.; *compound infusion of roses*, 2 fl. oz. Tonic. *Dose.* A tea-spoonful 2 or 3 times a day in a glass of water. "I have found this mixture very efficacious in the cure of *barking* (gastric?) coughs manifestly of a spasmodic character." (*Trans. Ph. L.*, p. 178.)

MIXTURES (Arithmetic of). The constantly recurring necessity in business and chemical manipulations of determining the value of mixtures, and of producing articles and preparations of different strengths or prices to those already in stock, has rendered a ready means of making such calculations an indispensable qualification in almost every department of trade and industrial art. As we address ourselves to the intelligent operative and busy tradesman, as well as to those more blessed by education and leisure, we feel we are bestowing a boon on many of our readers, in giving a short, but sufficient outline of this useful branch of commercial arithmetic, which is most intimately connected with the objects of the present work.

1. To determine the price of a mixture from the value and quantity of each ingredient of which it is composed.—Rule. *Divide the "gross value" by the "gross saleable" or "useful quantity;"* the quotient is the value or cost per gallon, pound, &c., as the case may be.—*Example.* Required the *value per gallon* of a hogshead of wine containing—

		s.	*d.*	*£.*	*s.*	*d.*
30 Gallons	@	10	6	15	15	0
20 ,,	@	12	6	12	10	0
13 ,,	@	14	6	9	8	6
63				) 37	13	6
Cost per gallon . . .				0	11	11½

2. To determine the proportions of substances or articles of different values or strengths which must be taken to prepare a mixture of any other value or strength.—Rule. *Arrange the "prices" or "strengths of the ingredients" in a column, and link them together in pairs; each of those* above *the required price being always connected with another* below *it. Then set the difference between the required price and these numbers, alternately* against those they are *linked to;* when they will indicate the quantities to be taken, as in the following *examples*:—*a.* Required the proportions of tea at 3*s.*, 4*s.*, 6*s.*, and 7*s.*, that

must be taken to produce a mixture at 5*s.* the pound. Here—

$$5\left\{\begin{array}{lllll}3 & \ldots & 1,\text{ or } 1\ \textit{lb.} & @ & 3s.\\ 4 & \ldots & 2,\ ,,\ 2\ ,, & ,, & 4s.\\ 6 & \ldots & 2,\ ,,\ 2\ ,, & ,, & 6s.\\ 7 & \ldots & 1,\ ,,\ 1\ ,, & ,, & 7s.\end{array}\right.$$

b. (When the number of the ingredients or prices is odd.) Required the proportions of teas at 3*s.*, 5*s.*, and 6*s.* the pound, to sell at 4*s.* Here the odd number must be taken a second time:—

$$4\left\{\begin{array}{lllll}3 & \ldots & 1+2,\text{ or } 3\ \textit{lb.} & @ & 3s.\\ 5 & \ldots & 1,\ ,,\ 1\ ,, & ,, & 5s.\\ 6 & \ldots & 1,\ ,,\ 1\ ,, & ,, & 6s.\end{array}\right.$$

c. (When the number of the ingredients is not merely odd, but the prices are unequally distributed either above or below the required price.) A dealer having wines of the same name at 7*s.*, 9*s.*, 11*s.*, 12*s.*, and 14*s.* per gallon, wishes to produce a mixture of them worth 10*s.* per gallon:—

$$10\left\{\begin{array}{lllll}7 & \ldots & 1+4,\text{ or } 5\text{ gall.} & @ & 7s.\\ 9 & \ldots & 2,\ ,,\ 2\ ,, & ,, & 9s.\\ 11 & \ldots & 3,\ ,,\ 3\ ,, & ,, & 11s.\\ 12 & \ldots & 1,\ ,,\ 1\ ,, & ,, & 12s.\\ 14 & \ldots & 3,\ ,,\ 3\ ,, & ,, & 14s.\end{array}\right.$$

It will be seen that by varying the manner of linking the numbers, different answers may often be obtained to the same question. It also often happens that the dealer or operator desires to use a *given quantity* of *one particular article*, or to produce a *certain quantity only of the mixture* instead of those indicated by the above calculations. In these instances he has simply to apply the common rule of "*practice*" or the "*rule of three*," as the particular case may demand.

In the above manner the *proportions* of the *constituents of a compound* may be determined from their *specific gravity*, when no change of volume has arisen from their admixture; but when this is the case, as in alloys, alcoholic mixtures, &c., it is either quite inapplicable, or the results obtained are mere approximations to the truth. It may, however, be conveniently employed for calculations connected with the "mixing" and "reduction" of spirits and other liquids, by substituting their per centage value in "proof gallons" or other corresponding denomination, for the prices in the above examples; water, when introduced be reckoned = 0. Thus:—A spirit merchant having *two puncheons of rum* of the strengths of 17 and 21 o. p., wishes to know what *proportions* of *each* and of *water* he must take to form a spirit 10 u. p. The proof values 100 gallons of these spirits are respectively equal to 121, 117, 90, and 0 (water). Therefore—

$$90\left\{\begin{array}{llllll}0 & \ldots & 27+31,\text{ or } 58 & \text{gallons of} & \textit{water}. & \\ 117 & \ldots & 90,\ ,,\ 90 & ,, & \textit{rum} & @\ 117\text{ o. p.}\\ 121 & \ldots & 90,\ ,,\ 90 & ,, & \textit{rum} & ,,\ 121\text{ o. p.}\end{array}\right.$$

Suppose the dealer required to use different proportions of the spirits referred to, instead of equal measures, he has only to take such aliquot parts of the quantities thus found referring to the smaller proportion; or such multiples of those referring to the larger one, as he wishes them to bear to each in the new mixture. Numerous other applications of this rule will occur to the ingenious reader.

Questions in "*alligation*," as the department of arithmetic above referred to is called, are very easily resolved by the "*method of indeterminate analysis*," even by persons but slightly conversant with rudimentary algebra; of which, indeed, they form a simple class of problems, often admitting of an almost indefinite number of solutions.

MOCHLIQUE (Des Frères de la Charité). *Prep.* From *glass of antimony* (in fine powder), 1 *oz.*; *white sugar*, 2 *oz.*; triturated together. *Dose.* 20 to 30 gr. Said to be a specific in lead colic.

MODELING CLAY. By using *glycerine* instead of water to knead the *clay* with, a mass is obtained which continues moist and plastic for a considerable length of time, thus removing one of the greatest inconveniences suffered by the modeler. (Barreswil, *Journ. de Pharm.*, 1852.)

MOHAIR. The hair of a goat indigenous in Asia Minor. It is *dyed* and *manufactured* by similar materials and in a similar manner to wool.

MOIL. See *Cider* (p. 257).

MOIREE METALLIQUE. Syn. *Crystallized Tin.* This is *tin plate* which has been submitted for a few seconds, whilst gently heated, to the action of *dilute aqua regia*, by which it acquires a variegated primrose appearance. It is afterwards washed in *hot water*, dried, and lacquered. The degree of heat and dilution of the acid modifies the beauty and character of the surface. The effect is also varied by employing *dilute sulphuric acid*, either alone, or mixed with a portion of *nitric* or *hydrochloric acid;* or by using a solution of *citric acid* or *caustic potassa.* According to Herberger, the best metal for the purpose is *plate iron* which has been coated by dipping it into a tin-bath composed of *pure tin*, 200 parts; *copper*, 3 parts; *arsenic*, 1 part. The *varnish* should consist of *copal* in *highly rectified spirit*. *Moirée metallique* is in much less demand now than formerly.

MOLASSES. See *Treacle*.

MOLES. The small soft excrescences and discolorations of the skin which are popularly known under this name, may, when slight, be removed by touching them every day with a little *concentrated acetic acid*, by means of a hair pencil, observing due care to prevent the application from spreading to the surrounding parts. This does not discolour the skin. The application of *lunar caustic* is also very effective, but it turns the spot temporarily black. In the pure mole there is always a considerable production of hair. When other means fail, they may be easily and safely removed by surgical means. The operation is trifling; and, when judiciously performed, no trace of such a proceeding is left behind.

MOLUCCA BALM. See *Liqueurs*.

MOLYBDATE. See *Molybdic Acid*.

MOLYBDENUM. Syn. *Molybdena; Molybdenum*,—Lat. A very rare metal, having a white colour, discovered by Hielm, in 1782.

Prep. By exposing *molybdic acid*, mixed with *charcoal* and placed in a covered crucible, to the strongest heat of a smith's forge.

Prop., *&c.* It is brittle, and very infusible; when heated in contact with the air, it is converted into *molybdic acid*. Sp. gr. about 8·625. With oxygen it forms a *protoxide* and *binoxide*, and *molybdic acid*. With chlorine it forms a *protochloride* and *bichloride*. With sulphur it unites to forms 2 or more *sulphurets*. The only one of the above compounds that possesses any practical interest is molybdic acid. (See *below*.)

MOLYBDENUM (Protoxide of). Syn. *Molybdeni Protoxydum*,—Lat. *Prep.* A *solution of molybdate of potassa* is treated with *hydrochloric acid* in sufficient excess to redissolve the precipitate (*molybdic acid*) at first thrown down; *metallic zinc* is then immersed in the acid solution, and after a time an excess of *caustic potassa* is added, when *hydrated protoxide of molybdenum* is precipitated. In this state it is soluble in acids and in solution of carbonate of ammonia. By exposure to heat in the air it is converted into *binoxide of molybdenum*.

MOLYBDENUM (Binoxide of). Syn. *Molybdeni Binoxydum*,—Lat. *Prep.* 1. By digesting *metallic copper* in a *hydrochloric solution of molybdic acid* until the liquid turns red, and then adding *ammonia* in considerable excess. Hydrated; soluble in acids yielding red solutions; nitric acid converts it into *molybdic acid*.

MOLYBDIC ACID. Syn. *Molybdenic Acid, Peroxide of Molybdenum; Acidum Molybdicum*,—Lat. *Prep.* 1. *Sulphuret of molybdenum ore* (in fine powder) is digested in *aqua regia* until completely decomposed; the residuum is then briskly heated. A white heavy powder.

2. *Native sulphuret of molybdenum*, after being well roasted, is reduced to fine powder, dissolved in *liquor of ammonia*, and the solution precipitated with *nitric acid*. Small white scales.

Prop., *&c.* Soluble in 570 parts of water; the solution reddens litmus paper; dissolves in the alkalies forming *alkaline molybdates*, from which it is again precipitated by strong acids. It is used in the preparation of *molybdenum blue*, and in *calico-printing*, but its scarcity precludes its extensive employment in the arts. *Molybdate of ammonia* is the salt principally used in dyeing. *Silks* and *cottons* passed through a solution of this salt, then through a bath soured with *hydrochloric acid*, and, lastly (without washing), through another of *protochloride of tin*, are dyed of a rich and permanent blue colour. A *molybdous acid*, mentioned by old writers, does not exist.

MOMORDICINE. See *Elaterine*.

MONESIA. Syn. *Monesia Bark, Buranheim do.; Cortex Monesiæ*,—Lat. The bark of *chrysophyllum buranheim*, a tree growing in the Brazils. The rough imported extract of this drug also commonly passes under the name of *monesia*. It is astringent, and possesses no advantage over rhatany or catechu. *Dose.* (Of the latter.) 15 to 30 gr.

MONESINE. A peculiar acrid principle, analogous to saponine, found in *monesia bark*, to the extent of 4·7%. (Journ. de Pharm.)

MONOMANIA. See *Insanity*.

MONTANINE. The bitter principle of *St. Lucia bark* or *quinquina piton*.

MORDANT. *Prep.* 1. *Water* or *beer* rendered adhesive by the addition of a little *gum*, *sugar*, or *honey*, and tinged with a little *gamboge* or *carmine*, to mark the parts to which it is applied. *Used* to attach gold leaf to *paper*, *taffety*, *vellum*, *&c.*

2. (*Mixtion.*) From *asphaltum*, 1 part; *mastic*, 4 parts; *amber*, 12 parts; fused together, and then mixed with *hot boiled*

oil, 1 pint. *Used* for *gilding wood*, &c. See *Gold Size.*

MORDANTS are substances employed to fix the colouring matter of dye-stuffs in the fibres of organic bodies, and to give it brilliancy and permanency. This they effect either by serving as a bond of union between the two, owing to their mutual attraction for each of them; or they act by uniting with the colouring particles in the minute pores of the fibres, and rendering them insoluble in the alkaline, soapy, and other liquids, to the action of which they will subsequently be exposed. When an infusion of some dye-stuff, as *cochineal* or *madder*, for example, is mixed with *alum* or *acetate of alumina*, and a little *alkali*, a precipitate immediately forms, consisting of alumina in combination with colouring matter, constituting a *lake*. It is by a similar reaction occurring within the fibres that the permanent dyeing of the cloth is effected. Here the colouring matter of the dyeing materials not only passes from the soluble to the insoluble form, but it enters into chemical combination with other substances, and in the new compounds it assumes greater brilliancy and permanency than it previously possessed. *Annotta* and *safflower* afford instances of the second mode of action above referred to, by which substances operate as mordants. The colouring matter of these dye-stuffs is soluble in *alkaline lyes*, and into a solution of this kind the cloth is dipped. It has now received an extremely fugitive colour only; but by passing it through *acidulated water* the alkaline solvent is abstracted, and the tinctorial matter is precipitated in an insoluble and minutely divided state within its pores, and it becomes permanently dyed. A similar reaction takes place in dyeing with the *indigo vat*, in which atmospheric oxygen performs the part of a mordant. It is believed that even in these cases the colouring principle, during its transition from the liquid to the solid form, enters into combination with the fibres of the organic substance, and that, in proportion to the affinity existing between the two, is the integrity and excellence of the dye. In *wool* and *silk*, the affinity between their filaments and the tinctorial particles of the dye-bath is, in general, so considerable, that a permanent stain is very easily communicated to them; but with *cotton* and *flax*, the materials of which calicoes and linen goods are made, the reverse is the case, and the intervention of a third material, in the shape of a mordant, is absolutely necessary to dye them of a permanent colour.

"Experience has proved, that of all the bases, those which succeed best as mordants are *alumina*, *tin*, and *oxide of iron;* the first two of which, being naturally white, are the only ones which can be employed for preserving to the colour its original tint, at least without much variation. But whenever the mordant itself is coloured, it will cause the dye to take a compound colour quite different from its own. If, as is usually said, the mordant enters into a real chemical union with the stuff to be dyed, the application of the mordant should obviously be made in such circumstances as are known to be most favorable to the combination taking place; and this is the principle of every day's practice in the dyehouse."

"In order that a combination may result between two bodies, they must not only be in contact, but they must be reduced to their ultimate molecules. The mordants to be united with stuffs are, as we have seen, insoluble in themselves, for which reason their particles must be divided by solution in an appropriate vehicle. Now this solvent or menstruum will exert in its own favour an affinity for the mordant, which will prove to that extent an obstacle to its attraction for the stuff. Hence we must select such solvents as have a weaker affinity for the mordants than the mordants have for the stuffs. Of all acids which can be employed to dissolve *alumina*, for example, *vinegar* is the one which will retain it with the least energy, for which reason the *acetate of alumina* is now generally substituted for *alum*, because the acetic acid gives up the alumina with such readiness, that mere elevation of temperature is sufficient to effect the separation of these two substances. Before the substitution of the acetate, alum alone was employed; but without knowing the true reason, all the French dyers preferred the alum of Rome, simply regarding it to be the purest; it is only within these few years that they have understood the real grounds of this preference."

"The two principal conditions, namely, extreme tenuity of particles, and liberty of action, being found in a mordant, its operation is certain. But as the combination to be effected is merely the result of the play of affinity between the solvent and the stuff to be dyed, a sort of partition must take place, proportioned to the mass of the solvent, as well as to its attractive force. Hence the stuff will retain more of the mordant when its solution is more concentrated, that is, when the base diffused through it is not so much protected by a large mass of menstruum; a fact applied to very valuable uses by the practical man. On impregnating, in calico printing, for example, different spots of the same web with the same mordant in different degrees of concentration, there is obtained in the dye-bath a depth of colour upon these spots intense in proportion to the strength of their various mordants. Thus, with *solution* of *acetate of alumina* in different grades of density, and with madder, every shade can be produced from the *fullest red* to the *lightest pink;* and with *acetate of iron* and *madder*, every shade from *black* to *pale violet*." (Ure.)

In the *employment* of *mordants* in the ordinary processes of *dyeing*, the goods are passed through the solution for a period varying, under different circumstances, according to the object in view. The cloth is subsequently aired, dried, and well rinsed before immersing it in the colouring bath. In *calico printing* the mordant is applied partially or topically to the cloth by means of wooden blocks, or some similar contrivance, or certain parts of the cloth are stopped out by a suitable preparation or "*resist*," by which means a pattern is produced, as the colouring matter of the dye-bath is removed from the other portions by the washing or scouring to which it is subsequently subjected. The *substances* used to *thicken* the *mordants* by the calico printers, to prevent them spreading, are *starch* and *British gum*. The first is preferred for neutral solutions; the last, for acidulous ones. The *removal* of the *undecomposed particles of the mordant*, so as to preserve the other portion of the cloth from their action, is effected by adding *cow-dung* to the scouring-bath, by which means the aluminous and ferruginous salts are absorbed, or converted into an inert or insoluble form.

The *process* of *galling* or *rooting*, commonly employed as a preparation of *cotton* and *linen* for fast dyes, consists in working the stuff for some time, at a good hand heat, in a *decoction of galls* or an *infusion of sumach*. In this case the astringent matter plays the part of a mordant. About 2½ *oz.* of *galls*, or 5 *oz.* of *sumach*, and 3 or 4 pints of *water*, are commonly taken for every *lb.* of *cotton*. See *Calico Printing, Dyeing*, and the *respective dye-stuffs* and *mordants*.

MORESQUE. See *Arabesque*.

MORINE. The colouring principle of the wood of *morus tinctoria* or *old fustic*.

MOROCCO LEATHER. See *Tanning*.

MOROXYLIC ACID. A sour principle obtained by Klaproth from the bark of the *morus alba*, or *white mulberry*. It is found under the form of *moroxylate of lime*.

MORPHIA. Syn. *Morphine; Morphia, Morphina, Morphium*,—Lat. The hypnotic principle of opium. Morphia was discovered by Ludwig in 1688, but it was first obtained pure, and its precise nature pointed out by Sertuerner, in 1804. It is peculiar to the papaveraceæ, or poppy tribe.

Prep. 1. (Ph. D.) *Turkey opium* (cut into thin slices), 1 *lb.*, is macerated for 24 hours in *water*, 1 quart, and the liquid portion decanted; the residuum is macerated for 12 hours with a *second* quart of *water*, and the process is repeated with a *third* quart of *water*, after which the insoluble portion is subjected to strong pressure; the mixed liquids are evaporated by a water or steam heat to a pint, and filtered through calico; to the filtrate is added a solution formed of *chloride of calcium*, 6 *dr.*, dissolved in *distilled water*, 4 fl. oz., and the liquid is further evaporated until it is so far concentrated that nearly the whole of it becomes solid on cooling; this is enveloped in a couple of folds of *strong calico*, and subjected to powerful pressure, the dark liquid which exudes being preserved for subsequent use; the squeezed cake is next treated with about ½ pint of *boiling water*, and the undissolved portion is washed on a paper filter; the filtered solution is again evaporated, and the solid portion thus obtained submitted to pressure, as before; if the product is not quite white, this process is repeated a third time; the squeezed cake is now dissolved in *boiling water*, 6 fl. oz., and the solution filtered through *animal charcoal* (if necessary); to the clear solution is added *liquor of ammonia*, in slight excess; the crystalline precipitate which forms as the liquid cools, is collected on a paper filter, washed with *cold distilled water*, and, lastly, the filter is transferred to a porous brick, in order that the morphia which it contains may become dry. (From the liquids reserved from the expressions more morphia may be obtained by dilution with *water*, precipitation with *ammonia*, resolution in *boiling water*, and treatment with a little *animal charcoal*, *&c.*, as before.)

2. (Ph. L. 1836.) *Hydrochlorate of morphia*, 1 oz., is dissolved in *distilled water*, 1 pint, and *liquor of ammonia*, 5 fl. dr. (or q. s.), previously diluted with *water*, 1 fl. oz., is added with agitation; the precipitate is well washed in *distilled water*, and dried by a gentle heat. By a

similar process morphia may be obtained from its other salts.

2. (Merck.) A *cold aqueous infusion of opium* is precipitated with *carbonate of soda*, in excess, the precipitate washed, first with *cold water* and then with *cold alcohol* of sp. gr. 0·85; the residuum is dissolved in *weak acetic acid*, the solution filtered through *animal charcoal*, and precipitated with *ammonia;* the precipitate is again washed with *cold water*, dissolved in *alcohol*, and crystallized. A good process where spirit is cheap.

4. (Mohr.) *Opium*, 4 parts, is made into a *strong infusion* with *water*, q. s.; *lime*, 1 part, reduced to the state of milk with *water*, is then added; the mixture is next heated to boiling, at *once* filtered through linen, and treated whilst still hot, with *sal ammoniac*, in fine powder, in slight excess (about 1 *oz.* to each *lb.* of opium); the *morphia* is deposited as the liquid cools, and may be purified by a second solution in *lime* and precipitation by *sal ammoniac*. This process is remarkably simple, and in many points is preferable to any other, either on the *small* or *large scale*.

Prop. The morphia of *commerce* is a white crystalline powder; but when crystallized in alcohol, it forms brilliant prismatic crystals of adamantine lustre. It exerts an alkaline re-action on test paper; imparts a perceptible bitter taste to water; requires 1160 parts of cold water, and 94 parts of boiling water for its solution; insoluble in ether; dissolves in 90 parts of cold, and about 30 parts of boiling alcohol; it also dissolves in the fixed and volatile oils, and in solutions of the alkalies; heated in close vessels it forms a yellow liquid like melted sulphur, which becomes white and crystalline on cooling; heated in the air it melts, inflames like a resin, and leaves a small quantity of charcoal behind. With the acids it forms salts, which are mostly soluble and crystallizable. These may all be made by the direct solution of the alkaloid in the dilute acid. The only ones of importance are the acetate, hydrochlorate, and sulphate.

Pur. Commercial morphia and its preparations are often contaminated with codeia, narcotine, and colouring matter. The proportion of the first two may be estimated by the loss of weight which the sample suffers when digested in ether; or by dissolving out the morphia by digestion in weak liquor of potassa. Pure morphia "is scarcely soluble in cold water, sparingly so in boiling water, and readily so in alcohol. This solution is alkaline to test paper, and by evaporation leaves crystals, which are wholly dissipated by heat. It is soluble in pure potassa." (Ph. L. 1836.)

Tests. 1. Potassa and ammonia precipitate morphia from solutions of its salts under the form of a white crystalline powder, which is very soluble in excess of potassa, and, with somewhat more difficulty, in excess of ammonia. The solution formed by excess of the first is precipitated on the addition of bicarbonate of potassa. The precipitate in either case is soluble in a solution of hydrochlorate of ammonia, and in dilute acetic acid, and is insoluble in ether. A careful inspection of the precipitate through a lens of small power shows it to consist of minute acicular crystals; and seen through a glass which magnifies 100 times, these crystals present the form of right rhombic prisms.—2. The carbonates of potassa and soda produce the same precipitate as potassa, and which is insoluble in excess of the precipitant.—3. The bicarbonates of potassa and soda also give similar precipitates from neutral solutions, insoluble in excess. In each of the above cases stirring with a glass rod and friction on the sides of the vessel promote the separation of the precipitate.—4. If to a mixture of morphia and oil of vitriol a minute fragment of bichromate of potassa be added, oxide of chrome is set free, and a fine green colour developed. 5. A drop or two of solution of terchloride of gold added to a weak solution of morphia, gives a yellow precipitate which is mostly redissolved on agitating the liquid, which then assumes various hues (green, blue, violet, purple) on the addition of a drop of liquor of potassa.—6. A minute fragment of terchloride of gold and of hydrate of potassa very gently dropped into the liquid, occasion purple clouds or streaks in dilute solutions, followed by a precipitate, which is violet, purple, or blue-black, according to the strength of the liquid.

The above are the most reliable precipitates for morphia; the first two may, indeed, be regarded as characteristic, and the remainder as almost so. The following are often referred to by medical writers, but are less exclusive and trustworthy:—Morphia and its salts are,—7. *Reddened* by nitric acid, and form orange-red solutions, darkened by ammonia in excess, and ultimately turning yellow, with the production of oxalic acid.—8. They are turned *blue* by sesquichloride of iron, either at once, or on the addition of an alkali, and this colour is destroyed by water, and by alkalies, or acids in excess.—9. Iodic acid added to their solutions, turns them yellowish brown, by setting iodine free, and the liquid forms a blue compound with starch.

Uses. Morphia and its salts are exhibited either in substance, made into pills, or in solution, generally the latter; or *externally*, in fine powder, applied to the dermis denuded of the cuticle. They are principally employed as anodynes and hypnotics in cases in which opium is inadmissible, and are justly regarded as the most valuable medicines of their class. "In cases wherein both opium and the morphia salts are equally admissible, I prefer the former, its effects being betterknown and regulated: moreover, opium is to be preferred as a stimulant and sudorific, and for suppressing excessive mucous discharges." (Pereira.) *Dose.* Of pure morphia, $\frac{1}{12}$ to $\frac{1}{6}$ gr.; of its salts, $\frac{1}{8}$ to $\frac{1}{4}$ gr.; *externally*, $\frac{1}{2}$ to $1\frac{1}{2}$ gr. Morphia is chiefly used for the preparation of the acetate, and some of its other salts.

Good opium yields from 10% to 13% of *morphia.* See *Morphiometry.*

MORPHIA (Acetate of). Syn. *Morphiæ Acetas*,—Ph. L. E. & D. *Prep.* 1. (Ph. L. 1836.) *Morphia*, 6 dr.; *acetic acid* (Ph. L.), 3 fl. dr.; *distilled water*, 4 fl. oz.; dissolve, gently evaporate, and crystallize.

2. (Ph. E.) *Hydrochlorate of morphia*, 1 part, is dissolved in *warm water*, 14 parts; and the solution, when cold, is precipitated with *liquor of ammonia*, in slight excess; the precipitate is washed in *cold water*, and dissolved, by means of *pyroligneous acid* (acetic acid, Ph. E.) in excess, in *warm water*, 12 parts; from the solution crystals are obtained as before.

3. (Ph. D.) *Morphia* (in fine powder), 1 *oz.;* rectified spirit, 8 fl. oz.; mix, apply a gentle heat, and add of *acetic acid* (sp. gr. 1·044), $4\frac{1}{2}$ fl. dr., or q. s., until a neutral or slightly acid solution is obtained; evaporate this to the consistence of a syrup by steam or water heat, and set aside the residuum for a few days until it solidifies.

Pur. "Soluble in water and rectified spirit" (less so in the last than the other), "and when the spirit is distilled from the solution, it yields crystals which are totally destroyed by heat." (Ph. L.) "100 measures of a solution of 10 gr. in $\frac{1}{2}$ fl. oz. of water, and 5 minims of acetic acid, heated to 212° and decomposed by a very slight excess of ammonia, yield by agitation a precipitate which, in 24 hours, occupies $15\frac{1}{2}$ measures of the liquid." (Ph. E.)

Obs. The acetate of morphia of commerce is usually in the form of a whitish powder, and is prepared by the mere evaporation of the solution to dryness by a gentle heat. During the process a portion of the acetic acid is dissipated, and hence this preparation is seldom perfectly soluble in water, unless it has been slightly acidulated with acetic acid. In the Ph. L. 1851 this salt (in crystals) is included in the materia medica. See *Morphia.*

MORPHIA (Citrate of). See *Morphia* and *Liquor of Opium.*

MORPHIA (Hydriodate of). Syn. *Morphiæ Hydriodas*,—Lat. *Prep.* (A. T. Thomson.) *Hydrochlorate of morphia*, 2 parts; *iodide of potassium*, 1 part; dissolve each separately in a *little water*, mix the solutions, wash the precipitate in a *little very cold water*, press it in bibulous paper, redissolve it in *hot water*, and crystallize.

MORPHIA (Hydriodate of,—Ioduretted). Syn. *Hydriodate of Morphia with Iodine; Morphiæ Hydriodas cum Iodinio*,—Lat. *Iodure d'Iodohydrate de Morphine*,—Fr. *Prep.* (Bouchardat.) Dissolve *sulphate of morphia* in *water acidulated with sulphuric acid*, mix the solution with a *solution of ioduretted iodide of potassium*, and after keeping the mixed liquid at the temperature of about 140° Fahr. for an hour, collect the crystalline scales, wash them, and dry them by a gentle heat. The solutions should be rather concentrated. *Dose.* $\frac{1}{4}$ to $\frac{3}{4}$ gr., at bedtime. In phthisis, hemicrania, neuralgia, &c.

MORPHIA (Hydrochlorate of). Syn. *Muriate of Morphia; Morphiæ Hydrochloras*,—Ph. L. *Morphiæ Murias*,—Ph. E. D. & U. S. *Prep.* 1. (Ph. L. 1836.) Macerate *sliced opium*, 1 ℔, in *water*, 4 pints, for 30 hours; then bruise it, digest it for 20 hours more, and press it; macerate what remains a *second*, and a *third* time in water until exhausted, and as often bruise and press it; mix the liquors, and evaporate at 140° Fahr. to the consistence of a syrup; add of *water*, 3 pints, and after defecation decant the clear portion; gradually add to this liquid, *crystallized chloride of lead*, 2 oz. (or q. s.), dissolved in *boiling water*, 4 pints, until it ceases to produce a precipitate; decant the clear liquid, wash the residuum with water, and evaporate the mixed liquids, as before, that crystals may form; press these in a cloth, then dissolve them in *distilled water*, 1 pint, add *freshly burnt animal charcoal*, $1\frac{1}{2}$ oz., digest at 120°, and filter; finally, the charcoal being washed, cautiously evaporate the mixed liquors, that *pure crystals* of *hydrochlorate of morphia* may form. To the *decanted liquor from which the crystals were first separated*, add of *water*, 1 pint, and drop in *liquor of ammonia*, frequently shaking, until all the morphia is precipitated;

wash this precipitate with *cold distilled water*, saturate it with *hydrochloric acid*, digest with *animal charcoal*, 2 oz., filter, wash the filter as before, and evaporate the mixed liquors, cautiously, as above, that *pure crystals* may be obtained.

2. (Ph. E.) *Opium*, 20 oz., is exhausted with *water*, 1 gall., in the quantity of a quart at a time, and the mixed liquors are evaporated to a pint; *chloride of calcium*, 1 oz., dissolved in *water*, 4 fl. oz., is added, and, after agitation, the liquid is placed aside to settle; the clear decanted liquid, and the washings of the sediment, are next evaporated, so that they may solidify on cooling; the cooled mass, after very strong pressure in a cloth, is redissolved in *warm water*, a *little powdered white marble* added, and the whole filtered; the filtrate is acidulated with *hydrochloric acid*, the solution again concentrated for crystallization, and the crystals submitted to powerful pressure, as before; the process of solution, clarification with *powdered marble* and *hydrochloric acid*, and crystallization, is repeated until a snow-white mass is obtained. The above is the process of Gregory and Robertson, and is one of the easiest and most productive on the large scale. To procure the salt quite white, 2 to 4 crystallizations are required, according to the power of the press employed. The Edinburgh College recommends, on the *small scale*, the solution, after two crystallizations, to be decoloured by means of *animal charcoal;* but, on the *large scale*, to purify the salt by repeated crystallizations alone.

3. (Mohr.) By dissolving the *precipitate of morphia* (see 4, *p.* 803) in *dilute hydrochloric acid*, and by crystallization, as before.

Pur., *&c.* It "is completely soluble in rectified spirit, and in water. What is precipitated from the aqueous solution by nitrate of silver is not entirely dissolved either by ammonia, unless added in excess, or by hydrochloric or nitric acid." (Ph. L.) "Snowy white; entirely soluble; solution colourless; loss of weight at 212° Fahr. not above 13%; 100 measures of a solution of 10 gr., in water, ½ fl. oz., heated to 212°, and decomposed with agitation by a *faint* excess of ammonia, yield a precipitate which, in 24 hours, occupies 12½ measures of the liquid." (Ph. E.) It takes 20 parts of cold, and about its own weight of boiling water to dissolve it. The hydrochlorate of morphia of the shops is usually, like the acetate, under the form of a white crystalline powder.

Obs. Of all the salts of morphia, this one appears to be that most suitable for medical purposes, from its free solubility, and from its solution not being liable to spontaneous decomposition, at least under ordinary circumstances. "The opium which yields the largest quantity of precipitate by carbonate of soda, yields muriate of morphia, not only in the greatest proportion, but also with the fewest crystallizations." (Ph. E.) Smyrna opium contains the most morphia.

MORPHIA (Meconates of). *Prep.* 1. (*Neutral Meconate of Morphia; Morphiæ Meconas*,—Lat.) By saturating an aqueous solution of *meconic acid* with *morphia*, and evaporating the solution by a gentle heat, so that crystals may be obtained.

2. (*Bimeconate of Morphia; Morphiæ Bimeconas*,—Lat.) *Meconic acid*, 11 parts; *morphia*, 14 parts; dissolve each separately, in *hot water*, q. s.; mix the solutions, and either gently evaporate and crystallize, or at once evaporate to dryness.

Obs. Morphia exists in opium under the form of *bimeconate*, and hence this preparation of that drug has been preferred by some practitioners. A solution of this salt for medical purposes, may be directly prepared from *opium*, by treating its infusion in *cold water* with a little *animal charcoal*, filtering, gently evaporating to dryness, redissolving the residuum in *cold water*, filtering, and repeating the treatment with *animal charcoal*. The dose of the dry bimeconate is ¼ gr., or more; and of the meconate rather less. "A powder is also sold, called '*bimeconate of morphia*,' which is of the same strength as *powdered opium*, and is given in similar doses. It is obviously incorrect to apply this name to a powder which consists principally of foreign matter. It is to be hoped that physicians will not prescribe this powder under the above name, as such a practice might lead to fatal results, if the prescription should be prepared with the substance which the name strictly indicates." (Prof. Redwood.)

MORPHIA (Muriate of). See *Hydrochlorate of Morphia.*

MORPHIA (Nitrate of). Syn. *Morphiæ Nitras*,—Lat. *Prep.* By saturating *very dilute nitric acid* with *morphia* (in slight excess), concentrating the solution by a gentle heat, and setting it aside to crystallize.

MORPHIA (Phosphate of). Syn. *Morphiæ Phosphas*,—Lat. As the last.

MORPHIA (Sulphate of). Syn. *Morphiæ Sulphas*,—Lat. *Prep.* Saturate *very dilute sulphuric acid* with *morphia*, evaporate to one half, add a little animal charcoal, continue the evaporation for a short time longer at a gentle heat, filter whilst hot, and abandon it to spontaneous evaporation. It is decomposed by driving off the water of crystallization. *Sulphate of morphia* is included in the Ph. U. S. According to Magendie this salt sometimes agrees with patients who cannot bear the acetate.

MORPHIA (Tartrate of). Syn. *Morphiæ Tartras.*—Lat. *Prep.* As the last.

MORPHIA AND CODEIA (Hydrochlorate of). Syn. *Gregory's Salt; Morphiæ et Codiæ Hydrochloras,*—Lat. *Sel de Gregory,*—Fr. This is commercial *hydrochlorate of morphia* prepared according to Dr. Gregory's process.

MORPHIA AND ZINC (Hydriodate of,—Ioduretted.) Syn. *Morphiæ et Zinci Hydriodas cum Iodinio.*—Lat. *Prep.* (Bouchardat.) *Ioduretted hydriodate of morphia,* 1 part; *pure zinc,* 10 parts; *water,* 50 parts; boil together, after some hours filter the boiling liquid, and collect the crystals which are deposited as it cools. *Dose.* ½ to 1½ gr., made into a pill; in various painful affections of the stomach, &c.

MORPHIOMETRY. A name given to the process of determining the richness of opium in morphia. See *Opium.*

MORISON'S PILLS. See *Patent Medicines.*

MORSULI. An old name applied to lozenges and masticatories. It is still retained in some foreign pharmacopœias.

MORTAR is the well-known cement, made of *lime, sand,* and *water,* employed to bind bricks and stones together in the construction of walls, buildings, &c.

In the composition of mortar, *stone lime* is preferred to that obtained from chalk, and *river sand* to pit or road sand. *Sea sand* is unfitted for mortar until it has been well soaked and washed in fresh water. Sifted *coal ashes* are frequently substituted for the whole or a part of the sand.

Hydraulic mortars or *cements* are those which, like *Roman cement,* are employed for works which are either constantly submerged, or are frequently exposed to the action of water. The poorer sorts of limestone are chosen for this purpose, or those which contain from 8% to 25% of alumina, magnesia, and silica. Such limestones, "though calcined, do not slake when moistened; but if pulverized they absorb water without swelling up or heating, like *fat lime,* and affords a paste which hardens in a few days under water, but in the air they never acquire much solidity."

"The essential constituents of every good hydraulic mortar are *caustic lime* and *silica;* and the hardening of this composition under water consists mainly in a chemical combination of these two ingredients through the agency of the water, producing a hydrated silicate of lime. But such mortars may contain other ingredients besides lime, as for example, clay and magnesia, when double silicates of great solidity are formed; on which account *dolomite* is a good ingredient in these mortars. But the silica must be in a peculiar state for these purposes; namely, capable of affording a gelatinous paste with acids; and if not so already, it must be brought into this condition, by calcining it along with an *alkali* or an *alkaline earth,* at a bright red heat, when it will dissolve and gelatinize in acids. *Quartzose sand,* however fine its powder may be, will form no water mortar with lime; but if the powder be *ignited* with the lime, it then becomes fit for hydraulic cement. *Ground felspar* or *clay* forms with slaked lime no water cement; but when they are previously calcined along with the lime, the mixture becomes capable of hardening under water."

"*All sorts of lime* are made *hydraulic,* in the *humid way,* by mixing the slaked lime with solutions of common alum or sulphate of alumina; but the best method consists in employing a solution of the silicate of potash, called *liquor of flints* or *soluble glass,* to mix in with the *slaked lime* or *lime and clay.* An hydraulic cement may also be made which will serve for the manufacture of *architectural ornaments,* by making a paste of *pulverized chalk,* with a *solution* of the *silicate of potash.* The said liquor of flints likewise gives chalk and plaster a stony hardness, by merely soaking them in it after they are cut or moulded to a proper shape. On exposure to the air, they get progressively indurated. *Superficial hardness* may be readily procured by washing over the *surface* of *chalk, &c.,* with *liquor of flints,* by means of a brush. This method affords an easy and elegant method of giving a *stony crust* to the *plastered walls* and *ceilings of apartments;* as also to *statues* and *busts,* cast in gypsum mixed with chalk."

Under *Prof. Kuhlman's patent,* dated April, 1841, "instead of calcining the limestone with clay and sand alone, as has been hitherto commonly practised, this inventor introduces a small quantity of *soda,* or, preferably, *potash,* in the state of *sulphate, carbonate,* or *muriate;* salts susceptible of forming silicates when the earthy mixture is calcined. The *alkaline salt,* equal in weight to about 1-5th that of the *lime,* is introduced in solution among the earths." (Ure, *Dict. of A. M. & M.,* Edn. 4.)

The hardening of the common mortars and cements is in a great measure due to the gradual absorption of carbonic acid; but even after a very great length of time, this conversion into carbonate is not complete. Good mortar, under favorable circumstances, acquires extreme hardness by age.

Attempts have been made at various times to introduce the use of bituminous cements into this country, and thus to restore both to land and submarine architecture a valuable material which has now lain neglected for a period of fully 30 centuries; but unfortunately, owing to the interest of our great building and engineering firms lying in another direction, these attempts have been hitherto unsuccessful. See *Asphaltum, Cements, Lime, &c.*

MORTIFICATION. Syn. *Gangrene; Gangrena, Mortificatio,*—Lat. Local death; the loss of vitality in one part of the animal body, whilst the rest continues living. "The terms gangrene and mortification are often used synonymously; but *gangrene* properly signifies the state which immediately precedes mortification, while the complete mortification, or absolute death of a part, is called *sphacelus.* A part which has passed into the state of sphacelus is called a *slough.* When a part becomes gangrenous, it loses its natural heat and sensibility, it becomes livid, and vesications appear on its surface. Although this state generally leads to that of complete mortification, a certain degree of vitality remains, and, in some rare instances, the circulation is re-established, and the part restored to health. When *sphacelus* has taken place, the part becomes black and putrid, it is entirely dead and disorganized, and the living system must either cast it off, or sink from the effects of the absorption of putrid matter." (*Med. Lex.*)

The *common causes* of *mortification* are—inflammation (especially the erysipelatous); interrupted circulation; severe mechanical injury; exposure to intense cold (*gelatio*); the use of poisonous food, &c.; specific contagion; action of chemical agents, (heat, escharotics, &c.)

The *common symptoms* of *mortification* supervening on inflammation are—loss of pain, and sudden and overwhelming depression of the vital powers; diminution of the fever; small, sinking pulse; hiccough, delirium, cold sweat, and fainting, which precedes death.

The *treatment*, in the *early* or inflammatory stage of this disease, when the pulse is strong and quick, is antiphlogistic or depletive, more especially in young and vigorous subjects; in the *second* stage, when the symptomatic fever has given way to debility, and the pulse is sunk and feeble, stimulants and tonics, with strong soups, wine, &c., are to be had recourse to. "*Bark, port wine,* and *opium,* have been the constitutional remedies most generally employed in the cure of mortification; but the whole class of stimulants may be occasionally resorted to with more or less advantage," after once the inflammatory symptoms have subsided. During the *first* stage, emollient poultices mixed with *yeast* or *freshly burnt charcoal* should be applied hot, and renewed every 3 or 4 hours; and between the applications the parts should be well bathed with hot fomentations of *poppies, henbane,* or *opium.* In the *second* stage, stimulating liniments, as those of *camphorated spirit, vinegar, turpentine, &c.,* are used. In gangrene of the extremities, amputation is often necessary. See *Hospital Gangrene, &c.*

MOSAIC GOLD. See *Brass, Gold, &c.*

MOSSES. Syn. *Musci,*—Lat. Several vegetables of the natural orders, *algæ, fungi, lichenes,* and *muscoideæ,* commonly pass under this name with the vulgar. Of these the following are the principal:—

Australian Moss. For the most part resembles *Irish moss.*

Bog Moss (*Sphagnum palustre*). Very retentive of moisture. *Used* to pack up plants for exportation.

Ceylon Moss (*Plocaria candida,*—Nees.) Very nutritive; made into a decoction or jelly, which is highly esteemed as an article of diet for invalids and children, more especially for those suffering under affections of the mucous membranes or phthisis. See *Decoctions.*

Club Moss (*Lycopodium clavatum,*—Linn.) See *Lycopodium.*

Corsican Moss, C. Worm do. (*Plocaria helminthocorton,*—Endl.) *Dose.* ½ to 2 dr., in powder, mixed up with sugar; as a vermifuge. See *Decoctions.*

Cup Moss, C. Lichen (*Lichen pyxidatus,*—Linn.) Astringent and febrifuge. A cupful of the decoction taken warm generally proves gently emetic. *Used* in hooping cough, &c.

Fir Club-moss (*Lycopodium selago,*—Linn.) Violently emetic and purgative. It is also irritant and narcotic.

Hairy Tree-moss (*Lichen plicatus,*—Linn.) *Used* occasionally as an astringent.

Iceland Moss, Liverwort; Muscus Islandicus; Cetraria,—Ph. L. (*Cetraria islandica,*—Achar. *Lichen islandicus,*—Linn.) Highly nutritious and easy of digestion. The decoction is a favorite alimentary substance in affections of the lungs and digestive organs. In Iceland, after the bitter has been removed by soaking it in hot water, it is made into jelly, or dried, ground to flour, and made into bread. See *Decoctions.*

Irish Moss, Pearl do., Carrageen do. (*Chondrus crispus,*—Grev. *Fucus crispus,* —Linn.) Very nutritious. The *decoction* or *jelly* is a useful and popular demulcent and emollient in pulmonary affections, dysentery, scrofula, rickets, &c. It is often employed by cooks and confectioners instead of isinglass; and by painters to make their size.

Rein-deer Moss (*Lichen rangiferinus,*—Linn.) Esculent, very nutritious. *Used* for making *Cyprus powder* and *French scent bags* or *sachets.*

Rock Moss, Orchill, Canary Archil, Herb do., Dyer's Rocella, Dyer's Fucus (*Rocella tinctoria,*—D. C. *Lichen rocella,* —Linn. This is the most celebrated and valuable of the tinctorial lichens. The *decoction* is used to allay tickling phthisical coughs, &c. See *Archil, Cudbear,* and *Litmus.*

Tartareous Moss (*Lichen tartareus,*—Linn.) See *Cudbear.*

MOTHER OF PEARL. See *Pearl.*

MOTHER'S MARKS. See *Skin.*

MOTHER WATER. See *Crystallization.*

MOULDS. Numerous materials and compositions are employed for the purpose of taking moulds, among which are the following:—

1. (*Compo'*) — *a.* From *spermaceti, stearine* or *hard tallow,* and *white wax,* equal parts, melted together. For fine work, as medals, small casts, &c.

b. From *black rosin,* ¾ *lb.; hard tallow,* ½ *lb.; bees' wax,* 6 oz.; as the last. For coarse work, as architectural ornaments, &c. The above are poured on the objects to be copied (previously oiled) whilst in the melted state. Articles in *plaster of Paris* are first soaked in water, observing that none of it remains on the surface so as to interfere with the design.

2. (*Elastic.*)—*a.* Flexible or elastic moulds may be made of *gutta percha* softened in *boiling water,* and after being freed from moisture, pressed strongly against the object to be copied, by means of a screw press. A ring or support should be employed to prevent undue lateral spreading.

b. By the use of *gelatine* or *glue,* elastic moulds are formed capable of reproducing, with accuracy, and in a single piece, the most elaborately sculptured objects, of exquisite finish and delicacy. Casts from these are now common in the streets. The credit of the application of this substance to the purpose is due to Mons. H. Vincent. The process of casting consists in simply dissolving a certain quantity of *gelatine* in *hot water* until it is reduced to the state of liquid paste, when it is run over the object, previously oiled, intended to be reproduced. As it cools the gelatine assumes a consistency offering a considerable degree of resistance, and is highly elastic, which latter quality enables it to be easily detached from the work on which it has been fitted. In the hollow formed by the gelatine, the *finest plaster* mixed to a thick cream with *water,* is next run; and when the plaster has acquired the requisite hardness, the gelatine mould is detached in the same manner as from the original. From this apparently fragile mould as many as six copies may be taken, all reproducing the original with unerring fidelity.

3. (*Metallic.*)—*a.* From *fusible metal.*

b. (*Clichée moulds.*) From a fusible alloy formed of *bismuth,* 8 parts; *lead,* 5 parts; *tin,* 4 parts; *antimony,* 1 part; repeatedly melted together. The above are poured out in the melted state on a plate or slab, and after being stirred until in a pasty state, the object to be copied is strongly pressed on the alloy at the moment it begins to solidify. They are chiefly used for medals and other like objects.

c. (*M. Chameroy's patent.*) By melting together one part of some *easily fusible metal* in a crucible, and then mixing with it four parts of a *metal far less readily fusible, steeped in ammonia and reduced to powder.* Such a compound is stated to be of great solidity, hardness, facility of soldering, melts at a low temperature, and has great tractability in moulding to any form; and in casting takes the sharpest impressions, whilst in its nature it is peculiarly unchangeable. See *Voltatype, &c.*

MOUSE. This pretty and agile little animal which so commonly infests our dwelling houses and granaries, is the *mus musculus* (Linn.), one of the smaller *rodentia.* Its *flesh* was formerly much esteemed in certain diseases. Its *fat* and *excrement* are included among the simples of the Ph. L. 1618.

MOUTH COSMETICS. See *Breath, Teeth, Lozenges, Pastes, Powders, Washes, &c.*

MOXAS. Substances burnt upon the body, for the purpose of acting as counter-irritants, and allaying deep-seated pains, and inflammation. They have been used in gout, rheumatism, &c. The small cone constituting the moxa, is placed upon the part, lighted, and allowed to burn to its base. The *Chinese moxas* are made of the downy portion of the leaves of a species of wormwood (*artemisia sinensis*); but various other substances, as the *pith of the sunflower*, *cotton*, or *paper*, soaked in a *weak solution of nitrate*, *chlorate*, or *chromate of potassa*, answer as well. The actual cautery is said to be preferable to any of them.

MUCIC ACID. Syn. *Mucous Acid*, *Saccholactic Acid.* A compound discovered by Scheele, and by him named saccholactic acid. It is obtained in a state of purity by digesting 1 part of *sugar of milk*, in 4 parts of *nitric acid* (sp. gr. 1·42), diluted with 1 part of *water*, and applying heat till the effervescence ceases; on cooling, the acid is deposited. *Gum* may be substituted for sugar of milk, but yields a less pure acid.

Prop., *&c.* Mucic acid is a white, crystalline powder; soluble in 66 parts of boiling water, and in oil of vitriol, to which it imparts a crimson colour. By dry distillation it yields *pyromucic acid*, and other products; with the bases it forms salts called *mucates.* The *alkaline mucates* are soluble; the *earthy* and *metallic mucates*, insoluble.

MUCILAGE. Syn. *Mucilago*, — Lat. An aqueous solution of *gum*, or other like substance that gives a considerable consistency to water. See *Decoctions*, *Mixtures*, *&c.*

MUCILAGE (Tragacanth). Syn. *Mucilago Tragacanthæ*,—Ph. E., & Ph. D. 1826. *Prep.* (Ph. E. & D.) *Tragacanth*, 2 dr.; *boiling water*, 9 fl. oz. (8 fl. oz.,—Ph. D.); macerate for 24 hours, triturate, and press through linen. *Used* to make up pills, to suspend heavy powders in liquids, as an application to burns, &c.

MUCILAGINOUS FERMENTATION. See *Viscous Fermentation.*

MUDARINE. Syn. *Madarine.* A peculiar substance possessing powerful emetic properties, extracted from the *root-bark* of *calotropis mudarii* or *gigantea* (*madar*, *mudar*, or *yercund*), in which it exists to the extent of 11%. (Duncan.) It is soluble in water and in alcohol, and its aqueous solution, unlike that of most other substances, gelatinizes by heat, and becomes fluid again on cooling.

MUFFINS. *Prep.* Take of *fine flour*, ¼ peck; *warm milk-and-water*, 1 quart; *yeast*, a wine-glassful; *salt*, 2 *oz.*; mix for 15 minutes, then further add of *flour*, ¼ peck, make a dough, let it rise 1 hour, roll it up, pull it into pieces, make them into balls, put them in a warm place, and when the whole dough is made into balls, shape them into muffins, and bake them on tins; turn them when half done, dip them into *warm milk*, and bake them to a pale brown.

MUFFLE. See *Assaying.*

MULBERRY. Syn. *Morum*, — Lat. Mulberries (*mora*, *mori baccæ*) are the *fruit* of *morus nigra* (Linn.) or *black mulberry tree.* They are cooling and laxative; but when eaten too freely are apt to disorder the stomach and bowels. *Mulberry juice* (*mori succus*) is officinal in the Ph. L. A syrup (*syrupus mori*) is made of it. It is also, occasionally, made in wine.

MULLED. Sweetened and enriched with spices or aromatics. See *Wines.*

MULLET. Syn. *Red Mullet; Mullus*, —Lat. The *mullus barbatus*, a species of spiny-finned fishes (*acanthopterigians*). It is esteemed a delicacy; but is said to be rather indigestible. The Romans held it in such repute, that prodigious sums of money were given for it. The *striped mullet* or *striped surmullet* (mullus sarmuletus) is little inferior to the last. The *silvery gray mullet*, another esteemed table-fish, is the *mugil cephalus*, a genus of soft-finned abdominal fishes (*malacopterigii abdominales.*) The red mullet was formerly believed to be "good in colic. Applied fresh, they help the bitings of scorpions, spiders, &c." (!)

MULTUM. A *mixture* of *extract of quassia* and *liquorice*, used by fraudulent brewers instead of malt and hops.

MUM. A beverage prepared from *wheat malt*, in a similar way to ordinary beer from barley malt. A little *oat* and *bean meal* is frequently added. It was formerly much drunk in England; but its use at the present day is chiefly confined to Germany, and to Brunswick more particularly.

MUMMY. Syn. *Mumia*,—Lat. The mixed resinous mass with which the Egyptian corpses have been preserved, reduced to powder. *Used* by artists; a good glazing colour, but dries slowly. *Burnt Prussian blue*, or a *mixture of asphaltum and burnt sienna* melted together, are said to be good substitutes. Pure *asphaltum* (mumia mineralis) is superior to all the above for "glazings."

At one time a perfect rage existed for *Egyptian mummies* in Europe, the physicians having pronounced them to possess the most extraordinary virtues. The consequence was that "*mummy*" and its *preparations* "went up" in the market, and certain ingenious Jews commenced the manufacture of "*factitious mummy.*" This traffic lasted for a long time, until an ungrateful slave of Damietta, who entertained a serious objection to personally constituting pills, potions, and powders for Christian Europe, exposed the whole transaction to the Pacha. A serious persecution of the manufacturers of factitious mummy followed; the fastidious sick of Western Europe suddenly discovered that their doses of medicine lacked the peculiar palate of the ashes of the Pharoahs and Cleopatras, the doctors felt they had been outwitted, Avicenna fell into disgrace, and mummy went rapidly out of fashion.

MUMPS. Syn. *Parotitis*,—Lat. Inflammation of the parotid gland, which is situated under the ear, between the mamillary process of the temple-bone and the angle of the lower jaw. There is little constitutional derangement, but the cheeks become swollen and painful, and there is some difficulty in opening the mouth, and in swallowing. The *treatment* consists in simply keeping the part warm with flannel, and the use of warm fomentations, at the same time that the bowels are kept freely open with some mild laxative.

The *mumps* are said to be contagious, as when the affection appears in a school, it generally goes through every member of it. Low, damp situations are those most favorable to it. Occasionally, it is suddenly translated from the throat to the mammæ or testes, when it assumes a slightly more serious character, and a low diet, active purgation, and even local bleeding, should be had recourse to.

MUREXAN. Syn. *Purpuric Acid*,—Prout. *Prep.* (Liebig.) *Murexide* is dissolved in a *solution of caustic potassa*, heat is applied until the blue colour disappears, and *dilute sulphuric acid* is added in excess; silky crystalline scales of *murexan* or *purpuric acid* are deposited, and after being washed with a little *cold distilled water*, are, lastly, dried.

Prop., &c. It is only very slightly soluble in cold water; freely soluble in solutions of ammonia and the fixed alkalies; the first by exposure to the air becomes purple, and deposits brilliant crystals of *murexide*. These compounds are the *purpurates* of Dr. Prout.

MUREXIDE. Syn. *Purpurate of Ammonia*,—Prout. A highly interesting compound so named on account of its rich colour.

Prep. (Gregory.) *Hydrated alloxan*, 7 gr.; *alloxantine*, 4 gr.; *boiling water*, 240 gr.; dissolve, and add the solution to 80 gr.-measure of a *cold* and *strong solution of carbonate of ammonia;* crystals of murexide will separate as the liquid cools.

Prop., &c. It forms iridescent crystals, having a metallic lustre, of a magnificent green colour by reflected light, and an equally beautiful reddish-purple by transmitted light. It is soluble in boiling water, only very slightly soluble in cold water, and insoluble in alcohol and ether. An analogous substance, formed as above, by treating amalic acid with ammonia, is called "*caffein-murexide*."

MURIATE. See *Hydrochlorate.*

MURIATIC ACID. See *Hydrochloric Acid.*

MURIDE. The name originally given to *bromine*, by M. Balard.

MURRAIN. A disease affecting neat cattle, more especially young cows, in the seasons of spring and autumn. The *common symptoms* are tumefaction and discoloration of one of the hind quarters of the animal, with consequent lameness and inability to move; a peculiar emphysema or intumescence of various parts of the body, particularly over the region of the spine; and all the common features of putrid fever. In severe cases, gangrene soon follows, and death frequently ensues in from 12 to 24 hours.

The rapid progress of this disease admits of little being done in the way of medication or attempted cure. Extensive scarifications of the affected side, hot yeast or charcoal poultices, or hot fomentations, and active purgatives, appear to constitute the only useful treatment. The following *drenches* have been recommended for this affection:—

1. (Blaine.) *Sweet spirit of nitre*, ½ fl. oz.; *powdered cascarilla*, 2 oz.; *liquor of acetate of ammonia*, 4 fl. oz.; *yeast*, 8 fl. oz.; one every 3 or 4 hours.

2. (Clater.) *Laudanum* and *sweet spirit of nitre*, of each, ½ fl. oz.; *solution of chloride of lime*, ¼ fl. oz.; *prepared chalk*, 1 oz.; *warm gruel*, 1 pint. As the last.

The apparent incurability of this disease renders it of the utmost importance to the farmer to adopt *preventive measures.* These should consist of the supply of wholesome food and pure water, the adoption of extreme cleanliness, and the free access of pure air to all the stalls, barns, stables, and other buildings in which the cattle may be sheltered. As the disease is generally regarded as contagious, it is only prudent to separate, as speedily as possible, the healthy animals from those affected. The free use of chloride of lime as a disinfectant, is also advisable.

MUSHROOMS. Edible fungi. The

species commonly eaten in England are the *agaricus campestris* (Linn.), or *common field* or *garden mushroom*, used to make ketchup, and eaten either raw, stewed, or broiled;—the *morchella esculenta* (Linn.), or *common morel*, used to flavour soups and gravies;—and the *tuber cibarium* (Sibth; *lycoperdon tuber*,—Linn.), or *common truffle*, also used as a seasoning.

Several species of agarici, which to the inexperienced closely resemble the common edible mushroom, possess poisonous narcotic properties, and their use has not unfrequently been productive of serious, and, in some cases, fatal results. Unfortunately, no simple test exists by which the edible and poisonous varieties can be distinguished from each other. So strongly was the late Prof. L. C. Richards, the eminent botanist, impressed with this feeling, that though "none was better acquainted with the distinctions of fungi than he was, yet he would never eat any except such as had been raised in gardens, in mushroom beds." Certainly all mushrooms may be regarded as suspicious which are either not so raised, or not collected from a known pasture or meadow by a competent party. The following are a few of the published tests of the wholesomeness of mushrooms:—

1. Sprinkle a *little salt* on the spongy part or gills of the sample to be tried: if they turn *yellow*, they are *poisonous;* if *black*, they are *wholesome*.—2. *False mushrooms* have a *warty cap*, or else the fragments of membrane adhering to the upper surface, are heavy, and emerge from a vulva or bag; they grow in *tufts* or *clusters* in *woods*, on the stumps of trees, &c., whereas, the *true mushrooms* grow in *pastures*.—3. *False mushrooms* have an *astringent, styptic,* and *disagreeable taste*.—4. When cut they turn *blue*.—5. They are moist on the surface, and are generally of a *rose* or *orange* colour.—6. The *gills* of the *true mushroom* are of a *pinky red*, changing to a liver colour.—7. The flesh is white.—8. The stem is white, solid, and cylindrical.—9. "Introduce a silver spoon, or a new shilling or sixpence, or an onion, into a vessel in which mushrooms are seething; if, on taking either of them out, they assume a dark discoloured appearance, the circumstance denotes the presence of poison existing amongst them; if, on the other hand, the metal or onion on being withdrawn from the liquor wears its natural appearance, the fruit may be regarded as genuine, and of the right sort." (*Times*, Aug. 10, 1841.)

In cases of *poisoning* by *fungi*, vomiting should be immediately induced by an emetic and tickling the fauces with the finger or a feather; after which a purgative clyster or a strong cathartic should be administered, with ½ to 1 fl. dr. of *ether* in a glassful of water or weak brandy. As an antidote, a solution of *tannin*, ½ dr., in *water*, 1½ pint, or a *decoction* of ½ *oz.* of *powdered galls*, or of 1 *oz.* of *powdered cinchona bark* in a like quantity of *water*, has been strongly recommended by M. Chansarel.

Alexis Soyer is eloquent on the exquisite flavour and bouquet of mushrooms gathered in September or October, and baked under a glass or basin on toast, along with *scalded* or *clotted cream*, or a little *melted butter*, with *one clove*, and *salt*, *pepper*, *&c.*, to taste. They take about ¼ of an hour in a gentle oven or before the fire. "When it is taken up, do not remove the glass for a few minutes, by which time the vapour will have become condensed and gone into the bread; but when it is, the aroma, which is the essence of the mushroom, is so powerful as to pervade the whole apartment." "The sight, when the glass is removed, is most inviting,—its whiteness rivals the everlasting snows of Mont Blanc, and the taste is worthy of Lucullus. Vitellius would never have dined without it; Apicius would never have gone to Greece to seek for crawfish; and had he only half the fortune left when he committed suicide, he would have preferred to have left proud Rome and retire to some villa or cottage to enjoy such an enticing dish." (Soyer.)

MUSK. Syn. *Moschus*,—Ph. L. E. & D. "A secretion deposited in a follicle of the prepuce" of "*moschus moschiferus*, Linn." (Ph. L.) an animal inhabiting the mountains of Eastern Asia. It is imported from Bengal, China, and Russia; and, latterly, from the United States of America. That known as *Tonquin musk* is the most esteemed for its odour; but that from Russia is the only kind which reaches us in perfect bags, or which has not been tampered with. *Pod Musk* (*moschus in vesicis*) is the bag in its natural state, containing the musk. *Grain musk* (*moschus in granis*, *m. ex vesicis*) is the matter contained in the pods, and which constitutes true musk. The *average weight* of one of the *pods* is about 6 dr.; that of the *grain musk* which it contains, about 2½ dr.

Pur., *&c.* The musk of the shops is generally adulterated. *Dried bullock's blood* or *chocolate* is commonly employed for this purpose, along with a little *bone black*. The extent of these additions varies from 25% to

75$\frac{0}{0}$ of the gross weight of the mixture. The blood is dried by the heat of steam or a water bath, then reduced to *coarse* powder, and triturated with the genuine musk in a mortar along with a few drops of *liquor of ammonia.* It is then either replaced in the empty pods, or it is put into bottles, and sold as grain musk. The writer of this article has seen a large quantity of dried blood thus employed, and sold for musk, and therefore speaks, not from mere hearsay, but from personal observation. There are only three certain ways of detecting this *fraud*, viz.—by the *inferiority of the odour*, by an assay for the iron contained in the blood, or—by the microscope. Genuine musk often becomes nearly inodorous by keeping, but recovers its smell on being exposed to the *fumes of ammonia*, or by being moistened with *ammonia water.* The perfumers sometimes expose it to the fœtid ammoniacal effluvia of privies for the same purpose.

Pure musk, by trituration or digestion with boiling water, loses about 75$\frac{0}{0}$ of its weight, and the boiling solution, after precipitation with nitric acid, is nearly colourless. A solution of acetate of lead, and a cold decoction of galls, also precipitate the solution; but one of corrosive sublimate does not disturb it. The ashes left after the incineration of pure musk, are neither red nor yellow, but *gray*, and should not exceed 5 to 6$\frac{0}{0}$. The Chinese appear to be the most skilful and successful adulterators of musk.

Uses, &c. Musk is chiefly employed for its odour. As a *medicine*, it is a powerful stimulant and antispasmodic, and is a valuable remedy in various diseases of a spasmodic or hysterical character, or attended with low fever. *Dose.* 3 to 15 gr., made into an emulsion.

MUSK (Factitious). Syn. *Resin of Amber, Resina Succini, Moschus Artificialis. M. Factitius,*—Lat. *Prep.* 1. *Oil of amber*, 1 fl. dr.; *nitric acid*, 3½ fl. dr.; digest in a cold tumbler, and after 24 hours, wash in *cold water* the orange-yellow resinous matter which has formed, and carefully dry it.

2. (Elsner.) From *oil of amber*, 1 part; *fuming nitric acid*, 3 parts; as the last, but employing artificial cold to prevent any portion of the oil being carbonized.

Obs. Resin of amber smells strongly of musk, and is said to be antispasmodic and nervine. A tincture (*tinctura resinæ succini*) is made by dissolving 1 dr. of it in *rectified spirit*, 10 fl. dr., of which the *dose* is 1 fl. dr.; in hooping-cough, low fevers, &c.

Dr. Collier mentions an artificial musk, prepared by digesting for 10 days *nitric acid*, ½ oz., on "*fœtid animal oil*, obtained by distillation, 1 oz.; then adding of *rectified spirit*, 1 pint, and digesting the whole for a month." (Collier's *Pharm.* p. 184.)

MUSK SEED. Syn. *Grains d'Ambrette.* The seed of *hibiscus abelmoschus* (*Linn.*), or *musk mallow.* They are chiefly *used* for their odour, in perfumery, hair powder, coffee, &c.

MUSLIN, *Blonde, Lace,* and other like textile fabrics of a delicate description, are commonly cleaned by gently washing them with *white soap* and *water*, and after well rinsing them in *clean water*, they are either *clear-starched* or stretched on a frame to dry. Narrow blondes, lace, &c., are usually folded several times, and then loosely "tacked" together before putting them into the water. See *Clear-Starching.*

MUSQUITOS. See *Gnats.*

MUSSEL. See *Shell-fish.*

MUST. Syn. *Mustum,*—Lat. The *expressed juice* of *ripe grapes*, before fermentation. When boiled to 2-3rds, it is called *carenum;* when boiled to ½, it is called *sapa.* On further concentration, it yields a species of granular sugar (*grape sugar*).

MUST (Factitious). Syn. *Mustum Factitium,*—Lat. *Prep.* Dissolve *cream of tartar*, ¾ *oz.;* in *boiling water*, 7 pints; when cold, add of *lump sugar*, 2½ *lb.; raisins* (chopped small), ½ *lb.;* digest for 3 or 4 hours, strain through flannel as quickly as possible, and add of *lemon juice*, ½ pint.

MUSTARD. Syn. *Sinapis,*—Lat. "The seed" of "*sinapis nigra* and *s. alba.*" (Ph. L.) "Flour of the seeds of *sinapis nigra*, generally mixed with those of *sinapis alba*, and deprived of fixed oil by expression." (Ph. E.) "The flour of the seeds." (Ph. D.) That of the shops is very frequently *adulterated* with *wheat flour.* When this is the case, it does not readily make a *smooth paste* with water, but exhibits considerable toughness, and somewhat of a stringy appearance, especially when *little* water and *much* heat is employed. The common proportions taken by some grocers are,—*dried common salt, wheat flour,* and *superfine mustard,* equal parts; with *turmeric*, to colour, and *cayenne*, q. s. to give it piquancy and fire.

Uses, &c. Pure flour of mustard is used in medicine, to make stimulating poultices, pediluvia, &c. As a condiment it is useful in torpor and coldness of the digestive organs. A few years since the use of mustard seed, by spoonfuls, ad libitum, was a common and fashionable remedy in torpor or atony of the digestive organs. The practice was a revival of that recommended by Dr. Cullen; but it has now again sunk into disuse. Sir Jno. Sinclair also approved of the use of mustard seed in this way, especially for the preservation of the health of the aged. (*Lancet*, Jan. 1834.) See *Poultices, &c.*

MUSTARD (for the Table). The common practice of preparing mustard for the table with *vinegar*, or, still more, with *boiling water*, materially checks the development of those peculiar principles on which its pungency or strength almost entirely depends. To economise this substance, we should use *luke-warm water* only; and when "flavouring matter" is to be added to it, this is better deferred until after the paste is made. The following forms for "*made mustard*" are much esteemed for their flavour:

Prep. 1. *Mustard* (ground), 3½ *lb.; water*, q. s. to form a *stiff* paste; in ½ hour, add of *common salt* (rubbed very fine), 1 *lb.;* with *vinegar, grape juice, lemon juice*, or *white wine*, q. s. to reduce it to a proper consistence.

2. To the last add a *little soluble cayenne pepper*, or *essence of cayenne.*

3. (M. Lenormand.) *Best flour of mustard*, 2 *lb.; fresh parsley, chervil, celery*, and *tarragon*, of each, ½ *oz.; garlic*, 1 clove; 12 *salt anchovies;* (all well chopped;) grind well together, add of *salt*, 1 *oz.; grape juice* or *sugar*, q. s. to sweeten; with sufficient *water* to form the mass into a thinnish paste by trituration in a mortar. When put into pots a red-hot poker is to be thrust into each, and a *little vinegar* afterwards poured upon the surface.

4. (*Moutarde à l'estragon.*) From *black mustard seed* (gently dried until friable, and then finely powdered), 1 *lb.; salt*, 2 *oz.; tarragon vinegar*, q. s. to mix. In a similar way the French prepare several other "*mustards*," by employing *vinegars* flavoured with the respective substances, or *walnut* or *mushroom ketchup*, or the liquors of the richer pickles.

5. (*Moutarde superbe.*) *Salt*, 1½ *lb.; scraped horseradish*, 1 *lb.; garlic*, 2 cloves; *boiling vinegar*, 2 gall.; macerate in a covered vessel for 24 hours, strain, and add of *flour of mustard*, q. s.

6. (*Patent.*) *Black ginger* (bruised), 12 *lb.; common salt*, 18 *lb.; water*, 15 gall.; boil, strain, and add to each gallon, *flour of mustard*, 5 *lb.*

7. (M. Soyés.) Steep *mustard seed* in twice its bulk of *distilled vinegar* for 8 days, then grind the whole to a paste in a mill; put it into pots, and thrust a red hot poker into each of them. (*Patented.*)

MUSTINESS. See *Malt Liquors* and *Wines.*

MUTAGE. The term applied to the "matching" of *grape must* to arrest the progress of fermentation. See *Antiferments, Matches, &c.*

MUTTON (*Choice of.*) That of the *first quality* is "between *four* and *five* years old; but at present it is rarely got above three, and often under two. The flesh ought to be of a darkish, clear, red colour, the fat firm and white, the meat short and tender when pinched, and it ought not to be too fat." (Soyer.) The flesh of the "*South-down wether*" is esteemed the finest flavoured. *Mutton* is one of the most wholesome of the "red meats," and in commercial importance is second only to beef.

MYKOMELINIC ACID. A new acid discovered by Wöhler and Liebig, and obtained by heating to 212° a *solution of alloxan* with *ammonia* in excess, adding *dilute sulphuric acid*, also in excess, and boiling for a few minutes. The new acid falls as a yellow gelatinous precipitate, which dries to a yellow porous powder. It is only slightly soluble in water, but is freely soluble in alkaline solutions.

MYRICINE. The portion of *bees' wax* which is insoluble in alcohol, and saponified with difficulty.

MYRISTIC ACID. A monobasic fatty acid, obtained by the saponification of *myristine.* It melts at 120° Fahr.

MYRISTICINE. The *stéaroptène* deposited by *oil of nutmegs* by keeping.

MYRISTINE. Syn. *Sericine.* The white, solid portion of the *expressed oil of nutmegs* which is insoluble in cold alcohol. See *Myristic Acid.*

MYROLES. The *myrolés* of French pharmacy, are solutions of oleaginous or resinous substances in the volatile oils.

MYRONIC ACID. Bussy has given this name to an inodorous, bitter, non-crystallizable acid found by him in black mustard. It is soluble in water and alcohol.

MYROSINE. Syn. *Emulsine of Black Mustard.* A name given by Bussy to a peculiar substance soluble in water, and which possesses the power of converting *myronic acid*, in the presence of *water*, into the *volatile oil of mustard-seed.*

MYROSPERMINE. The name given by Richter to the portion of the *oil of balsam of Peru* which is soluble in alcohol.

MYROXILINE. The name given by

Richter to the portion of the *oil of balsam of Peru* which is insoluble in alcohol. By oxygenation it forms *myroxilic acid.*

MYRRH. Syn. *Myrrha,*—Ph. L. E. & D. "Gum resin exuded from the bark" of "*balsamodendron myrrha,* Nees." (Ph. L.)

Pur.—1. Triturate a small quantity of the *powder* of the *suspected myrrh* with an equal amount of *hydrochlorate of ammonia,* adding *water,* gradually; if the whole is *readily* dissolved, the myrrh is genuine; otherwise it is *sophisticated* with some inferior substance. (Giovanni Righini.)—2. When incinerated it should not leave more than 3½ to 4$\frac{0}{0}$ of ashes.

Uses, &c. Myrrh is a stimulating aromatic bitter and tonic, and is given in several diseases accompanied by relaxation and debility; especially in excessive secretions from the mucous membranes, and in disorders of the digestive organs. *Externally,* as an ingredient in dentifrices and rashes, in caries of the teeth, spongy and ulcerated gums, &c. *Dose.* 10 to 30 gr.; either alone or combined with aloes or chalybeates.

MYRRHIC ACID. The hard resinous portion of myrrh. It is soluble in the caustic alkalies, forming *alkaline myrrhates.*

NAILS (The) should be kept clean by the daily use of the *nail brush* and *soap-and-water.* After wiping the hands, but whilst they are still soft from the action of the water, the skin, which is apt to grow over the nails, should be *gently* loosened and pressed back, which will not only preserve them neatly rounded, but will prevent the skin cracking around their roots (*agnails, nail-springs*), and becoming sore. The free ends or points of the nails should be pared about once a week; and biting them should be particularly avoided, as being at once destructive to their beauty and usefulness. "The (free) edge of the scarf-skin *should never be pared,* the surface of the nail *never scraped,* or the nails cleaned with *any instrument whatever* saving the nail brush." (Eras. Wilson.)

The consequences of wearing a shoe that is obviously too short for the foot are thus described by the above authority. "In this case, Nature gives us warning, by means of her agent, *pain,* that such a proceeding is contrary to her laws. We stop our ears, and get accustomed to the pain, which, perhaps, is not severe, and soon goes off; the shoes get a scolding for their malice, and we forget all about it for a time. But does Nature check her course to suit the convenience of thoughtless man? No, no. In a short time we find that the nail, intercepted in its *forward* course, has become *unusually thick* and *hard,* and has *spread* out so much upon the sides, that it is now growing into the flesh, and so makes a case for the doctor. Or, perhaps, the continuance of pressure may have inflamed the sensitive skin at the root, and caused a *sore* and *painful place* there. And instances are by no means infrequent in which the power of production of the nail at the root becomes entirely abrogated, and then it *grows* in *thickness only.*"

When the *nails* are *stained* or *discoloured,* a little *lemon juice,* or *vinegar-and-water* is the best application. Occasionally a little *pumice stone,* in impalpable powder, or a little "*putty powder,*" may be used along with *water* and a piece of *soft leather* or *flannel* for the same purpose. The frequent employment of these substances is, however, injurious to the healthy growth of the nail.

Dr. Beau, a French writer quoted by Mr. Wilson, estimates the growth of the nails of the *hand* at 1 millimetre, or ⅗ths line a week; and the same length in 4 weeks for those of the *feet.* According to him, the portion of nail formed during the progress of disease is thinner than that produced during health, and may be distinguished on the surface as a transverse groove. If the disease has been sudden, the outer boundary of the groove is abrupt, and *vice versâ.* And if the disease is one in which the nutritive functions are seriously affected, the depth of the groove maintains an exact correspondence. From the changes thus produced on the surface of the nail, Dr. Beau suggests the possibility of *determining the period* of *occurrence* and also the *period of duration* of a *disease,* provided the time does not exceed that required for the entire growth of the nail. "For example:—a *groove,* or rather *ledge,* situated at the distance of eight millimetres from the edge of the root of the *thumb-nail,* or five from the free margin of the skin, is indicative of an attack of disease which commenced eight weeks previously; while the breadth of the groove being two millimetres would prove the disease to have continued for the space of two weeks. *After five months,* the *thumb-nail* ceases to be a tell-tale, on account of its entire growth in length being accomplished, and the vestige of disease consequently obliterated. The *great toe-nail* is now to be appealed to. At five months, the groove indicative of the above disease has advanced only five millimetres from the root, and is only just becoming apparent beyond the free margin of the skin, the breadth of the groove being only half a millimetre. In making these observations, M. Beau selects the thumb-nail and corresponding nail in the foot, because in them only he finds the appearances regularly present."

NANCEIC ACID. See *Zumic Acid.*

NANKEEN. The coloured cotton cloth which bears this name was originally brought from Nankin, the ancient capital of China, and was prepared from a native cotton, of a brownish-yellow hue. It is now successfully imitated in England, and at the present time the English manufacturers supply the Canton market. In this country the colour is generally given to the cloth by successive baths of *sulphate of iron* and *crude carbonate of soda* or *lime water.*

NANKEEN DYE. The liquid sold under this name in the shops, is the *annatto dye,* noticed at *p.* 69. It is employed to dye white calicoes of a nankeen colour; but, chiefly to restore the colour of faded nankeen clothing.

NAPHTHA. Syn. *Mineral Naphtha; Naphtha,*—Lat. A name given to the limpid and purer varieties of *liquid bitumen* or *rock oil,* which exudes from the surface of the earth in various parts of the world.

Prop. Naphtha possesses a penetrating odour and a yellow colour, but may be rendered colourless by distillation; its boiling point varies from about 160° to 201° Fahr., according to its purity; it is very inflammable; it does not mix with water, but imparts to that fluid its peculiar taste and smell; mixes with alcohol, and oils, and dissolves sulphur, phosphorus, camphor, iodine, most of the resins, wax, fats, and spermaceti; and forms with caoutchouc a gelatinous varnish, which dries with very great difficulty. Sp. gr., 0·753 to 0·780. The liquid distilled from the coal oil of the gas works, and commonly vended under the name of *naphtha,* or *coal-tar naphtha,* differs from true mineral naphtha in possessing a highly offensive odour and a different chemical constitution, although in many points, as in solvent power, &c., the two substances resemble each other. Coal naphtha has the sp. gr. 0·857, and does not boil at a lower temperature than 316° Fahr., unless when highly rectified.

Pur. Mineral naphtha is very frequently adulterated with oil of turpentine, a fraud which may be detected by—1. The addition of some oil of vitriol, which will, in that case, thicken and darken it.—2. Hydrochloric acid gas passed through the liquid for an hour will occasion the formation of hydrochlorate of camphine, either at once, or after a few hours' repose, even if only 5% of oil of turpentine is present. (Dr. Bolley.)—3. If a few grains of iodide of potassium and a little water are rubbed with the suspected sample, the colour of the water should continue unchanged; the presence of $\frac{1}{300}$th part of oil of turpentine will cause it to assume a red or orange colour. (Saladin.)

Uses. Naphtha is chiefly employed for the purposes of illumination, as a solvent for Indian rubber, and in the preparation of a very superior black pigment. It has been highly spoken of as a remedy for cholera, by Dr. Andreosky, a Russian physician; and, recently, a *naphthalized* or *petrolized soap* has been prepared, which is highly spoken of, both for the purposes of the toilet and as a remedial agent in several skin diseases. *Coal-tar naphtha* is principally employed in the preparation of certain coarse paints and varnishes, and as a solvent of Indian rubber. See *Pyroxylic Spirit.*

NAPHTHA (Acetic). See *Acetic Ether.*

NAPHTHA (Black). See *Petroleum.*

NAPHTHA (Coal-tar). See *above.*

NAPHTHA (Vitriolic). See *Ether.*

NAPHTHA (Wood). See *Pyroxylic Spirit.*

NAPHTHALAMIDE. A compound obtained by the distillation of *naphthalate of ammonia.*

NAPHTHALIC ACID. A crystalline substance resembling benzoic acid, obtained by Laurent from naphthaline.

NAPHTHALIDINE. A substance obtained by Zinin, by the action of *sulphide of ammonium* upon an *alcoholic solution of nitro-naphthalase.* It forms colourless, silky needles; is neutral; fusible; volatile without decomposition; soluble in alcohol and ether, but scarcely so in water; has a powerful odour; a hot taste; and forms crystallizable compounds with the acids.

NAPHTHALINE. A white, crystallizable, odorous, volatile substance, obtained by redistilling coal-tar.

Prep. The last portion of the *volatile oily product* is collected separately, and allowed to repose, when crude naphthaline separates. By pushing the distillation until the residuum in the still begins to char, a further portion of dark-coloured naphthaline may be obtained in the solid state. It is purified by resublimation a second, or even a third time.

Prop., &c. Soluble in alcohol and ether; slightly soluble in boiling water; melts at 178° Fahr.; boils at 413°; highly inflammable, burning with a red and smoky flame; with sulphuric acid it unites to form *sulphonaphthalic acid.* It has lately been extensively employed as a stimulating expectorant. *Dose.* 5 to 20 gr.; or, preferably, ½ gr., frequently. *Externally,* made into an ointment, in dry tetters, psoriasis, &c.

NAPLES YELLOW. See *Yellow Pigments.*

NARCEINE. Syn. *Narceina, Narceia.* A peculiar substance discovered by Pelletier in opium. It is *obtained* from the *aqueous solution of opium,* after it has been freed from morphia and narcotine by ammonia, by adding to it *hydrate of lime,* or, preferably, *baryta.* On boiling the filtered solution to expel the ammonia, and evaporating the liquid, *crystals of narceine* are gradually deposited. It may be purified by solution in *hot alcohol* and recrystallization.

Prop., &c. White, silky, acicular prisms; neutral; inodorous; bitter; pungent; soluble in 375 parts of water at 60°, and in 230 parts at 212° Fahr.; insoluble in ether; does not neutralize the acids, and is destitute of basic properties. It is *distinguished* from *morphia* by its easier fusibility (198°), and by forming a blue liquid with the dilute mineral acids, which on gradual dilution changes to violet, and rose red, and ultimately becomes colourless. It does not strike a blue colour with sesquichloride of iron, like morphia, but forms a blue compound with starch. It appears to be inert, and has not been applied to any useful purpose.

NARCOGENINE. A basic substance, of little importance, resulting from the oxidation of *narcotine* by *bichloride of platinum.*

NARCOTICS. Syn. *Stupefacients; Narcotica, Stupefacientia,* — Lat. Medicines which produce drowsiness, sleep, and stupor. In *small doses,* narcotics mostly act as stimulants, but in *larger ones* they produce calmness of mind, drowsiness, and torpor; and in *poisonous doses,* delirium, coma, and death. The general objects in the administration of these agents, are the production of sleep, and the alleviation of pain. Their action is modified to a greater degree by idiosyncracy and habit, than that of, perhaps, any other class of medicines. Hence the care necessary in their administration. *Alcohol, camphor, chloroform, ether, foxglove, hemlock, henbane, morphia, opium,* and *tobacco,* are *narcotics.*

NARCOTINE. Syn. *Narcotina,*—Lat. *Sel d'Opium, Matière de Derosne,*—Fr. A peculiar crystalline substance found by Derosne in opium, and on which its stimulant property was at first supposed to depend.

Prep. 1. From *opium exhausted of soluble matter by cold water,* by treating it with *water acidulated with acetic* or *hydrochloric acid,* filtering, neutralizing with *ammonia,* and dissolving the washed precipitate in *boiling alcohol;* the *narcotine* is deposited as the liquid cools, and may be purified by solution in ether.

2. By acting on *opium* (previously exhausted by *cold* water) with *ether.*

Prop., &c. White, inodorous, fluted or striated prisms; neutral to test paper; insoluble in cold water; sparingly soluble in boiling water; freely soluble in boiling alcohol, and in ether. It is only feebly basic.

Narcotine is *distinguished* from *morphia* by its insipidity, solubility in ether, insolubility in alkalies, giving an orange tint to nitric acid, and a greasy stain to paper when heated on it over a candle. *Another test* for narcotine, said by Orfila to be characteristic, is to add to a little of the suspected substance a drop or two of oil of vitriol, and then to add a *very small fragment of nitrate of potassa;* the liquid speedily acquires a deep blood-red colour if narcotine is present. Morphia treated in the same way strikes a brown or olive-green colour.

Obs. The physiological action of narcotine is differently stated by different authorities. 1 gr. of it dissolved in *olive oil,* killed a dog in 24 hours; but 24 gr. dissolved in *acetic acid* were given with impunity. (Magendie.) In the solid state it is inert; 129 gr. at a dose scarcely produce any obvious effects. (Bally.) Scruple doses have been given without injury. (Dr. Roots.) It has been recently proposed as a substitute for quinine in the cure of agues. For this purpose the *sulphate* or *hydrochlorate* is preferable. 200 cases of intermittent and remittent fevers have been thus successfully treated in India. (Dr. O'Shaughnessy.) *Dose.* 3 to 10 gr., as an antiperiodic, sedative, &c.

Turkey opium contains about 1%, and East Indian opium about 3% of narcotine.

NATRIUM. See *Sodium.*

NATRON. Native sesquicarbonate of soda.

NAUSEA. See *Sickness.*

NAUSEANTS. Syn. *Nauseantia,*—Lat. Substances which induce an inclination to vomit, without effecting it. See *Emetics.*

NECKLACES (Anodyne). These are formed of the *roots of henbane,* of *Job's tears, allspice steeped in brandy, jumble* *beads, elk's hoof, &c.*, cut and strung on ribbon or strings, according to the fancy of the quacks who prescribe them. Formerly, commonly used to promote easy dentition, sleep in fevers, &c.; and still occasionally employed by the ignorant and superstitious for the same purposes.

NECTAR. The fabled drink of the mythological deities. The name was formerly given to *wine dulcified with honey;* it is now occasionally applied to other sweet and pleasant beverages of a stimulating character. The following *liqueurs* are so called:—

Prep. 1. *Chopped raisins*, 2*lb.; loaf sugar*, 4*lb.; boiling water*, 2 gall.; mix, and stir frequently until cold, then add 2 *lemons*, sliced; *proof spirit* (brandy or rum), 3 pints; macerate in a covered vessel for 6 or 7 days, occasionally shaking, next strain with pressure, and let the strained liquid stand in a cold place for a week to clear; lastly, decant the clear portion, and bottle it.

2. *Red ratifia*, 3 gall.; *oils of cassia* and *caraway*, of each, 25 drops; (dissolved in) *brandy*, ½ pint; *orange wine*, 1 gall.; *sliced oranges*, 6 in no.; *lump sugar*, 2 *lb.;* macerate for a week, decant and bottle. See *Arrack* (Factitious).

NEGUS. A well-known beverage, so named after its originator and patron, Colonel Negus. It is made of either *port* or *sherry wine*, mixed with about twice its bulk of *hot water*, sweetened with *lump sugar*, and flavoured with a little *lemon juice* and *grated nutmeg*, and a *small fragment* only of the *yellow peel of the lemon.* The addition of about 1 drop of *essence of ambergris*, or 8 or 10 drops of *essence of vanilla*, distributed between about a dozen glasses, improves it.

NEPENTHES. The "*Homeri nepenthes*," that Helen cast into the wine, is now a sealed mystery. A composition containing *ambergris, crocus solis, lignum aloes, opium*, and *saffron*, was so called by the old writers; afterwards christened *laudanum*, by Paracelsus. The "*nepenthe*" of Messrs. Ferris and Score, of Bristol, in all essential points resembles Battley's *liquor opii sedativus.*

NERVINES. Syn. *Neurotics; Neurotica*,—Lat. Substances or agents which relieve disorders of the nerves. The *antispasmodics, chalybeates*, and *vegetable tonics*, belong to this class.

NERVOUS FEVER. Syn. *Febris Nervosa*,—Lat. A low continued fever, of a typhoid character (*typhus mitior*) in which nervous derangement or sensorial debility are leading symptoms. The *treatment* consists in allaying nervous irritation, and supporting the strength of the patient. See *Typhus.*

NERVOUSNESS. The indescribable derangement of health, and the complication of disagreeable sensations which are popularly described under this name, quite as much deserve the serious attention of both patient and physician as any other affection to which the human frame is liable. Although, in itself, not a definite disease, it is indicative of the vital system being out of order, that its energies are failing or overtasked, and that the functions of some of its members or organs are languidly or imperfectly performed. This condition, if not removed, will gradually increase into active disorganization and disease, if it be not prematurely cut short by the advent of some more serious malady, to which its existence has rendered the body peculiarly susceptible.

The *treatment* of nervousness consists mainly in restoring the healthy action of the stomach and bowels, and in the use of proper *exercise*, especially in the open air. The stomach should not be overloaded with indigestible food, and the bowels should be occasionally relieved by the use of some mild aperient. Mental, as well as bodily relaxation, should be sought, and the pleasures, without the vices of society, should be indulged in as discretion and inclination may direct. Abernethy's injunction to a nervous and dyspeptic lady, "*Dismiss your servants, madam, and make your own beds*," should be recollected by all, and may be taken as a proof of the importance that eminent surgeon attached to EXERCISE. See *Exercise, Flatulence, Hypochondriasis, Hysterics, Indigestion, &c.*

NETTLE RASH. See *Rashes.*

NEURALGIA. Literally, pain in a nerve. "Various parts of the body are liable to be affected with excruciating pain, which is quite independent of any inflammation of the part, and which may often be traced in the course of the nerves." These affections constitute *neuralgia.* One of the most distressing forms of this disease is *facial neuralgia* or *tic douloureux* (neuralgia facialis), which, when it assumes a marked intermittent character, is popularly known as *face ague.* Sometimes it attacks the nerves of the female breast; or those of the hand, feet, hip, or loins, in which cases it is often confounded with acute rheumatism of those parts.

The *treatment*, when neuralgia is *symptomatic* of any other affection, must be directed to the primary disease. When it is idiopathic, or an independent affection, powerful tonic medicines, and powerful local counter-irritation are generally found the most successful remedies. Of *tonics*, carbonate of iron and bark (both in very large doses) are generally preferred; the last, more particularly when the affection is of an intermittent kind. As a counter-irritant, caustic ammonia has been much relied on. When all other means fail, a current of mild streaming electricity through the part will often give immediate and permanent relief.

NEUTRALIZATION. The admixture of an *alkali* or *base* with an *acid* in such proportions that neither shall predominate. A neutral compound neither turns turmeric paper *brown*, nor litmus paper *red*.

NICARAGUA WOOD. An inferior variety of *Brazil wood*. With a *mordant of tin* it dyes a bright but fugitive red.

NICKEL. Syn. *Nickelium*,—Lat. A metal obtained from speiss or kupfernickel, a native arseniuret of nickel found in Westphalia.

Prep. The *powdered ore* is roasted first by itself, and next with *charcoal powder*, until all the arsenic is expelled, and a garlic odour ceases to be evolved; the residuum is mixed with *sulphur*, 3 parts, and *potassa*, 1 part, and the compound is melted in a crucible with a gentle heat; the fused mass, when cold, is reduced to powder, edulcorated with *water*, dissolved in *sulphuric acid mixed with a little nitric acid*, and precipitated with *carbonate of potassa*; the precipitate (*carbonate of nickel*) is washed, dried, mixed with *powdered charcoal*, and, lastly, reduced by the heat of a powerful furnace.

When nickel predominates in the ore, after the arsenic, iron, and copper have been separated, *ammonia* is digested in the *mixed oxides of cobalt and nickel*, and the resulting blue solution, after dilution with *boiled pure water*, is treated with *caustic potassa* until the colour disappears, when the whole is put into an air-tight vessel, and set it aside for some time. The powder (*hydrated oxide of nickel*) which subsides, after edulcoration, is mixed with *charcoal*, and reduced by fusion in a crucible containing some *crown glass*.

On the *small scale*, for chemical purposes, *pure nickel* is best obtained by moderately heating *oxalate of nickel* in a covered crucible lined with *charcoal*.

Prop. White; hard; malleable; magnetic; capable of receiving the lustre of silver; sp. gr., when hammered, about 8·82; fusibility between that of manganese and iron; it is not oxidized in the air; and is little attacked by dilute acids unless when nitric acid is present; this last acid dissolves it freely. With the acids, &c., it forms numerous compounds, most of which may be prepared by the direct solution of the carbonate.

Tests. The *salts of nickel* in the *anhydrous* state are for the most part yellow; when *hydrated*, green,—and furnish solutions possessing a pale-green colour. Solutions of its salts exhibit the following reactions:—1. Caustic alkalies give a pale apple-green precipitate, insoluble in excess, but soluble in a solution of carbonate of ammonia yielding a greenish-blue liquid.—2. Ammonia gives a similar precipitate, soluble in excess, yielding a deep purplish-blue solution. The presence of ammonia or free acids interferes with this reaction.—3. Cyanide of potassium produces a green precipitate, soluble in excess, forming an amber-coloured liquid which is reprecipitated by hydrochloric acid. This last precipitate is scarcely soluble in excess of the acid in the cold, but readily so upon boiling the liquid.—4. Ferrocyanide of potassium gives a greenish-white precipitate.—5. Sulphuretted hydrogen occasions no change in solutions of nickel containing free mineral acid; but in alkaline solutions gives a black precipitate.—6. Hydrosulphuret of ammonia in neutral solutions gives a black precipitate, soluble with difficulty in hydrochloric acid; but freely soluble in aqua regia.

Estim. Nickel may be thrown down from its ores in the form of either carbonate or hydrated oxide (see *above* and *Carbonate of Nickel*), and after ignition, may be weighed as oxide, each grain of which is equal to $\frac{7}{8}$ gr. of PURE NICKEL; or more accurately, 0·7871 gr.

According to H. Rose, *nickel* may be separated from *cobalt* as follows:—The mixed metals are dissolved in considerable excess of *hydrochloric acid*, and the solution is diluted with a very large quantity of *water;* a current of *chlorine* is then passed through the liquor for several hours, and the upper part of the flask is left filled with the gas after the current has ceased; *carbonate of baryta* is next added, in excess, the whole digested together with frequent agitation for 15 or 18 hours, and then thrown on a filter. The *filtrate* yields pure OXIDE OF NICKEL by precipitation with caustic potassa; whilst the residuum on the filter, after being washed in water, dissolved in hot hydrochloric acid, and the baryta precipitated with sulphuric acid, furnishes, with hydrate of potassa, a precipitate of *hydrated oxide of cobalt*, free from nickel, which when washed and dried, is reduced in a platinum or porcelain crucible, by hydrogen gas. See *German Silver*.

Uses. Nickel is chiefly employed in the manufacture of German silver. Some of its salts have been recently introduced into medical practice, and appear likely to prove most valuable additions to the materia medica. (See *below.*)

NICKEL (Acetate of). Syn. *Nickelii Acetas,* — Lat. *Prep.* By neutralizing *acetic acid* with *carbonate* or *oxide of nickel,* and gently concentrating by evaporation so that crystals may form. Small green crystals, soluble in 6 parts of water.

NICKEL (Carbonate of). Syn. *Nickelii Carbonas,*—Lat. This salt may be obtained in the manner described at *p.* 818, or by simply adding *carbonate of soda* to a *solution of chloride* or *sulphate of nickel,* but in this state some *hydrate of nickel* is precipitated along with it. The following is another formula which produces a nearly pure carbonate, but one which may still contain a little cobalt, the *entire* separation of which is a matter of extreme difficulty, and can only be effected in the manner described above.

Prep. The *mineral* (crude speiss or kupfernickel) is broken into small fragments, mixed with from one fourth to one half its weight of *iron filings,* and the whole dissolved in *aqua regia;* the solution is gently evaporated to dryness, the residue treated with *boiling water,* and the insoluble *arseniate of iron* removed by filtration; the liquid is next acidulated with *hydrochloric acid,* treated with *sulphuretted hydrogen,* in excess, to precipitate the copper, and, after filtration, is boiled with a little *nitric acid,* to bring back the iron to the state of sesquioxide; to the *cold* and *largely diluted* liquid a *solution of bicarbonate of soda* is gradually added, and the *sesquioxide of iron* separated by filtration; lastly, the filtered solution is boiled with *carbonate of soda,* in excess, and the pale-green precipitate of *carbonate af nickel* collected, washed, and dried.

Uses, &c. It is freely soluble in the acids, and is chiefly employed to prepare the salts and other compounds of nickel.

NICKEL (Chloride of). Syn. *Muriate of Nickel; Nickelii Chloridum*—Lat. *Prep.* From *carbonate* or *oxide of nickel* and *hydrochloric acid,* as the *acetate.* Small green crystals, which are rendered yellow and anhydrous by heat, unless they contain cobalt, when the salt retains a tint of green.

NICKEL (Oxalate of). Syn. *Nickelii Oxalas,*—Lat. *Prep.* By adding a *strong solution of oxalic acid* to a like solution of *sulphate of nickel,* and collecting the pale bluish-green precipitate which forms after a time. *Used* to prepare both *metallic nickel* and its *oxide.*

NICKEL (Oxides of). *Prep.* 1. (*Oxide of Nickel, Protoxide of do.*)—*a.* By heating the *nitrate, carbonate,* or *oxalate* to redness in open vessels. Anhydrous.

b. By precipitating a *soluble salt of nickel* with *caustic potassa.* Hydrated. An ash-gray powder, freely soluble in acids forming the ordinary *salts of nickel.*

2. (*Sesquioxide of Nickel, Peroxide of do.*) By passing *chlorine* through *water* holding the *hydrated protoxide* in suspension; or by mixing a *salt of nickel* with *bleaching powder.* An insoluble, black powder, which is decomposed by heat.

NICKEL (Sulphate of). Syn. *Nickelii Sulphas,*—Lat. From *carbonate* or *oxide of nickel* and *dilute sulphuric acid,* as the *acetate.* Green prismatic crystals, soluble in 3 parts of cold water. With the sulphates of potassa and ammonia it forms beautiful double salts.

NICKEL SILVER. See *German Silver.*

NICOTIANINE. Syn. *Tobacco Camphor; Oleum Tabaci Volatile,*—Lat. From *tobacco leaves,* by distillation along with *water.* Its odour and action strongly resemble those of tobacco. 6 *lb.* of leaves only yield 11 gr., which float on the surface of the distilled water. See *Oils.*

NICOTINE. Syn. *Nicotia, Nicotina,*—Lat. A volatile base discovered by Reiman and Posselt in *tobacco.*

Prep. (Ortigosa.) Infuse *tobacco leaves* for 24 hours in *water acidulated with sulphuric acid,* strain, evaporate to a syrup, add ⅙th of its volume of a *strong solution of potassa,* and distil in an oil bath at 288°, occasionally adding a little *water* to assist the process, and prevent the too great concentration of the solution of potassa in the retort; next saturate the distilled product with *oxalic acid,* evaporate to dryness, digest in *boiling absolute alcohol,* evaporate the resulting *tincture* to a syrup, and decompose the *oxalate of nicotine* thus obtained, by adding *caustic potassa* to it in a close vessel, and agitate the mass with *ether,* repeating the process with *more ether* until *all* the nicotine is dissolved out; lastly, distil the mixed *ethereal solutions* in an oil-bath. At first ether comes over, then water, and, lastly, *nicotine,* which towards the end of the process assumes a yellowish tint.

2. (Schloesing.) This chiefly differs from the preceding by directing the concluding distillation to be conducted in a retort, by the heat of an oil-bath, at the temperature of 284° Fahr., in a *current of hydrogen,* for 12 hours; after which, by raising the heat

to 356° Fahr., the nicotine distils over pure, drop by drop.

Prop., *&c.* Nicotine is a colourless, volatile liquid; highly acrid and pungent; smelling strongly of tobacco; boiling at 375° Fahr. (482°,—Pereira); soluble in water, ether, alcohol and oils; and combining with the acids forming salts, many of which are crystallizable. It is a frightful poison; $\frac{1}{4}$th of a drop will kill a rabbit; a single drop will kill a large dog. Nicotine is the substance which was employed by the Count Bocarmé for the purpose of poisoning his brother-in-law, Gustave Fougnies, the particulars of which were developed in the the celebrated trial, in Belgium, of that nobleman, in 1851. Good Virginia and Kentucky tobacco, dried at 212° Fahr., contain from 6% to 7% of nicotine; Havannah tobacco (*cigars*) less than 2%. (Schloesing.)

NIGELLINE. A yellowish liquid obtained by Rensch from the seeds of the *nigella sativa* (Linn.) or *fennel flower.* It is obtained by digestion in *rectified spirit*, distilling the *tincture*, separating the *reddish brown* from the *lighter portion* of the product, agitating the latter with *ether*, and then with *water*, adding to the liquid when decanted, a little *subacetate of lead*, filtering, and treating it with *sulphuretted hydrogen;* the *aqueous liquid* is then filtered, and gently evaporated, to expel moisture.

NIGHTMARE. Syn. *Ephialtes*,—Lat. The *common causes* of nightmare are indigestion and the use of narcotic and intoxicating substances. Its *prevention* consists in the selection of proper food, and in duly attending to the state of the stomach and bowels. Heavy and late suppers should be particularly avoided, as well as all articles of diet that are of difficult digestion, or apt to induce flatulency. When it arises from strong drink, tobacco, or opium, these should be abandoned, or employed in smaller quantities. A teaspoonful of *spirit of sal-volatile*, *magnesia*, or *bicarbonate of soda*, taken in a glass of *cold water* on going to bed, is a good and simple preventive. In cases accompanied by restlessness, a few drops of laudanum or tincture of henbane may be added. An occasional aperient is also excellent. See *Chamomile.*

NIGHTSHADE (Deadly). Syn. *Belladonna*,—Ph. L. E. & D. "The leaf, fresh and dried," (leaves and root,—Ph. D.) of "*atropa belladonna*, Linn." "Oval, acute, very perfect, glabrous, when bruised exhaling a disagreeable odour. The herb which grows spontaneously in hedges and uncultivated places is to be preferred to that which is cultivated in gardens." (Ph. L.)

Belladonna is a powerful narcotic, and is used as an anodyne, antispasmodic, and discutient, in a variety of diseases,—neuralgia, arthritic pains, migratory rheumatic pains, spasmodic rigidity and strictures, angina pectoris, hooping-cough, fevers, phthisis, &c.; also as a prophylactic of scarlet fever, as a resolvent in enlarged and indurated glands, to produce dilation of the pupil, &c., &c. *Dose.* Of the powder, commencing with 1 gr., gradually and cautiously increased until dryness of the throat, or dilation of the pupil occurs, or the head is affected. See *Atropia.*

The properties of *black* or common *garden nightshade* (solanum nigrum,—*Linn.*) are nearly similar to those of the above, but are greatly weaker.

NIGHTSHADE (Woody). Syn. *Bittersweet; Dulcamara*,—Ph. L. E. & D. The "new shoots (*caules*)" of "*solanum dulcamara*, Linn." "It is to be collected in autumn, after the leaves have fallen." (Ph. L.) Diaphoretic, diuretic, and (in large doses) narcotic. See *Decoction of Dulcamara.*

NIHIL. *See Oxide of Zinc.*

NIOBIUM. See *Tantalum.*

NIPPLES (Sore). The most common form of this affection is that termed "*chapped nipples*," by nurses. As a *preventive* measure, the part may be moistened morning and evening, for some weeks before the period of lactation, with a little *rum* or *brandy*, which is more effective if *slightly* acidulated with a few drops of *dilute sulphuric acid.* Some persons employ *tincture of tolu*, or *compound tincture of benzoin* (Friar's balsam) for this purpose.

When *chaps*, *cracks*, or like sores, arising from lactation, are once developed, one of the safest and most effective remedies is *tincture of catechu* applied 3 or 4 times a day, by means of a camel-hair pencil.

The celebrated nostrum of Liebert for cracked nipples, "*Cosmétique infaillible et prompt contre les gerçures ou crevasses aux seins et autres*," is a lotion formed of 10 gr. of *nitrate of lead* dissolved in 1 fl. oz. of *rose water*, and tinged with a little *cochineal.* The parts are moistened with the liquid, and are then covered with fine *leaden nipple-shields*, two of which are provided for the purpose. This is repeated soon after each time the child leaves the breast; and the nipple is *carefully* washed with a soft sponge and lukewarm water, and gently dabbed dry with a very soft towel, before the infant is again applied to it. This remedy is very successful, and has acquired great popularity and patronage in Brussels, Paris, Frankfort, and other parts. It must be recollected, however, that all applications of an active or poisonous nature should be employed with the greatest possible caution, as, unless unusual care is taken, a portion of the remedy may remain concealed within the delicate pores of the skin, and be sucked off by the infant, to the serious disturbance of its health.

NITRANILINE. This substance is obtained by acting on *nitrobenzol* with a mixture of *fuming nitric acid* and *oil of vitriol; binitrobenzol* is formed, which is dissolved in *alcohol,* and the resulting solution subjected to the reducing action of *ammonia* and *sulphuretted hydrogen,* as described under *aniline.* Nitraniline forms yellow, acicular crystals, little soluble in cold water, but freely soluble in alcohol and ether. Its salts are crystallizable.

NITRANISIC ACID. A sparingly soluble, yellowish-white, semicrystalline powder, formed by the action of *nitric acid* on *oil of aniseed.*

NITRANISIDE. A resinous substance, produced by the action of *fuming nitric acid* on *oil of aniseed.*

NITRARIA. See *Nitrate of Potassa.*

NITRATE. Syn. *Nitras,*—Lat. A salt of nitric acid. The nitrates are very easily prepared by the direct solution of the *base*, or its *oxide*, or *carbonate*, in *nitric acid*, which, in most cases, should be previously diluted with *water.* By evaporation, with the usual precautions, they may be obtained either in the pulverulent or crystalline form.

The *nitrates* are *characterized* by deflagrating when thrown on red-hot coal, or when heated in contact with inflammable substances. See *Nitric Acid*, and the *respective bases.*

NITRE. See *Nitrate of Potassa.*

NITRIC ACID. Syn. *Azotic Acid; Acidum Nitricum,*—Ph. L. E. & D. *A. Nitrosum,*—Ph. L. 1788. *Spiritus Nitrici Glauberi,*—Ph. L. 1746. *Solutive Water, Spirit of Nitre, Glauber's do.,*—Obs. var. An acid compound of nitrogen and oxygen, of which the *aquafortis* of the shops is a crude and weaker form.

Prep. 1. (Ph. E., and Ph. L. 1836.) *Purified nitre* (dried) and *sulphuric acid*, equal parts; mix in a glass retort, and distil with a moderate heat, from a sand-bath (or *naked gas-flame,*—Ph. E.) into a cool receiver, as long as the fused materials continue to evolve vapours. "The pale-yellow acid thus obtained may be rendered colourless (if desired) by *gently* heating it in a retort." (Ph. E.) Sp. gr. 1·500. In the present Ph. L. this acid is included in the materia medica. (See *below.*)

2. (Ph. D.) The *nitrate of potassa* is dissolved in *water*, the solution precipitated with a little *nitrate of silver*, filtered, evaporated to dryness, weighed, and then treated as above.

3. (Wholesale.) *Nitre* (dry), 168 *lb.*, in the state of coarse powder, is introduced into a cold *cylindrical iron retort*, which it will only half fill, and after the lid is luted on, and the connection made with the condensers, *oil of vitriol* (sp. gr. 1·845), 93 *lb.*, is slowly poured in through an aperture provided for the purpose, and the charge is worked off with a gradually increased heat. The condensing apparatus consists of a series of 5 or 6 double-necked glass or salt-glazed stoneware bottles, about $\frac{1}{6}$th part filled with cold water, and the whole arrangement is similar to that figured in the engraving at page 61. The product of this process is the strongest brown and fuming *nitrous acid* of commerce (*aquafortis, fuming nitric acid; acidum nitrosum; acidum nitricum fumans*), and has usually the sp. gr. 1·45. It is rendered *colourless* by gently heating it in a glass retort, when it forms *commercial nitric acid*, (sp. gr. 1·37 to 1·4.) By omitting the *water* in the receivers, an acid of fully 1·500 is obtained.

Prop. Pure liquid nitric acid is colourless, highly corrosive, and possesses powerful acid and oxygenizing properties. The sp. gr. of the strongest liquid acid is variously stated by different authorities. According to some, it may be obtained as high as 1·55 (Davy, Kirwin, &c.), or 1·62 (Proust); while, according to others, 1·503 to 1·510 is the greatest density at which it can be procured, (Phillips, Gay-Lussac, &c.) Thénard fixes the greatest density at 1·513; Millon at 1·521; and Ure, at 1·51 to 1·52. When of the sp. gr. 1·5, it boils at 210°; when of 1·45, at 240°; when of 1·42, at 253°; and when of 1·40, at 246° Fahr. (Ure.) According to others, acid of 1·42 boils at 248° Fahr. Acid of less density than 1·42, parts with water and gradually becomes stronger by boiling; but acid of higher sp. gr. than 1·42 is weakened by exposure to heat. When exposed to intense cold, liquid nitric acid freezes. It is rapidly decomposed, with loss of oxygen, by contact with most organic, and many metallic and non-metallic bodies. In many cases these reactions occur with considerable violence, and the production of light and heat.

Pur. The nitric acid of commerce is generally contaminated by *hydrochloric acid, nitrous acid, sulphuric acid,* or *chlorine*, or by their *soda* or *potassa salts*, and, occasionally, *iodine*, together with an *excess of water.* The last is readily detected by the sp. gr., and the others by the appropriate tests. "Free from colour. Sp. gr. 1·42. Exposed to the air, it emits very acrid vapours. Totally volatilized by heat. Diluted with 3 times its volume of water, it gives no precipitate with either nitrate of silver or chloride of barium. 100 gr. of this acid (sp. gr. 1·42) are saturated by 161 gr. of crystallized carbonate of soda." (Ph. L.) "100 gr. of this acid (sp. gr. 1·50) will saturate about 217 gr. of crystallized carbonate of soda." (Ph. L. 1836.) The Ph. E. states the density of *commercial nitric acid* is 1·380 to 1·390. "If diluted with distilled water, it precipitates but *slightly*, or not all, with solution of nitrate of baryta or nitrate of silver." The best *double aquafortis* of the shops (*aquafortis duplex*) has usually the sp. gr. 1·36; and the *single aquafortis* (*aquafortis simplex*), the sp. gr. 1·22.; but both are commonly sold at much lower strengths.

Tests.—1. It stains the skin yellow.—2. When mixed with a little hydrochloric acid or sal ammoniac, it acquires the power of dissolving gold leaf.—3. When mixed with dilute sulphuric acid, and poured on a few fragments of zinc or iron in a tube, the evolved gas burns with a greenish white flame. (Balmain.)—4. Substitute alcohol for zinc in the last test. (Maitland.)—5. Morphia, brucia, and strychnia, give it a red colour, which is heightened by ammonia in excess.—6. When placed in a tube, and a solution of protosulphate of iron is cautiously added, a dark colour is developed at the line of junction, which is distinctly visible when only $\frac{1}{24000}$th part of nitric acid is present. (Derbanius de Richemont.) This test may be often conveniently modified by dropping into the liquid a minute crystal of protosulphate of iron; the fluid immediately surrounding this crystal, then acquires a dark brown colour, which disappears upon simple agitation of the fluid, or by heating it.—7. When mixed with a weak solution of sulphate of indigo, and heated, the colour is destroyed.—8. When saturated with carbonate of potash or soda, and evaporated to dryness, the residuum deflagrates when thrown on burning coals.—9. When the mixture of a nitrate with cyanide of potassium, in powder, is heated on a piece of platinum, a vivid deflagration follows, attended with *distinct* ignition and detonation. (Fresenius.)

The *nitrates* may all be tested as above by first adding a small quantity of pure sulphuric acid, which will liberate the nitric acid of the salt.

Estim. The strength of nitric acid is usually estimated by its sp. gr.; but when very great accuracy is required, it may be more correctly ascertained by the amount of carbonate of soda, or other salt of known composition which is required to neutralize it. To render the assay trustworthy, it must be in all cases, also tested to detect the presence of impurities. See *Acidimetry* and *below*:—

TABLE *of Nitric Acid.* By DR. URE.

Specific Gravity.	Liq. Acid in100.	Dry Acid in 100.	Specific Gravity.	Liq. Acid in100.	Dry Acid in 100.
1·5000	100	79·700	1·3270	56	44·632
1.4980	99	78·903	1·3216	55	43·835
1·4960	98	78·106	1·3163	54	43·038
1·4940	97	77·309	1·3110	53	42·241
1·4910	96	76·512	1·3056	52	41·444
1·4880	95	75·715	1·3001	51	40·647
1.4850	94	74·918	1·2947	50	39·850
1·4820	93	74·121	1·2887	49	39·053
1·4790	92	73·324	1·2826	48	38·256
1·4760	91	72·527	1·2765	47	37·459
1·4730	90	71·730	1·2705	46	36·662
1·4700	89	70·933	1·2644	45	35·865
1·4670	88	70·136	1·2583	44	35·068
1·4640	87	69·339	1·2523	43	34·271
1·4600	86	68·542	1·2462	42	33·474
1·4570	85	67·745	1·2402	41	32·677
1·4530	84	66·948	1·2341	40	31·880
1·4500	83	66·155	1·2277	39	31·083
1·4460	82	65·354	1·2212	38	30·286
1·4424	81	64·557	1·2148	37	29·489
1·4385	80	63·760	1·2084	36	28·692
1·4346	79	62·963	1·2019	35	27·895
1·4306	78	62·166	1·1958	34	27·098
1·4269	77	61·369	1·1895	33	26·301
1·4228	76	60·572	1·1833	32	25·504
1·4189	75	59·755	1·1770	31	24·707
1·4147	74	58·978	1·1709	30	23·900
1·4107	73	58·181	1·1648	29	23·113
1·4065	72	57·384	1·1587	28	22·316
1·4023	71	56·587	1·1526	27	21·519
1·3978	70	55·790	1·1465	26	20·722
1·3945	69	54·993	1·1403	25	19·925
1.3882	68	54·196	1·1345	24	19·128
1·3833	67	53·399	1·1286	23	18·331
1·3783	66	52·602	1·1227	22	17·534
1·3732	65	51·805	1·1168	21	16·737
1·3681	64	51·068	1·1109	20	15·940
1·3630	63	50·211	1·1051	19	15·143
1·3579	62	49·414	1·0993	18	14·346
1·3529	61	48·617	1·0935	17	13·549
1·3477	60	47·820	1·0878	16	12·752
1.3427	59	47·023	1.0821	15	11·955
1·3376	58	46·226	1·0764	14	11·158
1·3323	57	45·429	1·0708	13	10·361

TABLE *of Nitric Acid*—(*continued*).

Specific Gravity.	Liq. Acid in100.	Dry Acid in 100.	Specific Gravity.	Liq. Acid in100.	Dry Acid in 100.
1·0651	12	9·564	1·0320	6	4·782
1·0595	11	8·767	1·0267	5	3·985
1·0540	10	7·970	1·0212	4	3·188
1·0485	9	7·173	1·0159	3	2·391
1·0430	8	6·376	1·0106	2	1·594
1·0375	7	5·579	1·0053	1	0·797

Ant., *&c.* See *Acids.*

Uses. Nitric acid is employed in assaying, to dye *silks* and *woollens yellow*, to form various salts, and in the manufacture of oxalic acid. In *medicine*, it is used as a caustic to corns and warts; and in doses of 1 to 10 drops in a tumbler of water, in liver complaints, fevers, dyspepsia, syphilis, to remove the effects of mercury, or as a substitute for that drug, &c. *Externally*, it is employed in the form of baths, lotions, and ointment. Dr. Collier declares a strong lotion of nitric acid to be almost specific in lepra, and several other kindred skin diseases.

Concluding Remarks. The common source of nitric acid is nitrate of potassa, but it may also be obtained from other nitrates by a similar process. *Nitrate of soda* is frequently used instead of nitrate of potash, and is more convenient in some respects, as the residuum is more easily dissolved out of the retort or cylinder. The residuum of the common process with nitre (*sal enixum*) is chiefly employed as a flux by the glass-houses, and as a source of potash in the manufacture of alum. On the *small scale* the first of the above formulæ will be found convenient for obtaining a pure acid. A powerful argand's lamp, or a charcoal chauffer, with the little apparatus figured at page 574, will be found to answer well. When a common retort and receiver are employed, *no luting* of any kind must be used.

By proper management *nitre* yields more than $\frac{2}{3}$ of its weight of *pure nitric acid*, sp. gr. 1·500; and *nitrate of soda*, its own weight of acid, sp. gr. 1·4.

By the patent process of M. Mallet, dried *nitrate of soda* is decomposed by dried or monohydrated boracic acid, by heating the two together. The products are liquid nitric acid, which distils over, and biborate of soda (*borax*) which remains in the retort.

The crude coloured nitric acid of commerce (*aquafortis*) was originally prepared by distilling a mixture of *nitre* and *copperas*, and is still sometimes obtained in this way.

The nitric acid of commerce may be freed from the impurities alluded to above by one or other of the following methods:

1. By the addition of a little *nitrate of silver*, as long as it produces any cloudiness, and, after repose, decanting the clear acid, and rectifying it at a heat under 212°. To ensure a perfectly colourless product, a small portion of pure *black oxide of manganese* should be put into the retort." (Murray.)

2. By agitating the acid with a little *red oxide of lead*, and then rectifying it, as before.

3. By adding 1% of *bichromate of potassa* to the acid before rectifying it. This answers well for acid not stronger than sp. gr. 1·48.

4. By rectification at a gentle heat, rejecting the first portion that comes over, receiving the middle portion as genuine acid, and leaving a residuum in the retort. (Ure.)

According to Phillips, Ure, and others, the strongest liquid nitric acid is a *monohydrate;* that of the sp. gr. 1·503 to 1·504, a *sesquihydrate;* that of 1·486, a *binhydrate:* and that of 1·42, a *quadrihydrate;* or containing respectively, 1, 1½, 2, and 4 atoms of water.

NITRIC ACID (Anhydrous). This interesting substance was first obtained in a separate form by M. Deville in 1849.

Prep. (M. Deville.) *Nitrate of silver* is dried by exposure to a current of *dry carbonic acid* at a temperature of 356° Fahr., and the tube containing it is then immersed in a water bath heated to 203° Fahr.; pure dry *chlorine gas* is next passed through the apparatus, and, as soon as the reaction commences, the temperature is reduced to 154° or even 136°, but not lower; the production of crystals in the receiver, which must be cooled by a powerful freezing mixture, soon commences; lastly, the liquid portion of the product is removed by a current of *dry carbonic acid* gas.

Prop., *&c.* Colourless prismatic crystals, which melt at 86° Fahr., boil at about 115°, and at 122° begin to suffer decomposition; added to water much heat is generated; it rapidly attacks organic bodies, even caoutchouc; sometimes it explodes spontaneously. The process for its preparation is tedious and difficult.

NITRIC ACID (Dilute). *Acidum Nitricum Dilutum,*—Ph. L. E. & D. *Prep.* 1.

(Ph. L.) *Nitric acid* (sp. gr. 1·42), 3 fl. oz.; *distilled water*, 17 fl. oz.; mix. Sp. gr. 1·082. "1 fl. oz. is saturated by 154 gr. of the crystals of carbonate of soda." It contains about 12% of pure anhydrous nitric acid.

2. (Ph. E.) *Nitric acid* (1·500), 1 fl. oz.; *distilled water*, 9 fl. oz. Or, *commercial nitric acid* (1·390), 1 fl. oz. 5½ dr.; *water*, 9 fl. oz. Sp. gr. 1·077. It contains 11·16% of pure dry nitric acid.

3. (Ph. D.) *Nitric acid* (1·500), 4 fl. oz.; *water*, 29 fl. oz. Contains about 9·7% of pure acid. The above are *used* for convenience in dispensing. *Dose.* 15 drops to ½ fl. dr., or more. The above must not be confounded with the *acidum nitricum dilutum*, Ph. D. 1826, which had the sp. gr. 1·280; nor with the following:—

4. (Henry's.) Sp. gr. 1·143; equal in saturating power to *hydrochloric acid* sp. gr. 1·074, and *sulphuric acid*, 1·135. *Used* in assaying.

NITRIC ACID (Fuming). Syn. *Acidum Nitricum Fumans*,—Lat. The red fuming *nitrous* or *nitric acid* of commerce is simply *nitric acid* loaded with *nitrous* or *hyponitric acid.* (See those articles.) That of the Ph. Bor. is distilled from *nitre*, 2 parts; *oil of vitriol*, 1 part.

NITRIC ACID (Oxygenized). See *Acids.*

NITRIC OXIDE. See *Binoxide of Nitrogen.*

NITRILE-BASES. Artificial organic bases, in which the hydrogen of ammonia is replaced by other radicals.

NITRITE. Syn. *Nitris*,—Lat. See *Nitrous Acid.*

NITRO-BENZAMIDE. A substance formed by treating *nitro-benzoic ether* with *ammonia.* See *Oxamide.*

NITRO-BENZOIC ACID. Prepared by boiling *benzoic acid* for several hours in *fuming nitric acid*, or until red fumes cease to be evolved. It closely resembles benzoic acid in character, but differs from it in constitution.

NITRO-BENZOLE. *Prep.* By treating *benzole* with *strong fuming nitric acid*, with heat; after the violence of the reaction is over, the liquid is diluted with *water*, and the heavy, oily fluid which separates, is collected, washed, and dried.

Prop., &c. Yellowish; very sweet; smells of bitter almonds; insoluble in water; little affected by reagents; boils at 415° Fahr.; sp. gr. 1·209. Heated with an alcoholic solution of caustic potassa, and the mixture submitted to distillation, it yields a red, oily liquid, from which large red crystals of "*azobenzole*" separate. These are nearly insoluble in water, freely soluble in alcohol and ether, melt at 150° Fahr., and boil at 380° Fahr. *Binitrobenzole* is made by dissolving *benzole* in a mixture of equal volumes of the *strongest nitric* and *sulphuric acids*, and boiling the liquid for a few minutes; the crystals (*binitrobenzole*) which form as it cools are insoluble in water, but are freely soluble in alcohol.

NITRO-CHLORONICENE. Obtained by treating *chloronicene* with *strong fuming nitric acid.* Crystallizable.

NITRO-COCCUSIC ACID. Obtained by acting on a mixture of *carminic acid* and *oxalic acid* with *nitric acid.* It forms magnificent yellow rhombic plates, which are soluble in water, alcohol, and ether.

NITRO-CUMIC ACID. From *cumic acid*, as *nitro-benzoic acid.*

NITRO-CUMOL. From *cumol*, as *nitrobenzole.*

NITRO-HYDROCHLORIC ACID. Syn. *Nitro-muriatic Acid; Aqua Regia, Acidum Nitro-hydrochloricum, A. Nitro-muriaticum*,—Lat. *Eau Régale*,—Fr. *Prep.* 1. (Ph. D. 1826.) *Nitric acid*, 1 part; *hydrochloric acid*, 2 parts, (both by measure;) mix in a refrigerated bottle, and keep the mixture in a cold and dark place. *Used* to dissolve gold and platinum; and in *medicine*, in liver complaints, syphilis, the exanthemata, &c., either *internally*, in doses of 5 to 15 drops in water, or *externally*, as a foot or knee-bath. It is also occasionally employed as a caustic.

2. (*Aqua regia with sal ammoniac.*) *Nitric acid* (sp. gr. 1·2), 16 fl. oz.; *sal ammoniac*, 4 *oz.;* dissolve. Occasionally used by dyers; does not keep well.

3. (*Dyer's aquafortis.*) Colourless *nitric acid* (sp. gr. 1·17), 10 *lb.; hydrochloric acid* (sp. gr. 1·19), 1 *lb.;* mix. *Used* by dyers. "It dissolves tin without oxidizing it." (?)

NITRO-LEUCIC ACID. Colourless, acicular crystals, formed by dissolving *leucine* in *nitric acid*, evaporating for crystals, and purifying these by re-solution in *water* and recrystallization.

NITRO-MECONIC ACID. Formed by the action of *strong nitric acid* on *meconine*, at a gentle heat. By solution in hot water, it is obtained in yellow crystals as the liquid cools.

NITRO-NAPHTHALASE. A substance formed, with other products, by the action of *nitric acid* on *naphthaline.*

NITRO-PHENASIC ACID. Obtained by distilling a *mixture* of *phenyl-alcohol* and *very dilute nitric acid.* Superb, yellow, acicular crystals, forming beautiful yellow salts with the alkalies, and a red one with oxide of silver.

NITRO-PHENESIC ACID. *Prep.* The portion of *crude coal oil* which boils between 360° and 400° Fahr. is *very carefully* mixed in a large open vessel with a little more than an equal weight of *nitric acid* of the sp. gr. 1·42, and, after the reaction is over, the resulting brownish-red substance is washed with *water*, boiled in a *dilute solution of ammonia*, and the liquid filtered whilst hot; the filtrate, on cooling, deposits crystals of *nitro-phenesate of ammonia;* these are purified by re-solution and recrystallization, after which the salt is dissolved in *water*, decomposed by *dilute nitric acid*, and the product crystallized from *alcohol.*

Prop., &c. Odourless; bitter; sparingly soluble in water; freely soluble in alcohol; melts at about 220° Fahr.; its salts are either yellow or orange, are mostly soluble, and are very beautiful.

NITRO-PHENISIC ACID. From the *brown matter* left on the filter in the last process, purified by solution and crystallization. It is identical with *carbazotic* or *picric acid.*

NITRO-PRUSSIDES. A series of salts discovered by Dr. Playfair, and obtained by the action of *nitric acid* on the *ferrocyanides* and *ferridcyanides.* See *Nitro-prusside of Sodium.*

NITRO-SACCHARIC ACID. A peculiar crystallized acid, formed by the union of *nitric acid* with the *saccharine matter obtained by the action of sulphuric acid on gelatine.*

NITRO-SALICYLAMIDE. Crystalline, yellowish-white needles, obtained by treating *salicylamide* with *strong fuming nitric acid.*

NITRO-SALICYLIC ACID. By acting on *salicine* with *strongest nitric acid*, with heat; or, by gently heating *salicylous acid* with moderately strong *nitric acid*, washing the mass with water, dissolving it in *alcohol*, and crystallizing. Small golden-coloured crystals; with the alkalies it forms crystallizable *nitrosalicylates.* It is identical with *anilic acid.*

NITRO-SULPHURIC ACID. *Prep.* From *nitre*, 1 part; dissolved in *sulphuric acid*, 9 parts. *Used* to separate the silver from the copper and solder of old plated goods. At about 200° Fahr. it readily dissolves the *first*, but scarcely acts on copper, lead, or tin, unless diluted, or assisted by a much higher temperature.

NITRO-TOLUOLE. From *toluole*, as *nitro-benzole*, which it closely resembles. A solid, crystallizable substance (*binitrotoluole*) is at the same time formed.

NITRO-TOLUYLIC ACID. From *toluylic acid*, as *nitro-benzoic acid.*

NITRO-XYLOLE. From *xylole*, as *nitro-benzole.*

NITROGEN. Syn. *Azote, Mephitic Air, Phlogisticated do.; Nitrogenium, Azotum,* —Lat. A gaseous substance discovered by Rutherford in 1772, and found to be a constituent of the atmosphere by Lavoisier and Scheele in 1775. It has hitherto resisted all attempts at decomposition, and is, therefore, considered to be a chemical element. (See Chem. v. 3.) It is found both in the organic and inorganic kingdoms of nature; it forms about ⅘ths, or 79% of the bulk of the atmosphere, enters largely into the composition of most animal substances, and is a constituent of gluten, the alkaloids, and other vegetable principles.

Prep. 1. A small piece of *phosphorus* is placed in a capsule floating on the surface of the water of the pneumatic trough, and after setting it on fire a gas or bell-jar is inverted over it; as soon as the combustion is over, and the fumes have subsided, the residual gas is washed by agitation with *recently boiled distilled water*, or with a *solution of pure potassa.* It may be dried by either letting it stand over *fused chloride of calcium*, or, what is better, by passing it through *concentrated oil of vitriol.* Nearly pure.

2. A porcelain tube is filled with *copper turnings*, or, preferably, with *spongy copper* (obtained by reducing the oxide with hydrogen), and is then heated to redness, a stream of *dry atmospheric air* being at the same time directed through it. By repeating the process with the same air, the product is rendered *quite pure.*

3. *Chlorine gas* is passed into a *solution* of *pure ammonia;* the evolved gas, after being dried, is *pure nitrogen.*

4. (Corenwinder.) From *solution of nitrite of potassa*, 1 volume; *concentrated solution of sal ammoniac*, 3 vols.; gently heated together in a flask, and the evolved gas passed through *sulphuric acid.* Pure.

5. From *nitrite of ammonia* exposed to heat in a retort.

6. From *lean flesh* digested in *nitric acid*, at a gentle heat.

Prop., &c. Pure nitrogen is a colourless, odourless, tasteless gas, neither combustible nor capable of supporting combustion or respiration. It is neutral to test-paper, does not affect lime-water, and is only slightly absorbed by pure water. Its sp. gr. is 0·9722 (Dumas and Liebig; 0·976 Berzelius); 100 cubic inches, at 60° Fahr., and 30 inches of the barometer, weigh 30·14 gr. (29·7 gr.,—Ure.) In *analysis* it is recognised by its purely negative qualities, and by its forming *nitric acid*, when mixed with oxygen and exposed to the electric spark; or when a jet of hydrogen is burnt in the mixed gases. The nitric acid thus formed may be tested in the way described under that article. See *Nitric Acid, Organic Substances, &c.*

NITROGEN (Chloride of). Syn. *Terchloride of Nitrogen.* This compound was discovered by Dulong, in 1811, but its nature was first accurately determined by Sir H. Davy.

Prep. (Liebig.) Dissolve *hydrochlorate of ammonia*, 1 *oz.*, in *hot water*, 12 or 14 *oz.*, and as soon as the temperature has fallen to 90° Fahr., invert a wide-mouthed glass bottle full of chlorine over it. The gas is gradually absorbed, the solution acquires a yellow colour, and in the course of 15 to 20 minutes yellow oil-like globules of *chloride of nitrogen* form upon the surface of the liquid, and ultimately sink to the bottom. The globules as they descend should be received in a small *leaden saucer*, placed under the mouth of the bottle for the purpose.

Prop., &c. Chloride of azote is one of the most *dangerous explosive compounds* known, and should consequently be only prepared in *very small quantities* at a time. Both its discoverer and Sir H. Davy met with severe injuries while experimenting on it. Its sp. gr. is 1·653; it volatilizes at 160° Fahr., and between 200° and 212° fulminates violently. Contact with combustible bodies at ordinary temperatures immediately causes detonation. The explosive power of this compound seems to exceed that of every known substance, not even excepting fulminating silver. A minute globule, no larger than a grain of mustard-seed, placed on a platina spoon, and touched with a piece of phosphorus stuck on the point of a penknife, immediately explodes, and shivers the blade into fragments, at the same time that the vessel that contains it is broken to pieces. Olive oil, naphtha, and oil of turpentine have a similar effect.

NITROGEN (Iodide of). Syn. *Teriodide of Nitrogen.* A dark-brown or black insoluble powder, which is most safely and conveniently prepared by saturating *alcohol* (sp. gr. 0·852) with *iodine*, adding a large quantity of the strongest *pure liquor of ammonia*, and agitating the mixture; *water* must now be added, when *iodide of nitrogen* will be precipitated, and must be *carefully* washed with *cold distilled water.*

Prop., &c. It detonates violently as soon as it becomes dry, by the *slightest* pressure or friction, even that of a feather, and often spontaneously; but the explosion is scarcely so powerful as that of the chloride of nitrogen. It also explodes whilst moist, though less readily. It should only be prepared in *very small quantities* at a time. Recent researches induce the belief that both the above compounds contain hydrogen.

NITROGEN (Oxides of). Nitrogen forms 5 distinct compounds with oxygen—2 *oxides*, and 3 *acids;* containing, respectively, 1, 2, 3, 4, and 5 equivalents of *oxygen* to 1 of *nitrogen.*

NITROGEN (Protoxide of). Syn. *Nitrous Oxide, Laughing Gas, Dephlogisticated Nitrous Air; Nitrogenii Protoxydum,*—Lat. *Prep.* From *fused nitrate of ammonia* introduced into a glass retort, or a flask furnished with a bent tube, and then exposed over a spirit-lamp or charcoal-chauffer, to a temperature of about 380° Fahr.; the evolved gas may be collected in bladders, gas bags, a gazometer, or in the pneumatic trough over warm water.

Prop., &c. Colourless; possesses an agreeable odour, and a sweetish taste; at 45°, under a pressure of 50 atmospheres, it is liquid; this, when exposed under the receiver of a powerful air-pump, changes into a snow-like solid; at—150° Fahr., it is a transparent, colourless, crystalline body; it supports combustion, and is absorbed by cold water. Sp. gr. 1·525 (1·527,—Ure); 100 cubic inches weigh 47·29 gr. (49·6 gr., —Ure.) Its most remarkable property is its action on the system when inspired. A few deep inspirations are usually succeeded by a pleasing state of excitement, and a strong propensity to laughter and muscular exertion, which soon subside, without being followed by languor or depression. Its effects, however, vary with different constitutions. A sailor that lately took this gas at a public exhibition, immediately drew his knife, and stabbed one of the company. From 4 to 12 quarts may be breathed with safety. It produces temporary insensibility to pain, like chloroform or ether; but its use is dangerous when affections of the heart, lungs, or brain are present.

Obs. No particular caution is required in preparing the above compound, except the use of too much heat. The temperature should be so arranged as to keep the melted mass in a state of gentle ebullition, and should not be allowed, under any circumstances, to exceed about 500° Fahr. Should white fumes appear within the retort after the evolution of the gas has commenced, the heat should be at once lowered, as when heated to about 600° nitrate of ammonia explodes with violence.

Nitrous oxide may also be made in the same way, from crystallized nitrate of ammonia, or by exposing nitric oxide for some days over iron filings, but, without great care, the product is not always fit for respiration. *When pure,* it is colourless, has an agreeable odour, and does not affect solution of nitrate of silver.

NITROGEN (Binoxide of). Syn. *Nitric Oxide, Nitrous Gas, Deutoxide of Nitrogen; Nitrogenii Binoxydum,*—Lat. *Prep.* By pouring *nitric acid*, sp. gr. 1·2, on *metallic copper*, under the form of *turnings, clippings*, or *wire.* Effervescence ensues, and *nitrous gas* is evolved, and may be collected over water or mercury in the pneumatic trough. The residual liquid yields crystals of *nitrate of copper* on evaporation.

Prop., &c. A colourless, tasteless, inodorous, *irrespirable*, and incombustible gas. In contact with free oxygen, it produces dense orange or red vapours of nitrous acid, which are freely absorbed by water. It is absorbed by a solution of protosulphate of iron, which it turns of a deep-brown or nearly black colour, which is removed by boiling. Sp. gr. 1·039; 100 cubic inches weigh about 32¼ gr. (36·66,—Ure.)

NITROGEN (Phosphuret of). A snow-white powder, formed by heating *chloride of phosphorus* which has been previously saturated with *dry ammoniacal gas.* (Rose.)

NITROGEN (Sulphuret of). A greenish-yellow mass, obtained by the action of *water* on a *compound of chloride of sulphur and ammonia.* (Soubeiran.)

NITROUS ACID. Syn. *Hyponitric Acid; Peroxide of Nitrogen,*—Graham; *Acidum Nitrosum,*—Lat. *Prep.* 1. Distil perfectly *dry nitrate of lead* in a coated glass retort, connected with a glass receiver placed in a *freezing mixture*, and furnished with a safety tube.

2. (Ure.) By distilling *strong fuming nitric acid* at the lowest possible temperature, and rectifying what comes over.

Prop., &c. A pungent, acid, corrosive liquid, colourless below zero, but yellow, or orange-coloured at higher temperatures; sp. gr. 1·42; boiling point, 82° Fahr. It is a powerful oxidizing agent. When mixed with water, it is decomposed. A mixture of nitrous and nitric acids forms the fuming nitric acid (*aquafortis*) of commerce. It possesses the power of forming salts in only a limited degree. The compounds commonly called *nitrites* are compounds of hyponitrous acid with the bases. A true *nitrite of lead* has, however, been formed by M. Peligot, by digesting nitrate of lead with metallic lead. "The *hyponitrous* and *nitrous* are two acids remarkable for containing *no* water in their composition; *nitrite of potassa* may be obtained by heating nitre to redness, and removing it from the fire before the decomposition is complete." (Ure.) See *Hyponitrous Acid, &c,*

NITROUS GAS. See *Binoxide of Nitrogen.*

NITROUS OXIDE. See *Protoxide of Nitrogen.*

NODE. Syn. *Nodus,*—Lat. A hard tumour proceeding from a bone, and caused by the swelling of its external membrane. The bones of the leg, forehead, and fore-arm, are those most commonly attacked. Nodes are generally accompanied with considerable pain, and often with caries and loss of vitality.

NOLI ME TANGERE. See *Lupus.*

NOMENCLATURE (Chemical). The following information will doubtless prove useful to many of our readers, as serving to explain terms which are necessarily of frequent occurrence in this work:—

Acids.—a. When a substance produces only *one* acid compound with oxygen, the name of this acid is formed by adding the termination *-ic* to that of the *radical*, or to the leading or characteristic portion of it; as, *sulphur*IC *acid*, an acid of sulphur. This is latinized by changing -ic into *-icum;* as, *acidum sulphur*ICUM.—*b.* When a body forms *two* acid compounds with oxygen, the name of the one containing the *smaller* proportion of that substance ends in *-ous;* as, *arsenious acid,* which contains 1 equivalent of arsenic with *three* of oxygen; *arsen*IC *acid*, containing 1 eq. of arsenic with *five* of oxygen. In this case the Latin name ends in *-osum;* as *acidum arsenio*SUM.—*c.* When a substance forms *more* than *two* acids with oxygen, the preposition *hypo-* (below *or* under) is prefixed to the name of the acid in *-ous* or *-ic* next above it; as, HYPO*nitrous acid.*—*d.* When a new acid compound of a substance is discovered, containing *more* oxygen than another acid of the same substance already known, the name of which ends in -ic, the prefix *per-* or *hyper-* is added; as, PER*iodic acid.* This may be illustrated by the compounds of oxygen and chlorine:—

	Chlorine.	Oxygen.
Hypochlorous acid (*acidum hypochlorosum*) contains	1 equiv.	1 equiv.
Chlorous ,, (,, *chlorosum*) ,,	1 ,,	3 ,,
Hypochloric ,, (,, *hypochloricum*) ,,	1 ,,	4 ,,
Chloric ,, (,, *chloricum*) ,,	1 ,,	5 ,,
Perchloric *or* Hyperchloric ,, (,, *perchloricum*) ,,	1 ,,	7 ,,

Oxides. The names of these have, in general, reference to the number of equivalents of oxygen which they contain. When a metal or base forms only *one* basic compound with oxygen, this compound is simply called the *oxide* of such base; but as most substances form *more* than one compound with oxygen, certain prefixes are introduced to express the proportions. In such cases it is always found that one out of the number has a strongly-marked basic character, and contains 1 equivalent of each of its constituents. This is called the *oxide* or *protoxide*, and forms the standard to which those both above it and below it are referred. Thus:—

	Metal or base.	Oxygen.
Suboxide or dioxide (*suboxydum, dioxydum*) contains	2 equiv.	1 equiv.
OXIDE OR PROTOXIDE (*oxydum, protoxydum*) ,,	1 ,,	1 ,,
Sesquioxide (*sesquioxydum*) . . ,,	1 ,,	1½ ,,
Binoxide or deutoxide (*binoxydum, deutoxydum*) . . . . ,,	1 ,,	2 ,,
Teroxide or tritoxide (*teroxydum, tritoxydum*) . . . . ,,	1 ,,	3 ,,
Peroxide or superoxide (*peroxydum*) . . ,,	That containing the *largest* proportion of oxygen.	

Salts.—*a.* The name of the salt of an acid in *-ic* ends in *-ate*, and is Latinized by *-as;* as, *carbonate of lime, sulphate of protoxide of iron, calcis carbonas, &c.*—*b.* The name of the salt of an acid in *-ous* ends in *-ite*, and is Latinized by *-is;* as *hypochlorite of soda, sodæ hypochloris.* For the sake of brevity the word oxide in speaking of the ordinary metallic salts is omitted, and we simply say *sulphate of iron, acetate of lead*, &c.—*c.* The preceding names are presumed to refer to neutral compounds. In *acid salts* the prefixes noticed above, are added to express the equivalent proportions of the acid; as *binacetate, sesquisulphate*, &c.—*d.* In *basic salts*, or those in which the base is in excess, the prefix *sub-* or *di-* is employed, in the way before pointed out; as *diacetate of lead, subnitrate of mercury*, &c. In many cases the previous terms are used with the word "*basic*" added, by which the number of equivalents of *base* instead of *acid* are indicated; as, *sesquibasic acetate of lead, tribasic do.*

Non-metallic bodies, &c. The names of the compounds formed by the union of the *non-metallic elements*, and certain other bodies, with the metals and with each other, either terminate in *-ide*, Latinized by *-idum*, or in *-uret*, Latinized by *-uretum;* as, *arsen*IDE or *arseni*URET (*arsen*IDUM, *arseni*URETUM), *bromide* or *bromuret*, *carbide* or *carburet*, *chloride* or *chloruret*, *cyanide* or *cyanuret*, *fluoride* or *fluoruret*, *hydride* or *hydruret*, *iodide* or *ioduret*, *sulphide* or *sulphuret*, &c. The *first* of these terminations is the now prevailing one among English scientific chemists; the *second* is that commonly adopted on the Continent. The prefixes already noticed are also employed here:—

	Sulphur.	Potassium.
Sulphide, sulphuret, *or* protosulphuret of potassium, contains	1 equiv.	1 equiv.
Sesquisulphide *or* sesquisulphuret ,, ,,	1½ ,,	1 ,,
Bisulphide *or* deutosulphuret ,, ,,	2 ,,	1 ,,
Tersulphide *or* trisulphuret ,, ,,	3 ,,	1 ,,
Quadrisulphide *or* quadrisulphuret ,, ,,	4 ,,	1 ,,
Pentasulphide *or* pentasulphuret ,, ,,	5 ,,	1 ,,
Persulphide, persulphuret, *or* supersulphuret . . . . . ,, ,,	Applied to that containing the *largest* quantity of sulphur.	

Metals. The names of the metals (those of them at least that have been given during the present century) end in *-ium* or (less frequently) in *-um;* as, *potass*IUM, *sod*IUM, *pla-*

*tin*UM. The Latin names of several of the non-metallic elementary bodies also end in *-ium;* as, *iodinium*, *nitrogenium*, &c.

Alkaloids. The names of the organic bases end either in *-ia*, *-na*, or *-ine;* as, *morph*IA, *quin*A, *strychn*INE. These terminations are now limited, as much as possible, to substances exhibiting basic properties, but were formerly very loosely applied.

The *Latin genitive* or *possessive* of the *above* compounds in—

-as is -atis
-is ,, -itis
-icum ,, -ici
-osum ,, -osi
-idum ,, -idi
-etum ,, -eti
-ium ,, -ii
-um ,, -i
-ia, -a, -na ,, -æ.

Ex. Acetas (acetate), *acetatis* (of acetate); arsenis, *arsenitis;* citricum, *citrici;* arseniosum, *arseniosi;* iodidum, *iodidi;* sulphuretum, *sulphureti;* sodium, *sodii;* platinum, *platini;* morphia, *morphiæ;* quina, *quinæ;* narcotina, *narcotinæ.* The genitives of common names vary with the termination. Most of those ending in *-a* make *-æ*, and most of those in *-us* and *-um* make *-i;* but there are many exceptions, among which *cornu* (a horn) and *spiritus* (spirit), which are unaltered in the genitive singular, may be mentioned as examples.

NONPAREILS. See *Sugar Plums.*

NORFOLK FLUID. *Prep.* Take of *linseed oil,* 3 pints; *black rosin,* ½ *lb.; yellow wax,* 12 *oz.;* melt, and add of *neat's-foot oil,* 1 quart; *oil of turpentine,* 1 pint. *Used* to preserve and soften leather.

NORIUM. An unexamined metal, the oxide of which, according to Svanberg, exists in certain varieties of *zircon.*

NOSTRUMS. See *Patent Medicines, &c.*

NOVARGENT. *Prep.* From *recently precipitated chloride of soda* by dissolving it in a solution of either *hyposulphite of soda* or of *cyanide of potassium. Used* chiefly to restore old plated goods. The liquid is rubbed over the metal to be coated with a little prepared chalk, and the part is afterwards polished off with a piece of soft leather. A *powder* recently sold under the same name is formed by mixing the preceding article with chalk, and drying the mass. It is made into a paste with a little water, spirit of wine, or gin, before applying it.

NOVAURUM. From a *solution of neutral terchloride of gold,* as the last.

NOYAU. Syn. *Créme de Noyau.* This is a pleasant nutty-tasted liqueur, but from the large proportion of prussic acid which it contains, a small quantity only should be taken at a time.

Prep. 1. *Bitter almonds* (bruised), 3 *oz.; spirit* (22 u. p.), 1 quart; *sugar,* 1 *lb.;* (dissolved in) *water,* ¾ pint; macerate for 10 days, frequently shaking the vessel, then allow it to repose for a few days, and decant the clear portion.

2. As the last, but substituting *apricot* or *peach kernels* (with the shells, bruised), for the almonds.

3. To either of the above, add of *coriander seed* and *ginger,* of each, bruised, 1 dr.; *mace* and *cinnamon,* of each, ½ dr.

4. (*Wholesale.*) To *plain cordial,* at 54 to 60 u. p., containing 3 *lb.* of *sugar* per gallon, add, gradually, *essence of bitter almonds,* q. s. to flavour.

5. (*Créme de noyau de Martinique.*) *Loaf sugar,* 24 *lb.: water,* 2½ gall.; dissolve, add of *proof spirit,* 5 gall.; *orange-flower water,* 3 pints; *bitter almonds* (bruised), 1 *lb.; essence of lemons,* 2 *dr.;* as above. See *Liqueurs.*

NURSERY. "A plot of ground, or an entire garden, set apart for the propagation of plants, more particularly of trees and shrubs. The situation ought to be open and airy, and the soil of an average quality, neither too heavy nor too light, so as to adapt it to the majority of plants." (Loudon.)

NURSING. Milk is the natural food of the mammalia during the earlier period of their existence. It contains all that is necessary for the nourishment of their bodies, and on it they thrive and grow. Its secretion only actively commences at the time when it is required for the sustenance of the offspring, and it either materially lessens in quantity, or wholly disappears, as soon as the necessity of its existence has passed away, and the little being who depended on it has acquired sufficient age and strength to exist on cruder aliment. The nursing mother when in a state of perfect health, and properly supplied with a sufficiency, without excess, of nutritious food, elaborates this secretion in the fittest condition to ensure the health and vigour of her offspring. Her bosom is the fountain whence flows the beauty and stamina of the future adult, and whilst giving strength and life to another, she increases and prolongs her own.

The milk of women *varies* with the food, health, age, &c., of the nurse. That produced from a *mixed animal* and *vegetable diet*, neither acesces nor coagulates spontaneously, like cows' milk; and when gently evaporated in an open vessel, "the last drop continues thin, sweet, and bland." Acids and rennet, however, coagulate it readily, and so does the gastric juice of the infant, as shown by the condition in which it is often ejected by the latter. The milk of a woman who lives wholly on *vegetable food* acesces and coagulates with equal readiness, and in a precisely similar manner to cows' milk. The quality of the milk also varies with the *progress of digestion.* Within the first hour or two after a meal it is thin and serous, and then gradually improves in richness and flavour, until at about the fourth or fifth hour, it possesses these qualities in the highest degree. This then is the period at which the infant should be applied to the breast, which, according to the present habits of society, would be during the hour immediately preceding each meal, except the breakfast. After about the fifth or sixth hour the milk gradually loses its peculiar colour and odour, until towards the tenth or twelfth hour after eating food it becomes yellowish, bitter, and often nauseous; and in this condition is frequently refused by the infant. This points out the impropriety of a nurse fasting longer than 4 to 5 hours, except during the night, when the period may be extended to 7 or 8 hours, but *never* longer. The *time after accouchement* is *another matter* that influences the character of human milk in respect of its wholesomeness for the infant. The milk secreted soon after delivery is very thin and serous, but in the course of a few days it becomes thicker, richer, and more nutritious; and a gradual change in the same direction proceeds during the usual period of suckling. When the mother suckles her own infant, or the "age of the milk," as the nurses say, corresponds to that of the child, all goes on well; but, when the former much exceeds the latter, the reverse is the case. Thus, it is found that an infant is incapable of completely digesting the milk of a nurse whose own child is much older than itself; and that an infant of a few weeks old will often starve on the milk intended by nature for one several times its age. It is, therefore, necessary, in selecting a wet-nurse, to be certain that her condition, in this respect, closely corresponds to that of the mother of the infant, or that it does not differ, on this point, more than 3 or 4 weeks. In respect of the use of high-flavoured or *improper food* and *beverages, medicine, &c.*, it appears that all these substances immediately affect the milk, and impart to it more or less of their peculiar flavour and properties; and, except with remedies administered under medical advice, in nearly all cases prove injurious to the infant. The *diet* of a *nurse* should be nutritious and succulent, and its healthy digestion should be promoted by exercise and pure air. Strong liquors, more especially spirits, act like slow poisons on the infant, and their habitual use by a nurse should, therefore, be considered as a positive disqualification for the duties of her office. The care of the mother or wet-nurse should be particularly directed to the maintenance of her own health and equanimity, by which both the health and good temper of the infant will be, as far as possible, ensured. A grieving, irritable, or angry mother, forces her bad qualities on her offspring, in the shape of fits, convulsions, or hopeless marasmus. See *Infancy, Milk, &c.*

NUTMEG. Syn. *Myristicæ Nucleus, Nucista, Nux Moschata, N. Myristica, N. Aromatica; Myristica,*—Ph. L. "The shelled seed of *myristica officinalis* (Linn.; *m. moschata,*—Thunberg), or *nutmeg-tree.*" (Ph. L.) It is chiefly used as a spice and condiment, but is also esteemed as an aromatic in flatulency and diarrhœa. *Dose.* Half a teaspoonful, or more, grated. The distilled and expressed oils (*oleum myristicæ*) are also officinal.

NUTRITION. The phenomena of life are accompanied by the constant and unceasing waste of the materials of which the animal body is composed. Every act of volition, every exertion of muscular power, every functional action of the organism, whether perceptible, or imperceptible and involuntary, every play of chemical affinity and decomposition, even thought itself, occasions the disorganization and destruction, as living matter, of a portion of ourselves. But the process of respiration, and the various important changes with which it is connected, tends, more than all the other vital functions, to waste the substance of the body, the temperature of which it is its special office to support. This loss, this change, which commences with life and terminates only with death, is compensated for by the constant renewal of the whole frame by the deposition and assimilation, or organization, of matter from the blood, which thus becomes gradually thinner and impoverished, unless, in its turn, it receives a corresponding supply of its vital elements. This it does from the food, which, by the functions of digestion, is converted into chyle, and, after being taken up by the lacteals, passes into the blood, of which it then becomes a part, and after being animalized, and rendered similar to the being it is designed to nourish, by the peculiar action of the vital affinities, it attaches itself to those organs or tissues the loss of which it is intended to supply. This constitutes nutrition.

The *food* of *animals*, or rather, the nutritious portion of that food on which we live, is wholly organic matter, and is either directly or indirectly, produced by the powers of vegetation from the inorganic world. The plant elaborates food for the herbivora, and these, in their turn, serve as food for the flesh-eating animals. In both cases the leading alimentary principles are the same; the difference is in their proportions. *Flesh* is identical in composition with blood, and with the body of the animal that blood is destined to nourish. It abounds in albumen, caseine, and fibrine. The *vegetable substances* used as food also contain nitrogenized principles of a precisely similar character and chemical constitution to those found in flesh, and which we are, therefore, bound to believe are absolutely the same. The *gluten* of wheat, when purified from gliadine, presents all the characteristics of pure fibrine. The *albumen* extracted from *vegetable juices* when coagulated by heat, cannot be distinguished from the boiled white of egg in a divided condition. The *emulsive principle* of almonds, peas, beans, and many of the oily seeds, bears the most striking resemblance to the caseine of milk. When a mixture of this substance with water is heated, it does not coagulate, but a skin forms on the surface; the addition of alcohol or acetic acid coagulates it immediately, and when it is mixed with a little sugar, it soon curdles, becomes sour, and undergoes the lactic fermentation. In all this it precisely resembles milk. Further, all these substances dissolve in a solution of caustic potassa, and the filtered solutions, when treated with excess of acid, give precipitates of proteine. These facts clearly show that the leading nitrogenized principles of animal bodies pre-exist in vegetables, and that the substances employed as food must have the same, or nearly the same chemical composition as the body itself. The striking contrast of *animal* and *vegetable food*, as far as this point is concerned, is more apparent than real. The actual difference between the two is to be found in the existence of a large quantity of non-nitrogenized matter (*sugar*, *starch*, *&c.*) in the last, which is not contained in the other—matter which abounds in carbon, and which, by its combustion in the system, serves to support the animal heat at a less sacrifice of the organic fabric. In the flesh-eating animal, the waste of the organic tissues is very rapid, and the tax upon the vital energies proportionate; for the temperature of its body is kept up, for the most part, by the burning of the nitrogenized matter of which these tissues are composed.

The *process* of *digestion* is that by which the available portions of the food are reduced to a form adapted for absorption by the vessels by which it is introduced into the system. In the flesh-eating animal this process is extremely simple, and consists in the mere comminution of the food by the teeth, and its reduction to the liquid state in the stomach, after which, from the nature of its composition, it is nearly all taken up, and at once conveyed into the blood. In the herbivora, however, the process of digestion is much more complicated, and occupies a longer period. Besides the ordinary principles of flesh, their food contains starch, sugar, gum, &c., mixed with much inert vegetable fibre and other useless substances from which it must be separated. The *first* of these supply materials for the waste and growth of the body, the *second* meet the requirements of respiration, and the *last* pass unaltered through the alimentary canal.

The *nature* of the *digestive process* is not clearly established. The principal objects effected appear to be the conversion of starch, coagulated albumen, fibrine, caseine, &c., into a liquid form. It is known that the saliva contains a peculiar principle resembling diastase, capable of transmuting starch into sugar, and that when a little starch is held in the mouth for a short time, this change actually occurs. It is also known that the gastric juice contains a peculiar organic principle named *pepsin*, and that this substance, in conjunction with *dilute hydrochloric acid*, which is likewise present in the stomach, possesses the property of dissolving the albuminous principles of food. These changes occur whenever these conditions are established out of the body; and, hence, it is inferred that the process of digestion is effected by similar means. Of this, however, there is no direct evidence.

The *use* of *food*, as already noticed, is two-fold. It supplies the materials of nutrition to balance the waste of the tissues continually taking place in the body, and it conveys into the system those elements which, by their chemical combinations, produce heat. To effect these purposes in the most beneficial manner, the food should not only be sufficient in quantity, but the proportions of its nitrogenized and carbonaceous principles should bear such relations to each other as to amply meet the demands of the system for each, without the existence, however, of an undue excess of either. When a larger supply of amylaceous or oleaginous matter is taken in the food than is necessary for the ordinary requirements of respiration, an unusual quantity of carbon accumulates in the system, and by its union with oxygen, a corresponding proportion of animal heat is generated. But the *whole* of this *carbon* is not got rid of by the process of respiration alone; some is deposited as fat in the tissues and bones; a large quantity is separated as a saccharine and fatty emulsion, by the liver; some is disposed of in the formation of the hair and unctuous substance of the skin; and some is eliminated by the skin, as carbonic acid gas. The *nitrogenous principles* of the food play an equally important part in the animal economy. These form compounds in the blood and in the tissues, which are of a stimulant nature, and hence are very proper to assist in the development of heat; but when these substances are produced in excess, they act as causes of irritation, and, indeed, are so violent in their effects, as sometimes to occasion death. The kidneys and the skin are the organs by which these offensive nitrogenous compounds are eliminated from the body; their detention or imperfect removal is a constant source of disease.

When the muscular movements of a healthy animal are restrained, a genial temperature kept up, and an ample supply of food containing much amylaceous or oily matter given, an *accumulation* of *fat* in the system rapidly takes place; this is well seen in the case of stall-fed cattle. On the other hand, when food is deficient, and much exercise is taken, *emaciation* results. These effects are ascribed to differences in the activity of the respiratory function. In the first instance, the heat-food is supplied faster than it is consumed, and hence accumulates in the form of fat; in the second, the conditions are reversed, and the creature is kept in a state of leanness by its rapid consumption. The fat of an animal appears to be a provision of nature for the maintenance of life during a certain period under circumstances of privation. Hence it is, that a lean animal suffers more from cold than a fat one, and is also sooner starved.

"The *origin* of *fat* in the animal body has recently been made the subject of much animated discussion: on the one hand it was contended that satisfactory evidence exists of the conversion of starch and saccharine substances into fat, by separation of carbon and oxygen, the change somewhat resembling that of the vinous fermentation: it was argued, on the other side, that oily or fatty matter is invariably present in the food supplied to the domestic animals, and that this fat is merely absorbed and deposited in the body in a slightly modified state. The question has now been decided in favour of the first of these views, which was enunciated by Professor Liebig, by the very chemist who formerly advocated the second opinion. By a series of very beautiful experiments, MM. Dumas and Milne Edwards proved that bees exclusively feeding upon sugar, were still capable of producing wax, which was pointed out as a veritable fact."

Dr. Prout has grouped all nutritive substances into four classes, which he terms *aqueous*, *saccharine*, *albuminous*, and *oleaginous*. The *first* of these needs no elucidation. Water is an abundant and necessary constituent of the body, and an universal component of our food. The *saccharine class* is derived from the vegetable kingdom, the *albuminous* chiefly from the animal, and the *oleaginous* from both. "A diet," says Dr. Prout, "to be complete, must contain more or less of all the four staminal principles; such at least must be the diet of the higher classes of animals, and especially of man."

Professor Liebig, the leading chemico-physiologist of the present day, has divided the principles found in food into two classes:—*plastic elements of nutrition*, or flesh-and-blood-making principles; and *elements of respiration*, or those which by their decomposition or combustion in the system generate heat. They are as follows:—

Elements of Nutrition. (Plastic or Nitrogenous.)	*Elements of Respiration.* (Heat-producing.)
Animal flesh	Fat
Blood	Starch
Vegetable albumen	Gum
" caseine	Cane sugar
" fibrine.	Grape "
	Milk "
	Pectine
	Alcohol.

According to Mr. Brande the *average quantity of solid digestible matter* in 1000 parts of the substances named below, and dried at 212° Fahr., is—

Almonds	650	Milk	72
Apples	170	Morels	896
Apricots	260	Mutton	290
Barley	920	Oats	742
Beef	260	Pears	160
Beet-root	148	Peaches	200
Blood	215	Plums	290
*Bones	510	Pork	240
Brain	200	†Potatoes	260
Cabbage	73	†Rice	880
Carrots	98	Rye	792
Cherries	250	Sole	210
Chicken	270	Strawberries	100
Cod	210	Tamarinds	340
Cucumber	25	Turnips	42
Grapes	270	Veal	250
Gooseberries	190	Wheat	950
Haddock	180	White of egg	140
Melon	30		

* Of this more than one half is earthy matter.
† Chiefly *starch.*

In an admirable lecture on the "*food of man*," recently delivered at the Royal Institution, by Dr. Lyon Playfair, the comparative ignorance under which we labour regarding the quantity of the different proximate constituents of aliments necessary for man's sustenance, even in his healthy and normal condition, was strikingly exemplified. "If the question were asked—*How much carbon should an adult man consume daily?*—there would be scarcely more than one reliable answer, viz., that 'the soldiers of the body-guard of the Duke of Darmstadt eat about 11 oz. each of *carbon* in their daily supply of food.' Liebig, on whose observations this assertion rests, states the quantity to be larger than this, but the figures here given are founded on a re-calculation from the new food-tables. If again the question were asked—*How much flesh-forming matter supports an adult man in a normal condition?*—no positive answer could be given. Even as respects the relation between the carbon in the flesh-forming matter and that of the heat-givers, we have no reliable information. It is true that certain theoretical conclusions on this head have been drawn from the composition of flour, but no real statistical answer deduced from actual experience exists.

"When we inquire into the cause of our ignorance on these points, it is found that the progress to knowledge is surrounded with difficulties. Neither chemistry nor physiology is in a sufficiently advanced state to grapple satisfactorily with the subject of nutrition. For example, we know that *albumen* in an egg is the starting-point for a whole series of tissues; that out of the egg comes feathers, claws, fibrine, membranes, cells, blood-corpuscles, nerves, &c., but only the result is known to us; the intermediate changes and their causes are quite unknown. After all, this is but a rude and unsatisfactory knowledge. Hence, when we approach the subject it is only to deal with very rough generalities. Admitting that the experience of man in diet is worth something, it is possible to arrive at some conclusions by the *statistical* method—that is, by accepting experience in diet and analysing that experience. Take, for example, the one general line of Pauper Diet for the English counties placed in the table below. The mode of arriving at the result of experience, in the case of paupers, was to collect it from *every* workhouse in the kingdom, and then to reduce it to *one* line. But the labour of this is immense. In the *preparation* of this *one line* the following work had to be performed in acquiring the data:—

Number of Unions applied to	542
Number of explanatory letters sent to them	700
Number of calculations to reduce the results	47,696
Number of additions of the above calculations	6,868
Number of extra hours, *beyond the office hours*, paid to a clerk for the reduction	1,248."

The lecturer then briefly alluded to the conditions in nutrition, which must be borne in mind in looking at these results. "It was now admitted that the heat of the body was due to the combustion of the non-nitrogenized ingredients of the food. Man inspires annually about 7 cwt. of *oxygen*, and about *one fifth* of this burns some constituent, and produces heat. The whole carbon in the blood would thus be burned away in about three days, unless new fuel were introduced as food. The amount of food necessary depends upon the number of respirations, the rapidity of the pulsations, and the relative capacity of the lungs. Cold increases the number of respirations, and heat diminishes them." "Beccaria, in 1742, pointed to the close resemblance between these ingredients of flesh, and asked, '*Is it not true that we are composed of the same substances which serve as our nourishment?*' In fact the simplicity of this view is now generally acknowledged; and albumen, gluten, caseine, &c., are now recognized as flesh-formers, in the same sense that any animal aliment is."

TABLE *of Examples of different Dietaries, re-arranged from the Diagrams of* DR. LYON PLAYFAIR.

Remarks.	Weight in Ounces per Week.	Nitrogenous Ingredients.	Substances free from Nitrogen.	Mineral Matter.	Carbon.	Proportion between	
						Carbon in *Flesh-Formers.*	*Carbon* in *Heat-Givers.*
Dietaries of Soldiers and Sailors.							
Bavarian Soldier	242	21·08	102·10	3·32	62·45	1	5·47*c*
Dutch ,, in War	298	35·21	102·08	1·85	74·08	1	3·87*b*
,, ,, in Peace	383	24·52	106·80	4·15	70·77	1	5·32*b*
English ,, ...	378	36·15	127·18	4·92	71·68	1	3·66*a*
,, ,, in India	261	34·15	103·19	2·39	66·32	1	3·58*a*
,, Sailor (Fresh Meat)	302	34·82	102·89	3·17	70·55	1	3·70*a*
,, ,, (Salt Meat)	290	40·83	132·20	6·03	87·40	1	3·94*a*
French Soldier	347	33·24	127·76	4·62	85·25	1	4·72*c*
Hessian ,, ...	423	23·0	136·0	—	77·0	1	6·16*d*
Dietaries of the Young.							
Chelsea Hospital, Boy's School	245	12·89	93·28	5·93	57·67	1	8·29*e*
Christ's Hospital, Hertford	216	17·16	61·27	2·47	39·18	1	4·21*e*
,, London	242	17·27	76·82	2·84	46·95	1	5·02*e*
Greenwich Hospital, Boy's School . .	231	18·43	86·73	2·62	52·87	1	5·29*e*
Dietaries of the Aged.							
Chelsea Pensioners	332	29·95	112·64	4·65	78·03	1	4·80 *f*
Greenwich ,, ...	269	24·46	122·21	3·54	72·43	1	5·46 *f*
Gillespie Hospital, Edinburgh	156	21·02	92·32	2·35	71·39	1	6·26 *f*
Trinity Hospital ,, ...	192	19·63	97·34	3·33	57·30	1	5·38 *f*
Pauper Dietaries.							
Class 1 (Old)	—	20·21	88·61	3·27	54·30	1	4·95*g*
,, 2 ,, ...	—	14·96	89·59	2·89	51·10	1	6·31*g*
,, 3 ,, ...	—	15·78	99·88	3·91	55·43	1	6·50*g*
,, 4 ,, ...	—	19·22	116·84	3·96	67·87	1	6·50*g*
,, 5 ,, ...	—	15·49	96·51	3·58	54·72	1	6·53*g*
,, 6 ,, ...	—	14·67	88·03	2·84	49·57	1	6·25*g*
Average of all English Counties in 1851 .	—	22·0	99·0	—	58·0	1	4·85*h*
City Workhouse, Edinburgh	107	13·30	49·99	1·74	31·48	1	4·36 *i*
St. Cuthbert's ,, ...	175	14·80	89·37	3·31	46·98	1	5·85 *i*
English Prison Dietaries.							
Class 2 Males	206½	15·28	111·85	3·46	59·23	1	7·13 *j*
,, 3 ,, ...	276	18·26	123·60	4·05	67·53	1	6·81*k*
,, 4, 8, and 9 ,, ...	229	20·97	159·98	5·03	69·88	1	6·13 *l*
,, 5 ,, ...	326	20·29	130·57	4·23	73·31	1	6·65*m*
,, 6 and 7 ,, ...	271½	20·97	125·98	5·03	69·88	1	6·13*n*
Bengal Prison Dietaries.							
Non-Labouring Convicts	224	18·43	163·16	2·08	76·35	1	7·62*o*
Working Convicts	296	28·16	191·12	2·97	91·07	1	5·96*o*
Contractors' insufficient Diet . . .	167½	12·70	135·95	1·30	61·33	1	8·88*o*
Bombay Prison Dietaries.							
All Classes of Prisoners not on Hard Labour	182	28·00	101 50	2·03	68·81	1	4·52*o*
Hard Labour	224	35·63	128·80	2·45	87·22	1	4·50*o*
Other Dietaries.							
Agricultural Labourer, England	163·6	26·64	106·57	1·10	74·70*q*	—	—
,, ,, ,, ...	114·6	20·39	72·46	1·18	51·72*q*	—	—
,, ,, India	218·0	14·02	138·27	2·41	61·54*r*	—	—
Bosjesman	—	574·0	368·0	—	555·0*p*	—	—
Esquimaux	—	250·0	1280·0	—	1125·0*p*	—	—
Hottentot	—	424·0	400·0	—	604·0*p*	—	—
Yacut	—	999·0	640·0	—	966·0*p*	—	—

a Public Dietaries. *b* MULDER. *c* Special Return obtained. *d* LIEBIG. *e* Special Returns obtained. *f* Special Returns obtained. *g* The 6 Dietaries recommended as equivalent by the Poor Law Commissioners. *h* Specially reduced from all the Unions in 1851. *i* Special Returns. *j* Convicted Prisoners exceeding 7 days, but not exceeding 21 days. *k* Convicted Prisoners, Hard Labour, exceeding 21 days, but not more than 6 weeks. *l* Convicted Prisoners, Hard Labour, above 6 weeks and not more than 4 months. *m* Convicted Prisoners, Hard Labour, for terms exceeding 4 months. *n* Solitary Confinement. *o* From information supplied from the India House. *p* These probably represent extreme cases, mentioned by the following authorities: — Ross, 1835, p. 448. Parry, 1823, p. 413. Cochrane, p. 255. Saritcheff. Barrow, pp. 152, 258. Richardson, *vide* Agric. Cyc. art. *Diet.* *q* Gloucestershire and Dorsetshire. See Agric. Cyclopædia. *r* Dharwar, Bombay—Return in Bombay Prison Dietaries.

The old mode of estimating the value of dietaries, by merely giving the total number of ounces of solid food used daily or weekly, and quite irrespective of its composition, was shown to be quite erroneous; and an instance was given of an agricultural labourer in Gloucestershire, who, in the year of the potato famine, subsisted chiefly on *flour*, consuming 163 ounces weekly, which contained 26 ounces of *flesh-formers.* When potatoes cheapened, he returned to a potato-diet, and now ate 321 ounces weekly, although his true nutriment in flesh-formers was only about 8 or 10 ounces. The lecturer showed this, by calling attention to the six pauper dietaries formerly recommended, to the difference between the salt and fresh meat dietary of the sailor, &c., all of which, relying on absolute weight alone, had in reality no relation in equivalent nutritive value. Taking the *soldier* and *sailor* as examples of healthy adult men, we should find that they consumed weekly about 35 ounces of *flesh-formers*, and 70 to 74 ounces of *carbon;* the relation of the *carbon in the flesh-formers* to that in the *heat-givers* being as 1 to 3. If the dietaries of the *aged* were contrasted with this, it would be found that they consumed less *flesh-formers*, but rather more *heat-givers;* the relation of carbon in the former to that of the latter being as about 1 to 5. The *young boy*, about ten or twelve years of age, consumed about 17 ounces weekly, or about one-half that taken by the adult man; the *carbon* being about 58 ounces weekly, and the relation of the two carbons being nearly as 1 to 5½. The circumstances under which persons are placed influence these proportions considerably. In *workhouses* and *prisons* the warmth renders less necessary a large amount of food-fuel to the body; while the relative amount of labour determines the greater or less amount of flesh-formers. Accordingly it is observed, that the latter are increased to the prisoners exposed to hard labour. From the quantity of flesh-formers in food, we may estimate approximatively the rate of change in the body. Now a man weighing 140 *lb.*, has about 4 *lb.* of *flesh* in *blood*, 27½ *lb.* in his *muscular substance, &c.*, and about 5 *lb.* of *nitrogenous matter* in the *bones.* These 37 *lb.* would be received in food in about eighteen weeks; or, in other words, that period might represent the time required for the change of the tissues, if all changed with equal rapidity, which is, however, not at all probable.

"All the *carbon* taken as food is not burned in the body, part of it being excreted with the waste matter. Supposing the respirations to be 18 per minute, a man expires about 8·59 *oz.* of *carbon* daily; the remainder of the carbon appearing in the excreted matter."

During his lecture, Dr. Playfair explained how the tables elucidated the various admixtures of food common to cookery, and how they might even be made to bear on certain national characteristics, which were in no small degree influenced by the aliments of different nations.

NUX VOMICA. Syn. *Koochla Nut, Poison do., Vomit do.; Nuces Vomicæ; Nux Vomica,*—Ph. L. E. & D. "The seed of *strychnos nux vomica*, Linn." (Ph. L.) This drug is chiefly known as a violent excitant of the cerebro-spinal system. In *small doses*, frequently repeated, it is tonic, diuretic, and, occasionally, laxative; in *slightly larger* ones, it is emetic; and, in *large doses*, it is an energetic and fearful poison. *Dose.* 1 to 5 or 6 gr.; in paralysis, nervous affections, impotence, chronic dysentery, chronic diarrhœa, &c. Its frequent use is *said* to render the system proof against the poison of serpents. See *Strychnia*, its active principle.

OAK. The common British oak is the *quercus rober* of Linnæus (*q. pedunculata,*—Willd.), and must be distinguished from the quercus sessiliflora, another variety of oak which is abundant in some parts of England, and is occasionally sold for it by the timber-dealers. The wood of the oak is more durable than that of any other tree, and "for at once supporting a weight, resisting a strain, and not splintering by a cannon shot, it is superior to every other kind." It, nevertheless, "warps and twists much in drying; and, in seasoning, shrinks about 1-32nd of its width." Foreign oak is less durable, but more brittle and workable. The bark (*oak bark; quercûs cortex; quercus,*—Ph. L. E. & D.) is used as an astringent and febrifuge, in *doses* of 15 to 30 gr., frequently; an astringent decoction is also made of it, but its chief employment is in tanning leather. The peculiar appearance of *old oak* or "*wainscoting*" is given to the new wood by exposing it whilst *very slightly* damp to the fumes of ammonia.

OAT. Syn. *Avena,*—Lat. The common cultivated oat is the *avena sativa* (Linn.), a gramineous plant, of which there are several varieties, as the *avena sativa alba*, or *white oat; a. s. nigra*, or *black oat;* the *potato oat*, &c. Other species are also cultivated, as *avena nuda* (Linn.), *pilcorn*, or *naked oat; a. strigosa*, or *Spanish oat*, *&c.* The seed (*oats; caryopsides, semina avenæ cruda*) form the common *horse-corn* of this country, but in the northern parts of the country it is extensively used as food for man. The husked grain constitutes *groats*, and its meal "*oatmeal.*" The latter does not form a dough with water, as wheaten meal or flour does.

Oats consist of from 24% to 28% of *husk*, and 74% to 78% of grain. According to M. Payen they contain of starch 60·59%; *azotized matter*, 14·39%; saccharine and gummy matter, 9·25%; fatty matter, 5·50%; cellulose, 7·06%; silica and saline matter, 3·25%. The *husk* contains between 6 and 7% of saline matter. (Prof. Norton.) The *ash* is 2·18%, and consists of potassa and soda, 26·18%; lime, 5·95%; magnesia, 9·95%; oxide of iron, 0·40%; phosphoric acid, 43·84%; sulphuric acid, 10·45%; chlorine, 0·26%; silica, 2·67%; alumina, 0·06%. (Johnston.)

The *yield* of *oats* is from 20 bushels per acre in *poor soils*, up to 60, 70, and even 80 bushels per acre in *rich soils*. The *weight* per bushel varies from 35 to 45 *lb.*, and the product in *meal* is about one-half the weight of the oats.

A large proportion of the oats given to horses passes off undigested. It has hence been proposed to prevent this loss, by either coarsely *bruising* them in a mill, or by pouring *boiling water* over them, and allowing them to macerate till cold, when they are to be given to the horses without straining off the water. It is stated on good authority, that oats thus treated will not only fatten quicker, but go twice as far as without preparation. The "*oat bruiser*" manufactured by the firm of Mary Wedlake and Co.,—the parties who so pertinaciously inquire through the medium of the public prints, "*Do you bruise your oats yet?*"—is unequalled for this purpose, and quickly reimburses the purchaser for the sum expended on it.

OATMEAL. Syn. *Avenæ Farina; F. ex Seminibus Avenæ*,—Ph. D. Of *thirty* samples of oatmeal examined by the 'Lancet Sanitary Commissioner,' no fewer than *sixteen* samples, or *more than one-half* were *adulterated.* The substance generally used for this purpose is *barley meal*, which is only half the price of oatmeal. That supplied to the army, navy, the workhouses, &c., is also very commonly adulterated with whiting, plaster of Paris, or ground bones. These frauds are readily detected by the microscope.

OBESITY. Syn. *Obesitas, Polysarcia*,—Lat. Unhealthy or troublesome fatness or corpulency. Sometimes the secretion of fat, and its accumulation in the adipose membrane, is almost as rapid as that of water in anasarca; on which account some of the old writers have called obesity a *dropsy of fat.* Persons in easy circumstances, of indolent habits, who live freely, and who are of a cheerful and contented disposition, are those most liable to obesity. The *treatment* consists in the *very gradual* reduction of the diet, until it falls rather below the average quantity required by a healthy adult; the *very gradual* disuse of fermented liquors, more especially beer; the *gradual* abridgement of the time devoted to repose, until it does not exceed 5 or 6 hours; the employment of several hours daily in exercise in the open air, at first moderate, but increased day by day in energy, until it becomes laborious; and, lastly, arousing the mind from a state of lethargy to one of active or even harassing employment.

In some few cases the accumulation of fat has been enormous. Bright, of Maldon, weighed 728 *lb.*; Daniel Lambert, of Leicester, 739 *lb.*; a girl, 4 years old, noticed in the 'Phil. Trans.,' 1813, weighed 256 *lb.*

Persons affected with obesity are generally short-lived.

OCHRES. These are native earthy compounds of clay, coloured with oxide of iron, with frequently a little chalk, or magnesia. The differences in the colour arise partly from the quantity of iron present, and partly from the state of oxidation in which the iron is found. Several varieties are known in commerce—*Brown ochre, French do., Oxford do., red do., Roman do., Yellow do.* All these, with the exception of the first and fourth, have a yellow colour. *Armenian bole, Indian red, Venetian do.*, and *Spanish brown*, are also ochres.

All the ochres are darkened by calcination. The *yellow ochres* acquire a red or reddish-brown colour by this treatment. The pigment called "*light red,*" is thus prepared from yellow ochre.

OD. The name given by Baron von Reichenbach to the peculiar force or power which he presumes to exist in light, heat, and electricity, in crystals, living persons, and in all material substances generally, of acting on the nervous system, and which forms a part of animal magnetism or mesmerism. This name he also employs as a termination; as *crystallod, biod, photod, &c.*; according to the assumed source of this power.

ODONTALGIA. See *Toothache.*

ODORAMENTS. Syn. *Odoramenta*,—Lat. Substances employed in medicine on account of their odour. They differ from disinfectants, in only disguising, but not destroying noxious vapours, &c. *Ammonia*, *strong vinegar*, and *pastilles*, furnish the most familiar examples of this class of substances. See *Disinfectants*, *Perfumes*, *&c.*

ODORINE. The name given by Unverdorben to one of the products of the rectification of the *volatile oil of bones.* It is basic, and has a highly empyreumatic odour.

ODOUR. The emanation of an odoriferous or scent-giving body. See *Perfumes.*

ŒDEMA. A swelling or puffiness, arising from water or serum collecting in the cellular membranes. It is a local or minor species of dropsy.

ŒNANTHIC ACID. *Prep.* By digesting *œnanthic ether* with a *hot solution of caustic potassa*, alcohol distils over, and a solution of *œnanthate of potassa* remains in the retort; this is decomposed by warm *dilute sulphuric acid*, and the oily liquid (*crude œnanthic acid*) which separates, is purified by repeated washings with *warm water.*

Prop., *&c.* An inodorous, oily liquid, having an acid reaction, and dissolving readily in spirit, and in alkaline solutions forming *alkaline œnanthates.* Below about 77° Fahr., it assumes a buttery consistence. See *Œnanthic Ether.*

ŒNANTHYLIC ACID. A peculiar compound, possessing acid properties, and an aromatic odour, obtained by Mr. Tilly, by the action of *nitric acid* on *castor oil.*

ŒNOTHIONIC ACID. See *Sulphovinic Acid.*

OFFICINAL. Syn. *Officinalis*,—Lat. A term applied to substances or medicines ordered in the Pharmacopœia.

OFFSET. A young sprout or bulb from the root of a plant, when removed for the purpose of propagation. One of the commonest and most successful methods of multiplying plants is by *Offsets.*

OIL COLOURS (in Cakes). *Prep.* The *colours* (which are the ordinary pigments used in oil) are ground to a proper consistence with *oil of turpentine* holding about $\frac{1}{6}$th of its weight of *gum mastic* in solution; the levigated mass is allowed to dry and harden; it is next placed on the stone over a slow charcoal fire, and ground with a mixture of 3 parts of *spermaceti* and 1 part of *poppy oil*, after which the whole is allowed to cool slowly, and when it has acquired a proper consistence is pressed into moulds, and set aside to harden.

OIL COLOURS (in Foil, Bladders, or Bottles). As the last, omitting the spermaceti, and reducing the consistence with *pale drying-oil.* Both of the above are *used* by artists; rubbed down with poppy, nut, or linseed oil, and turpentine as required.

OIL GAS. A mixture of several gaseous hydrocarbons, obtained by passing *oil* through red-hot tubes, or by allowing it to fall, in drops, on red-hot stones or bricks arranged in an iron retort, or other suitable apparatus. One gall. of *whale oil* yields 90 to 100 cubic feet of *gas*, which affords a more brilliant light than that given by coal-gas, and burns about three times as long. It further possesses the advantage of being free from sulphur, and hence, during its combustion, does not produce fumes or vapours containing *oil of vitriol*, which are so injurious to the lungs, and destructive to the colours and texture of delicate fabrics exposed to their action.

OILS. Syn. *Olea*,—Lat.; *Huiles*,—Fr. Oils are either compounds of carbon and hydrogen (*hydrocarbons*), or of carbon, hydrogen, and oxygen (*oxyhydrocarbons*), derived from the animal or vegetable kingdom, and are chiefly distinguished by a certain degree of consistence (*unctuosity*), insolubility in water, and power of supporting combustion with flame.

Oils are *divided* into two great classes,—*fixed* or *fatty oils*, and *volatile* or *essential oils.* Almond, castor, and olive oil, are examples of the *first*, and the oils or essences of bergamotte, lavender, lemons, and turpentine, of the *other.* The term *oil* is also rather loosely applied to various *empyreumatic products* of the distillation of organic bodies, and to several *unctuous mixtures* in *perfumery* and *pharmacy*, as well as by *liquoristes* to their richer cordials. (See *below.*)

OILS (Compound). See *Oils* (Medicated), *Oils* (in Perfumery), &c.

OILS (Drying). All the fixed oils have an attraction more or less powerful for oxygen, and, by exposure to the air, they either become hard and resinous, or they only thicken slightly, and become sour and rancid. Those which exhibit the first property in a marked degree, as the oils of linseed, poppy, rape, and walnut, are called *drying oils*, and are used as vehicles for colours in painting. The others are frequently termed *glutinous* or *non-drying oils.*

The *resinifying* or *drying property* of oils is greatly increased by boiling them, either alone, or along with some *litharge*, *sugar of lead*, or *white vitriol*, when the product forms the "*boiled oil*" or "*drying oil*" (*oleum dessicativum*) of commerce. The efficacy of the process, according to Liebig, depends on the elimination of substances which impede the oxidation of the oil. The following formulæ are adopted for this purpose:—

1. *Linseed oil,* 1 gall.; *powdered litharge,* ¾ *lb.*; simmer, with frequent stirring, until a pellicle begins to form, remove the scum, and when it has become cold and has settled, decant the clear portion. Dark coloured; used by house-painters.

2. *Linseed oil* and *water,* of each, 1 quart; *white vitriol,* in powder, 2 *oz.*; boil to dryness. Paler than the last.

3. *Pale linseed* or *nut oil,* 1 pint; *litharge* or *dry sulphate of lead,* in fine powder, 2 *oz.*; mix, agitate frequently for 10 days, then set the bottle in the sun or a warm place to settle, and decant the clear portion. Very pale.

4. *Linseed oil,* 100 gall.; *calcined white vitriol,* in fine powder, 7 *lb.*; mix in a clean copper boiler, heat the whole to 285° Fahr., and keep it at that temperature, with constant stirring, for at least one hour; then allow it to cool, in 24 hours decant the clear portion, and in 3 or 4 weeks more rack it for use. *Used* for varnishes.

5. (Liebig.) *Sugar of lead,* 1 *lb.*, is dissolved in *rain water,* ½ gall.; *litharge,* in fine powder, 1 *lb.*, is then added, and the mixture is gently simmered until only a whitish sediment remains; *levigated litharge,* 1 *lb.*, is next diffused through *linseed oil,* 2½ gall., and the mixture is gradually added to the *lead solution,* previously diluted with an equal bulk of *water;* the whole is now stirred together for some hours, with heat, and is, lastly, left to clear itself by exposure in a warm place. The *lead solution* which subsides from the oil, may be used again for the same purpose, by dissolving in it another *lb.* of *litharge,* as before.

6. (Wilks.) Into *linseed oil,* 236 gall., pour *oil of vitriol,* 6 or 7 *lb.*, and stir the two together for 3 hours; then add a mixturse of *fuller's earth,* 6 *lb.*; and *hot lime,* 14 *lb.*, and again stir for 3 hours; next put the whole into a copper, with an equal quantity of *water,* and boil for about 3 hours; lastly, withdraw the fire, and when the whole is cold, draw off the water, run the oil into any suitable vessel, and let it stand for a few weeks before using it. Patent.

7. Mix *nut* or *pale linseed oil* with about an equal measure of *snow* or *powdered ice,* and keep it for 2 months at a freezing temperature. *Used* by artists.

8. (Allg. Polytech. Zeitung.) *Binoxide of manganese* (in coarse powder, but not dusty), 1 part; *nut* or *linseed oil,* 10 parts; mix, and keep the whole gently heated and frequently stirred for 24 to 36 hours, or until the oil begins to turn reddish. Recommended for zinc paint, but is equally adapted for other purposes for which boiled oil is employed.

Obs. There is often a difficulty in obtaining the oils "*bright*" after boiling or heating them with the lead solutions;—the best way, on the *small scale,* is either to filter them through coarse woollen filtering paper, or to expose the bottle for some time to the sun or in a warm place. On the *large scale,* the finer oils of this kind are often filtered through Canton-flannel bags. The litharge and sulphate of lead used in the above processes, may be again rendered available for the same purpose, by washing them in hot water, to remove adhering mucilage.

OILS (Empyreumatic). Syn. *Olea Empyreumatica,*—Lat. Oily fluids obtained by the dry distillation of various animal and vegetable substances. When the *ingredients* are of a liquid or pasty nature, or become so when heated, they are usually mixed with about *twice their weight of sand, powdered glass,* or other like substance, to divide them, and thus expose them more effectually to the action of the fire. Care must also be taken to provide a well-cooled receiver, which must be furnished with a tube to carry off the non-condensable gases liberated at the same time as the oil. The *products of the first distillation* are generally *purified* by rectification, either alone, or along with *water.* In general they require to be preserved from the light and air.

The following are principal substances belonging to this class:—

Oil of Aloes, Aloetic Oil; Oleum Aloeticum,—Lat. 1. From *socotrine* or *hepatic aloes* distilled along with *sand.*

2. (*Batavian,*— Cadet de Gassicourt.) *Olive oil,* 1 ℔; *hepatic aloes* and *myrrh,* of each, in powder, 2 oz.; *olibanum,* ½ oz.; distil in a sand-bath, from a stone-ware retort. *Used* as an external vermifuge for children; a portion is rubbed 2 or 3 times a day over the umbilical regions.

Oil of Amber; Oleum Succini,—Lat. From *coarse pieces* of *amber* distilled in an iron retort, either alone, or reduced to powder and mixed with *sand.* The oil is separated from the *fœtid liquor* and *succinic acid* which passes over, and rectified along with about 6 times its volume of *water,* by a gentle heat. It then forms "*rectified oil of amber*" (*oleum succini,*—Ph. L. 1836, *o. s. rectificatum,*—Ph. D. 1826, *o. s. purissimum,* Ph. E. 1841.) *Prod.* 20%.

Prop., &c. It has a pale yellow colour; a strong, ungrateful odour; and a hot acrid taste; heat and air blacken and thicken it; it boils at 186° Fahr. Sp. gr. 0·758 at 75° Fahr. It is antispasmodic, rubefacient, and stimulant. *Dose.* 5 to 12 drops, made into an emulsion with mucilage; in hysteria, epilepsy, and convulsive affections. *Externally,* as a friction, either alone or combined with laudanum or sweet oil, in rheumatism, tic douloureux, hooping-cough, &c.

Oil of Amber (Oxygenized); *Oleum Succini Oxydatum,*—Lat. See *Factitious Musk.*

Animal Oil (Fœtid or Empyreumatic); *Oil of Hartshorn, Dippel's Oil; Oleum Animale Empyreumaticum, Ol. Cornu Cervi, Ol. Dippelii,*—Lat. Chiefly obtained as a secondary product in the manufacture of bone-black. Fœtid and dark coloured. *Used* chiefly to make *lamp black.* (See *below.*)

Animal Oil (Ethereal); *Rectified Oil of Hartshorn; Oleum Animale Æthereum, Ol. Cornu Cervi Rectificatum, Loco Olei Animalis Dippelii,*—Lat. 1. A finer kind of animal oil made by slowly distilling *oil of hartshorn,* and collecting only the first portion that comes over. Pale and limpid. Exposure to light discolours it.

2. (Ph. Bor.) *Fœtid animal oil* distilled in a sand-bath, and the product rectified with *four times* its volume of *water.* White, limpid, fragrant. Light discolours it.

Prop., &c. Antispasmodic, anodyne, and diaphoretic. *Dose.* 5 to 30 drops, in water; in large doses, it acts as an irritant poison. According to Unverdorben it contains *four* distinct salifiable bases,—*ammoline, animine, odorine,* and *olanine.*

Oil of Asphaltum; Oleum Asphalti,—Lat. From *powdered asphaltum, washed sand,* and *dry salt,* equal parts; the product is *rectified,* as before. Stimulant; closely resembles mineral naphtha.

Oil of Benzoin, Oil of Benjamin; Oleum Benzoini,—Lat. From the *residuum* of the *process of making benzoic acid.* It is *used* to dress mock Russia leather.

Oil of Birch; Oleum Betulæ,—Lat. From the *inner bark* of the *birch,* by heating it in an earthen pot with a hole in the bottom, to allow the oil to flow through into another jar sunk in the ground and luted to it. Thick, balsamic, fragrant. *Used* chiefly to dress Russia leather.

Oil of Bones (Empyreumatic); *Oleum Ossium,*—Lat. See *Animal Oil.*

Oil of Box-wood; Oleum Buxi, Ol. B. Empyreumaticum,—Ph. L. 1746. From *box-wood sawdust.* Reputed resolvent; anodyne, antispasmodic, and diaphoretic. *Dose.* 5 to 20 drops; in convulsions, epilepsy, gonorrhœa, &c. *Externally,* in toothache, &c.

Oil of Bricks; Oleum Lateritium,—Ph. L. 1746. From *olive oil,* mixed with *brick dust,* and distilled; or, from *hot bricks* steeped in *olive oil,* then broken to pieces, and distilled.

Oil of Bricks (Factitious); *Oleum Lateritium Factitium,*—Lat. From *linseed oil,* 1 *lb.; oil of turpentine,* ½ *lb.; oil of bones* or of *hartshorn,* and *Barbadoes tar,* of each, 1 *oz.;* simply stirred well together. This is generally substituted for the preceding in the shops.

Oil of Cade; Oleum Cadinum,—Lat. *Huile de Cade,*—Fr. From the *juniperus oxycedrus* or *Languedoc juniper.* Used as oil of tar, which is commonly sold for it.

Oil of Coal, Coal Oil. From the gasworks. See *Naphtha.*

Oil of Earthworms; Oleum Lumbricorum Empyreumaticum,—Lat. From *linseed oil, earthworms,* and *dry sand,* equal parts. Now obsolete. See *page* 856.

Oil of Guaiacum; Oleum Guaiaci, Ol. G. Empyreumaticum,—Lat. From *guaiacum shavings* or *raspings.* Reputed balsamic, pectoral, and resolvent.

Oil of Hartshorn. Bone oil and rectified bone oil are commonly sold for it, but are inferior to it. See *Animal Oil.*

Oil of Hemlock (Empyreumatic); *Pyroconia, Oleum Conii Empyreumaticum,*—Lat. From the herb. Does not possess the narcotic properties of the plant.

Oil of Lettuce (Empyreumatic); *Oleum Lactucæ Empyreumaticum,*—Lat. From *garden lettuce* (lactuca sativa).

Paper Oil, Rag Oil; Pyrothonide; Oleum Chartæ,—Lat. On the *small scale* by burning *paper* on a cold tin-plate, and collecting the oil; on the *large scale,* by the destructive distillation of *paper* or *linen rags.* In baldness, tooth-ache, ear-ache, &c.

Rag Oil. See *above.*

Rock Oil. See *Naphtha* and *Petroleum.*

Oil of Soot; Oleum Fuliginis,—Ph. L. 1746. From *wood soot.* Fœtid; reputed antispasmodic and nervine.

Oil of Tar, Spirit of do.; Oleum Pini, O. P. Rubrum, O. Tædæ; O. Picis Liquidæ,—Lat. By simple distillation from *wood-tar.* Reddish and strong scented. By one or more rectifications it becomes colourless and limpid. It soon gets thick. *Used* in ringworm and several other skin diseases, made into an ointment with lard. It is *poisonous* if swallowed in large doses.

Oil of Tobacco (Empyreumatic); *Oleum Tabaci Empyreumaticum,*—Ph. U. S. From *tobacco*, in coarse powder, gradually heated in a green-glass retort to dull redness, and kept at that temperature as long as any oil passes over; the oily portion is then separated from the water in the receiver, and kept for use. Highly narcotic and poisonous.

Oil of Wax; Oleum Ceræ,—Lat. From *bees' wax* and *sand* distilled together; the product is rectified once or oftener. Reputed diuretic. *Dose.* 3 to 6 drops.

OILS (Fixed). Syn. *Fat Oils, Unctuous do.; Olea Fixa, Olea Expressa*,—Lat. *Huiles Grasses*,—Fr. The fixed oils are compounds of carbon, hydrogen, and oxygen (*oxyhydrocarbons*) obtained from the organic kingdom, and characterised by their insipidity, unctuosity, insolubility in water, and being lighter than that fluid. *Olive oil*, which is obtained from the *vegetable* kingdom, and *spermaceti oil*, which is obtained from the *animal* kingdom, may be taken as types of the rest.

The *fixed oils* are chiefly found in the *fruit* and *seeds* of *plants*, and in thin membranous cells, forming what is called the adipose tissue, in the *bodies of animals.* According to their consistence, they may be classed into *oils*, *butters*, and *tallows.*

Prop., *&c.* Among the *best known-properties* of the *fixed oils* are—the permanent stain they give to paper, which they render translucid; their non-volatility at the ordinary temperature of the atmosphere, or at that of boiling water, or indeed, at any temperature insufficient for their decomposition; their constantly floating on the surface of water when added to it; and, lastly, their great repugnance to mix with that fluid. Some of them, as *palm oil*, and *cocoa-nut oil*, are solid at ordinary temperatures; but the majority are fluid, unless they have been considerably cooled, when they separate into *two portions*,—the one *solid*, consisting chiefly of *stearine*, and the other *liquid*, consisting chiefly of *oleine.* Nearly all of them, when exposed to the air absorb oxygen rapidly, and either gradually harden, or become rancid and nauseous. From the *first* are selected the *drying oils* used by painters; the *last* are used as food, in cookery, and for machinery, lamps, &c. The whole of these oils, when heated to the boiling-point (500° to 600° Fahr.) suffer decomposition, yielding various hydrocarbons; and when suddenly exposed to a red heat, they furnish a gaseous product (*oil gas*), which was formerly employed for illumination. It is owing to this property of oil and liquid fats, that candles and lamps give their light. The wick is a *gas-producing apparatus* in miniature. With the caustic alkalies and water, the fixed oils unite to form *soap.* When some of these oils are absorbed by porous bodies, and thus expose a vastly increased surface to the air, they absorb oxygen with such rapidity as to generate a considerable degree of heat. Paper, tow, cotton, wool, straw, shavings, &c., slightly embued with oil, and left in a heap, freely exposed to the air or sun, often spontaneously inflame. In this way many extensive fires have arisen. The above is more particularly the case with *linseed*, *rape*, *nut*, and *olive oil.* The first, made into a paste with manganese, rapidly becomes hot, and ultimately inflames spontaneously.

"When oil is distilled, as soon as it begins to boil, a large quantity of gas is disengaged, consisting of a mixture of *carburetted hydrogen* and *oxide of carbon.* The *first product* of the distillation is a yellow-coloured, very odorous substance, of a moderate consistence, very soluble in alcohol, reddening strongly the tincture of litmus, and forming a true soap with dilute liquor of potassa. It may be regarded as a mixture of the acetic, sebacic, oleic, and margaric acids, empyreumatic oil, a volatile oil slightly odorous, and a peculiar volatile matter, very fetid, not acid, soluble in water; and which excites coughing and tears in the operator when the receiver is opened. The *second product* is a light-green fluid, which becomes brown on exposure to the air; has a slight empyreumatic odour, but does not excite coughing or tears. It does not redden tincture of litmus; alcohol, even when aided by heat, dissolves a very small portion only of it, and it is not affected by potassa. It burns like an essential oil, and is volatilized, without change, in close vessels. The *third product* is an orange-red, solid, transparent substance, inodorous and insipid; breaking with a waxy fracture, melting at a heat above 212° Fahr.; and dissolving in hot alcohol, from which it is precipitated unaltered on cooling. Ether is its proper solvent. (*Ann. de Chim. et de Phys.* xxx, 1—20.)

The *specific gravities* of the fixed oils range between 0·865 and 0·970, water being 1·000.

Prep. The *fixed oils*, except where otherwise directed, are obtained from the *bruised* or *ground fruit* or *seed*, by means of powerful pressure, in screw or hydraulic presses, and are then either allowed to clarify themselves by subsidence, or are filtered. Both methods are frequently applied to the same oil. In *some cases* the impurities are removed by ebullition with water, and subsequent separation of the pure oil. Heat is frequently employed to increase the liquidity of the oil, and thus lessen the difficulty of its expulsion from the mass. With this object the bruised mass, placed in bags, is commonly exposed to the heat of steam, and then pressed between heated plates of metal. This is always necessary with the butyraceous oils.

Another method is by boiling the *bruised seed* in water, and skimming off the oil as it rises to the surface. This is the plan adopted for castor oil in the West Indies.

In a few cases, for medicinal purposes, the *bruised mass* is mixed with ½ its weight, or an equal weight of *alcohol* or *ether*, and after 24 hours' digestion, the whole is submitted to pressure, and the alcohol or ether removed by distillation at a gentle heat. The first menstruum is commonly employed for *croton oil* on the Continent; the second, for that of *ergot of rye.*

Purif. Several methods are adopted for *refining* or *purifying oils*, among which are the following:—

1. The *oil* is violently agitated along with 1½ to 2% of *concentrated sulphuric acid*, when it assumes a greenish colour, and after about a fortnight's repose, deposits much colouring matter, becomes paler, and burns with greater brilliancy, particularly if well washed with *steam* or *hot water*, and clarified by subsequent repose, or by filtration. This answers well for most of the recently expressed *vegetable oils.* It also greatly improves most of the *fish oils.*

2. A modification of the last method, is to well mix the *acid* with the *oil*, then to "blow" *steam* through the mixture for some time, and afterwards to otherwise proceed as before.

3. Fish oil (*whale*, *seal*, *&c.*) is purified by—

a. Violently agitating it with *boiling water* or *steam*, by placing it in a deep vessel with a perforated bottom through which *high-pressure steam* is forced for some time; it is afterwards clarified by repose, and filtered through *coarse charcoal.*

b. The *oil* is violently agitated with a boiling hot and strong *solution of oak bark*, to remove albumen and gelatine, and next with *high-pressure steam* and *hot water;* it is, lastly, dried and filtered.

c. The *oil*, gently heated, is stirred for some time with about 1% of good *chloride of lime*, previously made into a *milk* by trituration with *water;* about 1½% of *oil of vitriol*, diluted with 20 times its weight of *water*, is then added, and the agitation renewed and maintained for at least 2 hours; it is, lastly, well washed with *steam* or *hot water.*

d. Mr. Davidson treats the oil, first with a *strong solution of tan*, next with *water* and *chloride of lime*, then with *dilute sulphuric acid*, and, lastly, with *hot water.*

e. Mr. Dunn's method, which is very effective, and admirable on account of its simplicity, is to heat the *oil* by steam to from 180° to 200° Fahr., and then to force a *current of air* of corresponding temperature through it, under a flue or chimney, until it is sufficiently bleached and deodorized; it is, *lastly*, either at once filtered or is previously washed with *steam* or *hot water.*

f. Another method, formerly very generally adopted and still in use, is to violently agitate the *oil* for some time with very strong *brine*, or with a mixed *solution of blue vitriol* and *common salt*, and then either to allow it to clarify by repose, or to filter it through *freshly burnt charcoal.*

4. *Almond*, *castor*, *linseed*, *nut*, *olive*, *rape*, and some other *vegetable oils*, are readily bleached by either—

a. Exposure in glass bottles to the *sun's rays*, on the "leads" or roofs of houses, or in any other suitable position, open to the south-east and south. This is the method employed by *druggists* and *oilmen* to whiten their *castor* and *linseed oils.* 14 to 21 days' exposure to the sun in clear weather during summer is usually sufficient for *castor oil* when contained in 2 to 4-quart pale green-glass bottles (preferably the former), and covered with white gallipots inverted over them. The oil is filtered before exposing it to the light, as, if only in a slight degree opaque, it does not bleach well. Almond and olive oil, are when thus treated, apt to acquire a slight sulphurous smell; but this may be removed by filtration through a little *animal charcoal*, or still better, by washing the oil with *hot water.*

b. Another method employed to decolour these oils is to heat them in a *wooden*, *tinned*, or *well-glazed earthen vessel* along with some dry *filtering powder* (1 to 2 *lb.* per gall.), with agitation for some time, and, lastly, to filter them in the usual manner through an *oil-bag.* In this way the West-end perfumers prepare their "*white almond oil*" (*oleum amygdalæ album*), and their "*white olive oil*" (*oleum olivæ album*). Formerly, *freshly burnt animal* was used for this purpose, and is still so employed by some houses.

5. Mr. Bancroft refines *oils* for *machinery* and *lubricating purposes* generally, by agitating them with a *lye* of *caustic soda* of the sp. gr. 1·2. A sufficient quantity is known to have been added when, after repose, a portion begins to settle down clear at the bottom. About 4% to 8% is commonly required for *lard oil* and *olive oil.* After 24 hours' repose, the clear supernatant oil is decanted from the soapy sediment, and filtered.

6. Not only the *oils* above referred to, but *all* other *oils* and *fats* may be rendered perfectly colourless by the use of a little *chromic acid;* or, what is the same, by a *mixture* of a *solution of bichromate of potassa* and sufficient *sulphuric, hydrochloric,* or *nitric acid,* to seize on all the alkali, and thus liberate the chromic acid.

7. *Palm oil* and *cocoa-nut oil* are generally refined and bleached by either chromic acid or chlorine, or by heat:—

a. The *butyraceous oil* is liquefied by heat in a wooden vessel, and 7% to 9% of good *chloride of lime,* previously made into a smooth cream with *water,* is added, and the whole assiduously stirred until the ingredients appear united; the mixture is then allowed to cool, and is next cut up into small lumps, which are exposed to a free current of air for 2, 3, or even 4 weeks; these are melted in a *wooden vessel* heated by high pressure steam circulating through *leaden pipes,* or in a cast-iron boiler lined with *lead,* and an equal weight of *oil of vitriol* (diluted with about 20 times its weight of water) is poured in, and the whole gently boiled until the oil is decoloured and runs clear; the fire is then moderated, and the whole allowed to settle; lastly, the fire is removed, and the oil is left to cool very slowly.

b. The process with *chromic acid* has been already noticed, but is more fully explained *below.*

c. The *oil* heated to the temperature of about 250° Fahr. is exposed to the action of *high-pressure steam,* which is continuously "blown" through it for 10 or 12 hours, or even longer. The process is greatly facilitated by the introduction of some *chromic acid.*

8. Mr. Watt's *methods* of *purifying fats* and *oils* are very effective, more especially for those intended for illumination. They are as follows:—

a. (For *fish oils.*) Each ton is boiled for ½ an hour with *caustic soda,* ½ *lb.,* previously made into a *weak lye* with *water;* or steam is blown through the mixture for a like period; *oil of vitriol,* ½ *lb.,* diluted with 6 times its weight of *water* is next added, the whole again boiled for 15 minutes, and allowed to settle for an hour or longer, when the clear oil is run off from the water and sediment into the bleaching tubs; here *solution* of *bichromate of potash,* 4 *lb.,* in *oil of vitriol,* 2 *lb.,* previously diluted with *water,* q. s., together with a little *nitric acid,* and some *oxalic acid,* are added, and after thorough admixture of the whole by blowing steam through it, *strong nitric acid,* 1 *lb.,* diluted with *water,* 1 quart, is poured in, and the boiling continued for ½ an hour longer; a *small quantity* of *naphtha* or *rectified spirit of turpentine* is then mixed in, and the oil is, finally, well washed with *hot water,* and left to settle.

b. (For *palm oil.*) The *oil* is melted by the heat of steam, and after it has settled and cooled down to about 130° Fahr., is carefully decanted from the water and sediment into the steaming tubs; here a *mixture* of a *saturated solution of bichromate of potash,* 25 *lb.,* and *oil of vitriol,* 8 or 9 *lb.,* is added, and after thorough admixture, *hydrochloric acid,* 50 *lb.,* is poured in; the whole is then constantly stirred until it acquires a uniform greenish colour, or is sufficiently decoloured, a little more of the bleaching materials being added if the latter is not the case, after which it is allowed to repose for half an hour to settle; it is next run into a wooden vat, where it is washed, &c., as before.

c. (For *vegetable oils.*) These are treated with a *solution of chromic acid,* or with a *solution of bichromate of potassa,* or some *mineral acid,* as noticed at (6). For *colza, linseed, mustard, nut,* and *rape oil,* a little *hydrochloric acid* is added; but for *almond, castor, olive oil,* and *poppy oil,* no such addition (at least in excess) is required.

9. *Rancid oils* and *fats* are *recovered* by boiling them for about 15 minutes with a little *water* and *calcined magnesia;* or, by filtering them through *freshly burnt charcoal.*

In reference to the above processes, it may be useful to remark, that *chlorine,* the common bleacher and deodorizer of other substances, cannot be well employed directly in the purification of oils, as certain chemical reactions occur when these substances are brought together, which increase the colour, instead of removing it, and are often otherwise injurious. The same remarks apply to the use of the *chlorides,* which frequently fails in unskilful hands, and is, indeed, of questionable utility, except, perhaps, in the case of palm oil. Even *charcoal* exerts little of its usual energy on the oils, and whilst it removes or lessens their offensive odour, sometimes increases their colour. The addition of 1% or 2% of very pure and recently rectified *naphtha* or *oil of turpentine* (camphine) to lamp oil is a real improvement, since it increases its combustibility and its illuminative power.

Oils for *medical purposes*, as castor oil, cod-liver oil, &c., must not be subjected to any process beyond mere clarification by subsidence, filtration through Canton flannel or porous paper, or, at the utmost, washing with warm water, as otherwise their active and valuable properties, if not wholly removed, will be considerably lessened. See *Filtration.*

Pur. The *fixed oils* vary greatly in their *value*, and hence the constant inducement which leads the unprincipled dealer to adulterate the more expensive ones with those of a similar character, but of an inferior kind or grade. Various methods are adopted to detect these frauds, among which the following are the most valuable of those capable of general application. Others referring to individual oils will be found under the respective heads.

1. (From the *Odour.*) The method of applying this test, is to *heat* a few drops of the *oil under examination* in a small *porcelain, platinum,* or *silver spoon* or *capsule* (a *watch-glass* answers well), and to carefully compare the odour evolved with that arising from a known pure sample of the same kind and quality of the oil similarly treated. The odour of the two, when each is pure, is precisely alike, and immediately suggests the plant or animal from which it has been obtained. The presence of *linseed, nut, rape, seal, train,* or *whale oil,* is thus readily detected, and the imperfections of the sample, even if pure, rendered much more perceptible.

2. (From the *Density.*)—*a.* According to M. Penot, *every oil* supposed to come from the *same plant*, or the *same animal*, has *its own particular density*, which, at the same temperature, *never deviates* more than a *few thousandths.* To apply this test, the relative density or specific gravity of the sample must be determined. This may be done by means of a *thousand-grain bottle* or an ordinary *areometer;* or, more conveniently, by an *elaïometer* or *oleometer* constructed and graduated for the purpose. Fischer's *elaïometer* or *oil-balance* is much employed on the Continent for this purpose, and is a very useful instrument. On the *large scale*, the weight of an *accurately-measured* imperial gallon of the oil may be taken.

b. M. Laurot, an eminent Parisian chemist, a short time since observed that, the variations of the density of an oil from adulteration is rendered much more apparent when it is examined in a heated state. To render this discovery practically available, he plunges an *elaïometer*, graduated for the given temperature, into a *small tin cylinder* nearly filled with the *oil*, and then places this in a vessel containing *boiling water;* as soon as the whole has acquired a uniform temperature, he observes the point on the scale of the instrument at which it floats. This point for

colza oil is	0°
fish oil	83°
poppy oil	124°
hempseed oil	136°
linseed oil	210°

c. By employing a *specific-gravity bottle* or *small glass globe*, fitted with a *stopper* in which is hermetically fixed a *capillary tube* of about 8 or 9 inches in length, we may apply the above principle of M. Laurot with the greatest accuracy. This little apparatus is filled with the *oil*, and then immersed in *boiling water* for a sufficient length of time for it to acquire that temperature; it is then removed and weighed. The smallest adulteration is in this way immediately detected.

When the *density of the given sample* has been taken, and the name of the oil used to adulterate it is known, the quantity of the latter present may be approximatively determined from the specific gravities by the common method of alligation. (See *page* 799.)

3. (*Sulphuric acid Test.*)—*a.* Heidenreich was the first person who gave a useful and general application to the reactions which occur when *oil of vitriol* is mixed with the *fatty oils.* As soon as these substances are placed together, very intense chemical action commences, the temperature of the mixture rises, and the mass becomes coloured. These changes are sufficiently varied in the case of the different oils to furnish us with the means of identifying many of them, and of determining their purity. The *method* of M. Heidenreich is to lay a *plate of white glass* over a sheet of *white paper;* on the glass he places 10 or 15 *drops of oil,* and then adds to it a *small* drop of *concentrated sulphuric*

acid (oil of vitriol). The appearances which follow differ with the character of the fatty oil examined, and whether the acid is allowed to act on the oil undisturbed (*without stirring*), or the two are *stirred* together with a glass rod. In many cases, as with tallow oil, a *peculiar odour* as well as a change of colour is developed, and a further means of detection supplied. M. Heidenreich has minutely described these reactions, which, for the most part, closely resemble those given in the table p. 485. It is necessary, however, in order to ensure great accuracy, to compare the effects of the reagent on the sample, with those which it produces on pure oil of the same kind and character under precisely similar circumstances.

b. M. Penot, who has followed up the researches of M. Heidenreich with considerable success, recommends the employment of 20 *drops of oil*, instead of only 10 or 15; and the use of *a small capsule* of *white porcelain*, instead of a plate of glass. He also employs a *saturated solution of bichromate of potash* in *sulphuric acid*, which he uses in the same proportion as before; but in this case, the *oil* and the *reagent* are always stirred together.

The observations of M. Penot have been repeated in many cases by ourselves, and the results, with additions, and re-arranged, are given in the *table* opposite.

"By perusing this table, it will be observed that the same oil does not, under all circumstances, yield precisely similar results with the same reagent. This depends on the place of their growth, their age, and the manner of pressing. If, however, any oil be examined comparatively with a perfectly pure one, the proof of adulteration may be rendered, if not certain, at least probable, by noting the difference. Thus I obtained, by adding 1 part of either whale-train or linseed oil, or oleic oil, to 10 parts of rapeseed oil, the following results:—

Name of oil.	Reagents.		
	Sulphuric Acid.		Solution of Bichromate of Potash.
	Not Stirred.	*Stirred.*	*Stirred.*
Rape oil with whale-train oil	More red ground than with rape oil	Brownish-olive coloured	Small reddish lumps on a gray ground
Rape oil with linseed oil	No perceptible difference from the rape oil	Olive coloured	Small and more numerous red lumps on a very dark-green ground
Rape oil with oleine or oleic acid	No perceptible difference from the rape oil	Greenish-brown	Small brownish lumps on an olive-coloured ground

"The adulteration being ascertained as far as is possible, the oil is then tested by endeavouring to discover the adulterating oil, either by reagents, or by its odour when gently heated, as before described. This having been found out, small quantities of the suspected oil are added to a perfectly pure oil of the kind under examination. Every mixture is then tested by the reagents, until precisely similar results are obtained as those yielded by the oil under examination. Thus the proportions of the two mixed oils will be discovered by approximation." (M. Penot.) A *simpler method* of finding the *proportions* of the so mixed oils is referred to above.

4. (*Increase of Temperature.*) M. Maumené proposed the increase of temperature arising from the admixture of *mono-hydrated sulphuric acid* (oil of vitriol, sp. gr. 1·845) with the fatty oils as a test of their purity, but a sufficient number of observations have not yet been made to furnish data for a general application of this method. According to MM. Faisst and Knauss, who have lately re-examined the subject, the following are the results when 15 *grammes of oil* are mixed with 5 *grammes of the acid:*

	Rise of Temperature.
Almond oil	72.5°
Olive "	68·0°
Poppy "	127·0°
Rape or colza oil	100·0°
Linseed oil (*with Nordhausen* or *fuming acid only*) . . .	133·0°

The above method is less liable to error

Action of one drop *of the* REAGENT *on* twenty drops *of* OIL.

Name of Oil.	Reagents.		
	Sulphuric Acid.		Saturated Solution of *Bichromate of Potash* in Sulphuric Acid.
	Not stirred.	*Stirred.*	*Stirred.*
Almond oil	Greenfinch-yellow, with orange spots	Dirty green	Yellowish, small lumps
Castor oil	Yellow, with slight spots	Little reaction	Slightly green
*Cod-liver oil	Deep purple in the centre, rapidly turning brown, whilst violet or purple clouds or streaks spread out towards the circumference, the colour of which remains unaltered for some minutes after the central portion has turned nearly black	Deep purple, passing into purple-brown, reddish-brown, and gradually deepening to an intense brown, approaching black	Reddish-brown clots, changing to a clear bright-green
Hemp-seed oil	Small brown lumps or clots on a yellow ground	Greenish brown	Small yellow lumps or clots on a green ground
Linseed oil (*from the Upper Rhine*)	Dark reddish-brown	Brown small lumps on a gray ground	Brown small lumps, on an almost colourless ground
,, (*from Paris*)	Reddish-brown, less dark coloured	Brown clots on a green ground	Brown small lumps on a green ground
,, (*English*)	Chestnut-brown	Brown clots on a greenish-gray ground	Brown lumps on a greenish-gray ground
Liver train-oil	Dark red	Dark red	Dark red
Madia-sativa oil	Slightly reddish-brown underneath a thin grayish film	Olive green	Light-brown small lumps on an olive-coloured ground
Black-mustard oil	Bluish green	Olive green	Olive brown
Neatsfoot oil	Yellow slight spots	Dirty brown	Brown spots on a brownish ground
Nut oil (*recent*)	Yellowish brown	Clotted, dark-brown	Small brown lumps or clots
,, (*one year old*)	Yellow	Dirty brown, less dark-coloured	Small brown lumps
,, (*still older*)	Orange yellow	Dirty brown	Small brownish lumps
Oleine, oleic acid, lard, or tallow-oil	Reddish spots, with reddish circles	Reddish brown	Bright chestnut-colour
Olive oil	Yellow	Dirty brown	Olive brown
,, (*another sample*)	Orange yellow	Brownish gray	Brown
,, (*from fermented olives*)	Orange yellow	Brownish gray	Brown
Poppy oil (*recent cold drawn*)	Yellow spots	Olive brown	Small yellow lumps on a white ground
,, (*recent*, expressed with slight heat)	Greenish-yellow spots	Olive brown, turning more on the green	Small yellow lumps on a greenish-gray ground
,, (*one year old, expressed with heat*)	Greenish spots	Olive green	Small yellow lumps on a green ground
Rape or colza oil (*trade*)	Yellowish-brown streaks surrounded by a bluish-green ring	Brownish, turning on the olive green	Yellow small lumps on a green ground
,, (*recent*)	Green	Bluish green	Yellow small lumps on a green ground
,, (*one year old*)	Green	Bluish green	Yellow lumps on a brighter green ground
,, (*one year old, rough hot-pressed*)	Green	Olive green	Small yellow lumps, more numerous, on an olive-green ground
Whale train-oil	Small reddish lumps on a brownish ground	Resembles wine-lees	Small bright chestnut-coloured lumps on a brown ground.

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* Finest sample of *pale oil* (*oleum morrhuæ*,—Ph. L.), prepared by Messrs. Chas. Fox & Co., of Newfoundland. *Dorse oil*, and other *fish oils* sold under the name of "*light-brown cod-liver oil*," exhibit much slighter reactions, which closely resemble those of *liver-train* and *whale-train oil*.

when a larger quantity of the substances are thrown together.

5. The *presence* of *fish oil* in the *vegetable oils* may be readily detected by passing a *stream of chlorine* through them; the pure vegetable oils are not materially altered, but a mixture of the two turns dark-brown or black.

The *following* are the *principal fixed oils* met with in *commerce*, or which are objects of interest or utility:—

Oil of Almonds; Oleum Amygdalæ,—Ph. L. *Ol. Amygdalarum,*—Ph. D. *Ol. Amygdali Communis,*—Ph. E. "The oil expressed from the kernels." (Ph. L.) "Bruise the fresh almonds in a stone mortar, then put them into a hempen sack, and express the oil, without heat." (Ph. E.) The *oil of almonds* of *commerce* is obtained from either the *bitter* or *sweet almond*, but chiefly from the first, on account of their less value, and the marc being employed in the manufacture of essential oil.

Prop., &c. Oil of almonds is bland, demulcent, emollient, and nutritious; possesses a purely oleaginous taste, and is one of the most agreeable of the fixed oils; when taken in quantity it is mildly laxative; it is little affected by cold, and congeals with difficulty; is soluble in 25 parts of cold, and 6 parts of boiling alcohol; ether dissolves it freely. Sp. gr. 0·915 to 0·918. *Av. Prod.* Sweet almonds, 46%; bitter do., 41%.

Pur. It is extensively adulterated with *poppy*, *nut*, and *teel oil*, and not unfrequently with *refined rape* or *colza oil*. (See *above*.)

Oil of Appleseed. From the "pips" of the *fruit* of any of the numerous species of *pyrus malus* (Linn.) Resembles poppy oil.

Oil of Bay, Expressed do. do.; *Oleum Lauri, Ol. Laurinum,*—Lat. 1. By expression from either *fresh* or *dried bay-berries*, as castor oil. Limpid; insipid.

2. (*Oil of Bay*, by decoction; *Butter of do.; Oleum Lauri Nobilis, Ol. L. Verum,*—Lat. From the *berries*, by *boiling* them in *water*, and skimming off the oil. Green, buttery; chiefly imported from Italy. *Used* by the vulgar in bruises, sprains, rheumatism, deafness, &c. *Prod.* 20%.

Oil of Beech; Oleum Fagi,—Lat. From the *nuts* of *fagus sylvatica* (Linn.) or *beech mast*. Clear; keeps well; when washed with hot water it is used for salads, and burnt in lamps. Sp. gr. 0·9225. *Prod.* 16%.

Oil of Belladonna; Oleum Belladonnæ Seminum, O. B. Baccæ,—Lat. From the *seeds* or *berries* of *atropa belladonna* or *deadly nightshade*. Yellow; insipid. *Used* for lamps in Swabia and Wurtemburg, and as an application to bruises. The *marc* is *poisonous*. It freezes at 34° Fahr. Sp. gr. 0·9250.

Oil of Ben, Oil of Behen; Oleum Balatinum. From the *seed* or *nuts* of *moringa aptera* and *m. pterygosperma* (ben nuts). Scentless, colourless; keeps long without growing rank; by standing it separates into two parts, one of which freezes with difficulty, and is hence much used in perfumery.

Oil of Cacao, Butter of do.; Oleum Cacao Concretum, Butyrum Cacao,—Lat. From the seeds of *theobroma cacao*, or *chocolate nuts*, gently heated over the fire, and then decorticated, and pressed between hot iron plates. Sp. gr. 0·892.

Oil of Camelina. From the *seeds* of *camelina sativa* or *wild gold of pleasure* (sesamum seeds). Drying. Sp. gr. 0·9252.

Oil of Carapa; Oleum Carapæ,—Lat. From the *fruit* of *carapa guianensis*. Rubefacient, vermifuge. *Used* to make the hair grow, &c.

Castor Oil; Oleum Castorei; Ol. Ricini,—Ph. L. E. & D. *Oil of Palma Christi, Ol. de Kerva, Ol. Kervinum,*—Obs. var. "The oil prepared by heat, or by pressure, from the seed" of "*ricinus communis*, Linn." (Ph. L.) or *Mexican oil-bush*.

The *best* castor oil (*cold-drawn castor oil; oleum ricini sine igne*) is *prepared* by pressing the *shelled* and *crushed fruit* (seed) in hemp bags, in an hydraulic press, and heating the oil thus obtained along with *water* in *well-tinned* vessels, until the water boils, and the albumen and gum separate as a scum; this is carefully removed, and the oil, as soon as it has become cold, is filtered through *Canton flannel*, and put into canisters. The *commoner kinds* are prepared by gently heating the *crushed seeds*, and pressing them whilst hot. *Another method*, sometimes adopted, is to put the *crushed seed* into loose bags, to boil these in *water*, and to skim off the floating oil.

Prop. It is the most viscid of all the fixed oils; when pure, it mixes in all proportions with alcohol and ether, and also dissolves, to a certain extent, in rectified spirit, but a portion of the oil separates on standing. Camphor and benzoic acid increase its solubility in spirit. By long exposure to the air, it becomes rancid, thick, and is ultimately transformed into a transparent yellow mass; light hastens these changes. Exposed to cold, a solid, white, crystalline fat (*margaritine*) separates from the liquid portion, and when cooled to 0° it congeals into a yellow transparent mass, which does not again liquefy until the temperature rises to about 18° Fahr. Sp. gr. 0·9611 to 0·9612, at 60°; 0·9690, at 55° (Saussure); 0·9575, at 77° (Saussure.) *Prod.* 38 to 40%, (62%,—Ure).

Pur. Castor oil is sometimes adulterated with rape oil, or with lard oil, a fraud which may be detected by its diminished density; and when the added oil exceeds 33%, by its insolubility in its own weight of alcohol of 0·820. In many cases *croton oil* is added to increase the purgative quality of the mixture. A compound of this kind is vended in gelatine capsules under the name of "*concentrated castor oil,*" the use of which is fraught with danger. "I have heard of several cases in which very violent and dangerous effects were produced by these capsules." (Pereira.) The best is imported from the East Indies in tin canisters. The oil obtained from the seeds of *ricinus viridis* (Willd.), or *lamp-oil seeds,* is often mixed with or sold for castor oil.

Uses, &c. Castor oil is an exceedingly useful mild purgative, particularly when abdominal irritation should be avoided, as in inflammations of the stomach and bowels, pregnancy, surgical operations, &c. *Dose.* 2 fl. dr. to 1 fl. oz.

Cherry-stone Oil. From the *kernels* of *prunus cerasus.* Sp. gr. 0·9239.

Chestnut Oil. From the *nuts* of *æsculus hippocastinum* or *horse chestnut.* Sp. gr. 0·9270. *Prod.* 6%.

Cocoa-nut Oil; Cocoa-nut Butter; Oleum Cocois Nuciferæ,—Lat. By expression from the *kernels* of the *cocoa nut,* or *fruit* of the *cocos nucifera.* White, hard. *Used* for soap and candles. (See *p.* 269.)

Cod-liver Oil, Cod-fish Oil; Oleum Jecoris Aselli, Ol. Gadi, Ol. G. Morrhuæ; Oleum Morrhuæ,—Ph. L. "The *oil* prepared from the *liver* of *gadus morrhua,* Linn." (Ph. L.)

The common *cod-liver oil* of *commerce* drains from the *livers* of the *cod-fish* when freely exposed to the sun, and just beginning to putrefy. It is dark-coloured, strong, and nauseous, and is now chiefly employed in this country by the curriers, for dressing leather. It is the *oleum jecoris aselli fuscum* of Continental writers. Formerly, the less fœtid varieties of this crude oil, after the impurities were removed either by subsidence or filtration, constituted the only cod-liver oil used in medicine. As its employment as a remedy increased, its revolting flavour, and its great tendency to permanently disorder the stomach and bowels, was found, however, to be a serious obstacle to its general use. It was observed, that the oil, as it exists in the liver of the cod, is bland, and nearly colourless, and has only a slight fishy but not a disagreeable flavour. The attention of parties interested was therefore immediately directed to the subject, and improved methods of obtaining the oil were suggested, and ere long adopted on the *large scale.* Mr. Donovan recommended the *fresh livers* to be heated in a water-bath to 192° Fahr., and then to be placed in cloths and pressed. The oil which separates from the liquid mass thus obtained, after defecation by repose for some days in a cold place, and filtration, is pale, and of excellent quality. This plan, slightly modified according to circumstances, is that now generally employed.

For the following description we are indebted to Messrs. Charles Fox and Co., of Newfoundland, Scarborough, and London, the eminent manufacturers and importers of *true* cod-liver oil:—

"The Newfoundland fisheries are entirely carried on in small boats, principally by the hand-line system, and quite close to the shore. The boats go out early in the morning, and return about four o'clock in the afternoon. The fish, on landing, are handed over to a 'fish-room keeper,' whose duty it is to split and open the fish, and to deposit the livers in small tubs, holding 17 or 18 gallons each. These tubs are soon afterwards collected from the different 'fish-rooms,' and conveyed to the manufactory. The livers are here thrown into tubs filled with *clean cold water,* and after being well washed and jerked over, are placed on galvanized iron-wire sieves to drain. They are next put into covered steam-jacket-pans, and submitted to a gentle heat for about three-quarters of an hour, after which the steam is turned off, cold air again admitted, and the whole allowed to repose for a short time, during which the livers subside, and the oil separates, and floats on the top. The oil is then skimmed off into tin vessels, and passed through flannel strainers into tubs, where it is left to subside for about 24 hours. From these the *purer upper portion of oil* is run into a *very deep* galvanized iron cistern, and again left to clarify itself by defecation for a few days. It is now further refined, by carefully passing it through clean and very stout moleskin filters, under pressure. The transparent filtered oil is received in a clean, galvanized iron cistern, containing a pump, from which the casks are filled for exportation. The latter, before being filled, are carefully seasoned and cleaned, to prevent their imparting either flavour or colour to the pure oil." "Sometimes we receive 14 tons of cod-livers a night."

The superiority of the oil prepared as above, consists essentially in every part of the process of extraction being performed whilst the *livers* are *fresh,* and in *no chemical means* being adopted to give the oil a factitious appearance. Its *natural* pale colour is thus preserved from contamination, and its medicinal virtues maintained intact.

Messrs. Charles Fox and Co. prepared, by the above method, about 22,000 gallons of oil, in 1853, and nearly the same quantity in 1854; all of which was imported into this country, and was immediately recognized by the respectable portion of the trade as of the very finest quality. We have chemically examined six different samples of this oil, and we have tested its efficacy by taking it ourselves for a long period; and we have, therefore, the more confidence in stating, that the preference given to it, wherever it is known, is well deserved. Its taste is so little different from other oil, that we have frequently eaten it with salad; whilst during its use we were able to detect iodine in the urine, a point in which we failed with "light-brown oil," even when taken in much larger doses.

Pur., &c. "The *finest oil,*" remarks Dr. Pereira, "is that which is most *devoid of colour, odour,* and *flavour.* The oil, as contained in the cells of the fresh liver, is nearly *colourless,* and the brownish colour possessed by ordinary cod-liver oil, is due to colouring matters derived from the decomposing (putrefying) hepatic tissues and fluids; or from the action of the air on the oil (age). Chemical analysis lends *no support* to the opinion, at *one time* entertained, that the brown oil was superior, as a therapeutical agent, to the pale oil. Chemistry has *not* discovered any substance in the brown oil that would confer on it superior activity as a medicine. On the other hand, the disgusting odour and flavour, and nauseating qualities of the brown oil, preclude its repeated use. Moreover, there is reason to suspect that, if patients could conquer their aversion to it, its free use, like that of other rancid and empyreumatic fats, would disturb the digestive functions, and be attended with injurious effects." (*Elem. Mat. Med., &c.,* 3d edit., iii, 2239.)

Among the tests of *purity,* that generally relied on is known as the "*sulphuric acid test.*" (See p. 843-4.)

To detect the presence of *combined iodine,* which is now generally considered as one of the leading medicinal constituents of pure cod-liver oil, the sample is saponified by trituration with a little *caustic potassa* and *hot water,* the resulting soap cautiously incinerated, the ashes digested with *water,* and the whole thrown on a filter. The usual tests for iodine may be then applied to the filtered liquid.

The *presence* of *iodine artificially added,* is best detected by agitating the *oil* with a little *rectified spirit,* and then testing this last for iodine. Or, a little solution of *starch* and a few drops of *sulphuric* or *nitric acid* may be at once added to the oil, when a blue colour will be developed if iodine has been mixed with the sample.

The sp. gr. of the *pale oil* is 0·9230 to 0·9238; of the *light-brown oil,* 0·9240 to 0·9245; of the *dark-brown oil,* 0·9290 to 0·9315. The density is, however, apt to vary a little with the quantity of moisture present.

Uses, &c. Cod-liver oil is a most valuable medicine in a great variety of diseases, more especially in glandular indurations and enlargements, scrofula, phthisis, rheumatism, gout, certain cutaneous diseases, amenorrhœa, chlorosis, caries, rickets, &c. To be of service, however, its use must be continued for several weeks, and the oil must be recent. *Dose.* 1 to 2 table-spoonfuls, 3 or 4 times daily, or oftener.

Obs. Since the unfortunate year 1843, when De Jongh published, at Leyden, his "*Disquisitio comparativa chemico-medica de tribus olei jecoris aselli speciebus,*" the press has been continually burdened with remarks and controversies on the relative merits of "*pale,*" "*pale-brown,*" and "*brown,*" cod-liver oil. In an excellent paper, recently read by Mr. Mercer, before the Pharmaceutical Society, that gentleman places the question in its proper position. "De Jongh quotes several authorities as to what constitutes the distinction between the three varieties of oil referred to, and the conclusion he arrives at from their testimony, is that 'the *clear pale oil* is obtained by spontaneous flow from the putrescent livers; the *brown,* by the boiling or roasting of these livers; and the *light brown* is a clear pale oil, which has stood long on the (putrid) livers, or has got *old* in the warehouse.' In the analysis of these three varieties given by De Jongh, little difference can be observed. They all contain about 96% of oleic and margaric acids, and glycerine, the constituents of all oils and fats. The remaining 4% is made up by small portions of the butyric and acetic acids, the elements of bile, iodine, bromine, &c. The conclusion De Jongh draws from these analyses is, that the '*light-brown* and the *pale oil* agree in *every* respect much more than the brown, by which *it is established* that the *light brown* is only *a pale oil which has become old.*' Proceeding in his investigations, he tries their comparative medicinal value, and for this purpose selects three sets of *six* patients each, and (to the astonishment of Mr. Mercer) he found that the palm of superiority was carried off, *not* by the *light brown* which De Jongh *now* proclaims preferable to all others, but by the *brown*, obtained, as he tells us, by '*boiling* or *roasting* the *putrescent livers* of the fish.' This De Jongh accounts for by observing that 'according to his analysis, the brown contains a little more biliary matter and butyric acid than either of the others,' and 'it is therefore,' he says, 'fair to assume that the brown oil owes its greater power to the biliary matter and butyric acid which exists in it in much larger proportions than in the lighter coloured oils.' Yet, strange to say, by referring to his own published analysis, the *pale brown oil* which he *now recommends*, does *not* contain even a *trace* of *butyric acid.* Altogether De Jongh shows such a slight difference to exist between the chemical composition and medical effects of the three oils, that the question naturally arises—Is it not possible that he may have failed in discovering their active principles? This clearly appears to have been the case. Instead of cod-liver oil having a similar constitution to other ordinary fats and oils, with the addition of small quantities of biliary and inorganic matter superadded, Winckler, an eminent German chemist, has shown that it possesses a chemical composition *differing from all other fatty oils hitherto employed in medicine*, and that in cod-liver oil *glycerine* is replaced by the *oxide of propyle.* The generation of *propylamine* which is met with in the normal urine and perspiration, takes place *only in cod-liver oil* on the addition of ammonia, and in no other officinal fatty oil; and hence the place of cod-liver oil in the materia medica cannot be supplied by any other oil."

The discovery of Winckler has not been questioned, and when we see that De Jongh failed to detect the presence of such an important substance as *propyle*, a characteristic which distinguishes cod-liver oil from all other oils, and professed to have discovered substances in it which other first-class chemists have failed to detect, we cannot place much reliance in the other results of his analysis or experiments. Indeed, his published analyses of cod-liver oil appear to smell more of the lamp than of the laboratory, of which not the least feeble proof is furnished by the fact of his giving his proportions to the *fifth* figure of decimals, or 100,000ths, results which could only have been obtained on paper.

Further, in the British pharmacopœias it is distinctly stated that this oil is to be obtained from the livers of the *true* or common cod (*gadus morrhua*,—Ph. L.; *gadus vulgaris*,—Ph. D.); and in order to ensure this, the colleges have given it a name (*oleum morrhuæ*) indicative of the species from which it is to be prepared. In this the colleges have acted judiciously, for not only is the oil obtained from this source of much more regular constitution, but it is also *richer* in all those substances that render it valuable as a remedy than the oil obtained from *any other* member of the family gadidæ. This fact any person disposed to *honestly* and *practically* investigate the subject will inevitably discover; and to such only we address ourselves. A distinction in the species was known even in the time of Pliny. The only commercial sources of this oil can therefore be found where the *true cod-fish* is abundant. The number which frequent our coasts is comparatively insignificant; but on the coasts of Newfoundland, and on the "banks" in close proximity to it, they exist in myriads. We have ourselves seen there, at one time within the reach of our telescope, hundreds of boats and vessels loaded with men busily engaged in hook-and-line cod-fishing; and the rapidity with which they drew their victims from "the vasty deep" was truly astonishing. No other livers but those of the *true cod* can be obtained for the preparation of oil in Newfoundland—a fact well known to every scientific, and to every practical man who has resided there, or who is familiar with the subject. The "*light-brown oil*" now so much "puffed by advertisement," is obtained from variable species of gadidæ common to the northern seas, where the true cod is scarcely known. De Jongh himself declares that "the Bergen (Norwegian) oil is principally obtained from three species, viz., the *Dorse* (gadus callarias), the *Coal-fish* (gadus carbonarius), and the *Pollack* (gadus pollachius); but *chiefly* from the *first*." None from *gadus morrhua!* Can the druggist, therefore, be justified in the substitution of this *dorse oil* for the *cod-liver oil* ordered in our national pharmacopœias? The answer is—the *two* are *dissimilar*,—and on no one point is the respectable portion of the medical profession more agreed, than that the *substitution* of *one substance* for *another* is *unjustifiable.* Decency has lately compelled even the vendors of "*light-brown*" to omit the words, "*oleum jecoris aselli*" from the head of their lengthy advertisements, and they *now* declare "*light brown*" to be "extracted from the liver of the *dorse* (gadus callarias), a *species* of cod-fish caught at the great fishery of the Loffoden Isles, Norway." The "phosphate of *chalk*" (!), another specimen of De Jongh's chemistry, has also been recently transmuted into "phosphate of *lime.*"

A short time since we were congratulating ourselves that the "*testimonialists*"—happily forming a small portion only of the medical profession—exhausted with their exertions on behalf of *gutta percha, revalenta, galvanic chains,* and *bitter beer,* had permanently abandoned their labours, and that the whole system had been crushed by the admirable exposé in the '*Medical Circular*' of the notorious "*pale-ale puff.*" We find, however, that we were mistaken, and that the "*certificate-mongers*" only "rested on their oars" to recover breath and recruit their energies, before assisting to keep up by their efforts pretensions as manifestly absurd as those of the Holloways and the Morisons. Surely a Mr. Hunt, who seriously asserts that—*one* drachm of the so-called *light-brown oil* is equal to *four* drachms of *pale oil,* must either be a wag, or have dipped his pen in the inkstand of the learned Baron Munchausen, since even his employers make no such pretensions; whilst De Jongh himself gives his evidence precisely the other way. The dictum of Dr. Cowan, another testimonialist, that the remedial power of a medicine is in direct proportion to its nauseousness, is certainly unsupported by experience.

In conclusion, we beg to withdraw any remarks made by us some time ago on the subject of cod-liver oil, which we most positively assert referred to the *pale-brown oil,* and the *common brown oil* and the *bleached white oil* of the shops, and were entirely based on assurances and representations which we afterwards found to be *false.* At the date referred to, we had not seen, much less examined, the *pure pale oil* that has since been brought into the market, the process for obtaining which had not then been even patented. We have since carefully and laboriously investigated the subject, and the results of this investigation are embodied in the above remarks.

(Those interested in this important question in connexion with sanitation and the cure of disease, will do well to read '*Ancient and Modern Fish Tattle,*' and '*Cod Proper, and Newfoundland Fisheries,*' by Dr. Badham; '*Yarrell on British Fishes,*' ii, 151, &c.; and various articles which have appeared from time to time on the subject in the '*Pharmaceutical Journal,*' and in the '*Chemist.*')

Cod-liver Oil (Sir James Murray's). The *oil* is placed in silver cylinders, and agitated with dry *carbonic acid gas,* under a pressure of 200 *lb.* to the inch. Patent. The object is to deodorize the oil, and to disguise its nauseous flavour. It is, therefore, only applicable to the *pale brown* and *brown oils.*

Colza Oil; Oleum de Colza. From the *seeds* of *brassica campestris oleifera,* or *colsa de printemps,* a variety of brassica campestris (Linn.) It may be regarded as a superior sort of rape oil. Burns well in lamps, especially after being refined. Sp. gr. 0·9136. *Prod.* 39%.

Cornilberry-tree Oil. From *cornus sanguinea.* Glutinous.

Cotton Seed; Oleum Gossipii Seminum,—Lat. From the *seed* of *gossipium Barbadense.* Drying.

Croton Oil; Oleum Crotonis,—Ph. E. *Ol. Tiglii,*—Ph. L. From the *shelled seeds* of *croton tiglium* or *Molucca grains.* Imported chiefly from the East Indies. It is one of the most powerful cathartics known, and acts when either swallowed or merely placed in the mouth. *Externally,* it is rubefacient and counter-irritant, often causing a crop of painful pustules, like tartar emetic. *Dose.* 1 to 2 drops, on sugar; in apoplexy, &c. It is poisonous in larger doses. Sp. gr. 0·947 to 0·953. *Prod.* Unshelled seeds, 22% to 23%; shelled do., 32% to 35%.

Pure croton oil is soluble in an equal volume of alcohol of 0·796, but in 2 or 3 days about 96% of the oil separates. In France the marc is exhausted with alcohol, and the oil thus obtained is added to that previously obtained from the same seeds by expression. The East Indian oil (*ol. crotonis exoticum*) is usually of a pale yellow; that pressed in England (*ol. crotonis Anglicanum*) is much darker.

Oil of Cucumber; Oleum Cucurbitæ,—Lat. From the *seeds* of *cucurbita pepo* or *squash,* and the *c. melopepo* or *pumpkin.* Pale; *used* in lamps; and, sometimes, as a soothing application to piles. Sp. gr. 0·9231. *Prod.* 24%.

Oil of Cyper-grass. From the *roots* of *cyperus esculenta.* Glutinous. Sp. gr. 0·9180.

Oil of Eggs; Oleum Ovi, O. O. Vitelli, O. Ovorum,—Lat. From the *yelks of eggs,* gently heated until they coagulate and the moisture has evaporated, and then pressed or broken up, digested in *boiling rectified spirit,* the tincture filtered whilst hot, and the spirit distilled off. Bland; emollient. The common plan is to fry the yelks hard; but the oil is then darker coloured and stronger. The P. Cod. orders them to be exhausted with *ether,* by displacement. Formerly, commonly used to "kill" quicksilver, and still held in great esteem in some parts of England for sore nipples and excoriations. *Prod.* 10 to 12 eggs yield 1 *oz.* See *Mixed Oils.*

Oil of Garden Cress; Oleum Lepidii Sativi,—Lat. From the *seed.* Drying. Sp. gr. 0·9240. *Prod.* 54%.

Oil of Garden Spurge; Oleum Lathyris, Ol. Euphorbiæ L.,—Lat. From the *seeds* of *euphorbia lathyris* or *garden spurge.* Cathartic. *Dose.* 3 to 8 drops. Sp. gr. 0·9281. *Prod.* 39% to 41%. Croton oil mixed with 6 times its weight of nut or rape oil is usually sold for it.

Oil of Gingelie, Oil of Sesamum, Benne Oil, Teel do., Tel do.; Oleum Sesami,—Lat. From the *seeds* of *sesamum orientale* (Willd.) or *gingelly.* Pale; bland. *Used* in salads, paints, &c.; also to adulterate oil of almonds. *Prod.* 46%.

Gourd Oil. See *Cucumber Oil.*

Oil of Ground Nuts. From the *nuts* of *arachis hypogæa.* Glutinous.

Oil of Hemp; Oleum Cannabis,—Lat. From the *seed* of *cannabis sativa* (Linn.) or *common hemp.* Mawkish. Sometimes used for frying, but chiefly for paints, soaps, &c. Freely soluble in boiling alcohol; does not thicken until cooled to 5° Fahr. Sp. gr. 0·9276. *Prod.* 18 to 24%.

Oil of Henbane Seed; Oleum Hyoscyami Expressum,—Lat. From *hyoscyamus niger,* or *common henbane.* Glutinous. Sp. gr. 0·9130.

Indayaçu Oil, Oil of Anda Gomesii; Oleum Andæ,—Lat. From the *seeds.* Purgative. *Dose.* 15 to 30 drops, on sugar. It acts mildly, without exciting nausea or vomiting, and is regarded by many practitioners as preferable to castor oil. It is said to be extremely efficacious in weakness of the lymphatic system, and in general dropsy. (Lindley.)

Oil of Jatropha; Oleum Jatrophæ, Ol. J. Curcadis, Ol. Infernale,—Lat. var. From the *seeds* of *jatropha curcas.* Somewhat resembles croton oil. *Used* for lamps in the East Indies.

Oil of Julienne. From the *seeds* of *hesperis matronalis* or *dame's violet.* Drying. Sp. gr. 0·9281.

Kundah Oil, Tallicoonah do.; Oleum Touloucounæ,—Lat. From the *fruit* of *carapa touloucouna.* Rancid, nauseous, vermifuge, rubefacient, emetic, and purgative. Chiefly used in lamps.

Lard Oil, Tallow do., Oleine, Oleic Acid; Oleum Adipis,—Lat. By separating the *oleine* of lard from the *stearine* by means of *boiling alcohol.* Only applicable where spirit is cheap. The product is, however, excellent. The *crude oleic acid* or *lard oil* of *commerce,* is chiefly obtained as a secondary product in the manufacture of stearine. It is purified by agitation with sulphuric acid, and subsequently steaming it, or washing it with hot water. Burns well in lamps, if the wick-tube is kept cool. Sp. gr. 0·9003.

Linseed Oil; Oleum Lini,—Ph. L. E. & D. 1. (*Cold-drawn linseed oil; Oleum lini sine igne.*) From the *seed* of *linum usitatissimum* (Linn.) or *common flax,* bruised or crushed, and then ground and expressed without heat. Pale, insipid, viscous; does not keep so well as the next. *Prod.* 17% to 20%.

2. As the last, but employing a steam heat of about 200° Fahr. Amber-coloured; less viscous than the last; congeals at 2°; soluble in 5 parts of boiling and 40 parts of cold alcohol. Both are drying and cathartic. *Dose.* 1 to 2 oz.; in piles, &c. Chiefly used in paints, varnishes, &c. Sp. gr. 0·9347. *Prod.* 22% to 27%.

Boiled Linseed Oil. See *Oils* (Drying).

Oil of Mace (Expressed). See *Oil of Nutmegs* (Expressed).

Oil of Madia Sativa; Oleum Madi,—Lat. From the *seeds* of *madia sativa.* Pleasant flavoured. *Prod.* 18% to 20%.

Oil of Mustard; Oleum Sinapis,—Lat. From *sinapis alba* or *white mustard,* but chiefly from *sinapis arvensis, s. chinensis, s. dichotorna, s. glauca, s. ramosa,* and *s. tori.* Sweet. *Used* for the table. Sp. gr. 0·9142 (0·9160,—Ure). *Prod.* 36%.

Oil of Black Mustard; Oleum Sinapis Nigri,—Lat. From the "*hulls*" of *black-mustard seed.* Viscid, stimulant. *Used* in rheumatism. Sp. gr. 0·9168 to 0·9170.

Oil of Wild Mustard; Oleum Raphani,—Lat. From the *seed* of *raphanus raphanistrum* (Linn.) or *jointed charlock* or *wild mustard.* *Prod.* 30%.

Oil of Myrtle; Oleum Myrteum,—Lat. From the berries. Butyraceous, fragrant.

Neat's-foot Oil, Nerve do., Trotter do.; Oleum Bubulum, Ol. Nervinum, Axungia Pedum Tauri,—Lat. From *neat's feet* and *tripe,* by boiling them in *water,* and skimming off the oil. Does not thicken by age. *Used* to soften leather and to fry fritters.

Oil of Nettle-tree. From the *kernels* of *celtis Australis* (Willd.) or *nettle-tree.* Burnt in lamps.

Nickar Oil. From the *nuts* of *guilandina bonducella* (Linn.) or *gray nickar-tree.*

Nut Oil, Hazel-nut do.; Oleum Nucis, Ol. Coryli,—Lat. From the *kernels* of *corylus avellana* (Linn.) or *hazel-nut tree.* Pale, mild tasted, drying; superior to linseed oil for paints and varnishes. It is commonly sold for oil of almonds and oil of ben, and is extensively employed to adulterate both. Walnut oil is also frequently sold for nut oil. Sp. gr. 0·9260. *Prod.* 60% (Ure).

Oil of Nutmeg (Expressed); *Expressed Oil of Mace, Butter of do.; Oleum Myristicæ* (Concretum),—Ph. L. *Myristicæ Adeps,*—Ph. E. *M. Butyrum, Ol. Myristicæ Expressum, O. Moschatæ, O. Nucistæ,*—Lat. var. "The concrete oil expressed from the *seed* of *myristica officinalis,*—Linn." (Ph. L.), or *common nutmeg.* The *nutmegs* are beaten to a paste, enclosed in a bag, exposed to the *vapour of hot water,* and then pressed between heated iron plates. Orange coloured, fragrant, spicy; butyraceous, or solid. It is a mixture of the fixed and volatile oils of the nutmeg. When discoloured and hardened by age it is called *Banda soap* (ol. macis in massis). When *pure* it is soluble in 4 parts of boiling alcohol, and in 2 parts of ether. It has been used in rheumatism and palsy, but is now chiefly employed for its odour and aromatic qualities. From the East Indies. *Prod.* 17% to 20%.

Olive Oil, Salad do., Sweet do.; Oleum Olivarum; Ol. Olivæ,—Ph. L. E. & D. *O. O. Fixum,*—Ph. E. 1839. The "oil expressed from the fruit" of "*olea Europæa,* Linn." (Ph. L.), or *common olive.* Four different methods are employed to obtain the oil from the fruit:—

1. (*Virgin Oil; O. O. Virgineum; Huile Vierge.*) From *olives,* carefully garbled, either spontaneously or only by slight pressure, in the *cold.* That yielded by the pericarp of the fruit is the finest.

2. (Ordinary "*Fine oil.*") This is obtained by either pressing the *olives,* previously crushed and mixed with *boiling water,* or by pressing, at a gentle heat, the olives from which the virgin oil has been obtained. The above processes furnish the finer salad oils of commerce. The cake which is left is called "*grignon.*"

3. (*Second quality.*) By allowing the *bruised fruit* to ferment before pressing it. Yellow; darker than the preceding; but mild and sweet tasted. Much used for the table.

4. (*Gorgon.*) By fermenting and boiling the *pressed cake* or *marc* in *water,* and skimming off the oil. Inferior.

Oil of the infernal regions (*oleum omphacinum*) is a very inferior quality of oil, which is skimmed off the surface of the water in the reservoirs into which the waste water which has been used in the above operations is received, and allowed to settle. The last two are chiefly used for lamps, and in soap-making, &c.

Of the *principal varieties* of *olive oil* known in commerce, and distinguished by the place of their production—*Provence Oil* (oleum Provinciale) is the most esteemed; *Florence Oil* and *Lucca Oil* are also of very fine quality; *Genoa Oil* comes next, and then *Gallipoli Oil,* which forms the mass of what is used in England; *Sicily Oil,* which has a slightly resinous flavour, is very inferior; and *Spanish Oil* is the worst imported.

Prop., &c. Olive oil is a nearly inodorous, pale greenish-yellow, unctuous fluid, with a purely oleaginous taste, peculiarly grateful to the palate of those who relish oil. It does not suffer active decomposition at a heat not exceeding 600° Fahr.; and when cooled to 36° it congeals into a granular solid mass. It is very slightly soluble in alcohol, but its solubility is increased by admixture with castor oil. It is soluble in 1½ parts of ether. When pure it has little tendency to become rancid. Sp. gr. 0·9170 to 0·9173; 0·9192, at 53½° (Saussure); 0·9176, at 59° (Heidenreich); and 0·9109, at 77° Fahr. (Saussure). *Prod.* 32%; of which 21% is furnished by the pericarp, and the remainder, which is inferior, by the seed and woody matter of the fruit.

Pur. Olive oil, with the exception of that of almonds, being the most costly of the ordinary fixed oils of commerce, is, consequently, the one most subject to adulteration. Nut, poppy, rape, and lard oil, are those most commonly used for this purpose. Refined tallow oleine, including that obtained from the "knacker's yards" of Paris, is said to have been used in the same way. The addition of any other oil to olive oil renders it far less agreeable to the palate, and, by increasing its tendency to rancidity, much more likely to offend and derange the stomach and bowels of those who consume it. Parties who indulge themselves in the use of this luxury would, therefore, do well to ascertain that what they purchase is *pure.* When this is the case, and the oil is also fresh, it is most wholesome as an article of food or as a condiment.

In an extensive examination which we made into the quality of the article sold in London and its neighbourhood under the name of *olive* or *salad oil*, for the proprietors of the Medical Circular, we found that only *a few* of them were of *first-rate quality*, and that barely *one half* of them were even of really good quality; *one* out of every *twelve* was of a very doubtful description; *one fifth* of them had acquired more or less rancidity by exposure or age; whilst more than *one third* of the whole number of samples examined were adulterated with oils of an inferior and cheaper description. The old-fashioned Florence flask-oil was found to be the one least meddled with. (Med. Circ., i, 350-2.)

The *detection* of the *sophistication* of *salad oil* is a matter of no great difficulty. The palate of the connoisseur will readily perceive the slightest variation in the quality of his favorite condiment. Other methods, however, of a more accurate and certain description, and of more general application, are adopted. Amongst these, in addition to those mentioned above, are the following:—

a. When *pure olive oil* is shaken in a phial, only half filled, the "*bead*" or *bubbles* rapidly disappear; but if the sample has been mixed with poppy or other oil, the bubbles continue longer before they burst.

b. Olive oil congeals at 36° Fahr., and is *completely* solidified, when a small bottle, containing it, is surrounded by ice, or a freezing mixture; but when mixed with poppy oil, it remains partly liquid, even when the latter forms only 1-4th of the mass; if more than 1-3rd of poppy oil is present, it does not solidify at all, unless cooled much below the freezing-point of water.

c. (Ph. E.) When olive oil is "carefully mixed with $\frac{1}{12}$th part of its volume of a solution of 4 oz. of *mercury* in 8 fl. oz. 6 dr. of *nitric acid* (sp. gr. 1·500), it becomes in 3 or 4 hours, like a firm fat, without *any* separation of *liquid oil*."

d. M. Pontet recommends the *mercurial solution* to be made by dissolving 6 parts of *mercury*, in 7½ parts of *nitric acid* (sp. gr. 1·35), without heat; of this solution he adds 1 part to every 48 parts of the *oil*, and well shakes the mixture every 30 minutes, until it begins to solidify. This it does after about 7 hours in summer, and 4 or 5 hours in winter, and when the oil is pure, it will have formed, in 24 hours, a mass so hard, that some little force must be employed to thrust a glass rod into it. The other edible oils do not furnish a hard mass with nitrate of mercury. The solidity of the mass is exactly in proportion to the quantity of foreign oil present. When the sophistication is equal to 1-8th of the whole, a distinct liquid layer separates; when the mixture contains ½ its volume of an inferior oil, *one half* only of the mixture becomes *solid*, and the *other half* continues liquid. A temperature of about 90° Fahr., is the best to cause the oil and coagulum to separate then perfectly from each other. When the oil has been adulterated with *animal oil*, the mixture solidifies in about five hours; but in this case the coagulum consists of the animal oil, whilst the olive oil floats on the surface, and may be decanted for further examination. This coagulum, on being heated, exhales the well-known odour of rancid fat or melted tallow.

e. M. Boudet has discovered that it is only the hyponitrous acid (*hyponitric?*) in the above mercurial test-liquor, that acts on olive oil. He has hence adopted a mixture of 1 gr. of *hyponitrous acid* with 3 gr. of *nitric acid*, which he finds is capable of solidifying 200 gr. of *olive oil* in about 78 minutes. The only fixed oils which this *test-liquid* solidifies, are those of *sweet almonds*, *filberts*, and *colza*. The *drying oils* (except castor-oil) are not hardened by it. The presence of poppy oil is easily detected by its retarding effect; 1$\frac{0}{0}$ of it retards the solidification at least 40 minutes. Each of these oils require different lengths of time to become solid, and exhibit different colours during the reaction. The results, when 100 parts of the *given oils* were treated by a mixture of 9 parts of *nitric acid* and 1 part of *hyponitrous acid*, are given below:—

Names.	Colours developed by the action of the test.	Time required for Solidification (*in minutes*).
Acajou oil . .	Lemon-yellow . . .	40
Almond oil . .	Dingy-white . . .	160
Castor oil. . .	Golden-yellow . . .	603
Colza oil . . .	Yellowish-brown . .	2400
Filbert oil . .	Greenish-blue . . .	103
Olive oil . . .	Greenish-blue . . .	73

Uses, &c. The dietetical uses of olive oil are well known. In Spain and Italy it is commonly employed as a substitute for butter. It is highly nutritious, but is digested with difficulty by some persons, and hence should be avoided by the dyspeptic. Like almond oil, it is occasionally employed as a laxative and vermifuge, and is, perhaps, one of the mildest known. In pharmacy it is extensively employed in the preparation of cerates, liniments, ointments, and plasters. *Dose.* For an adult, ½ to 1 wine-glassful as a mild aperient; for an infant, ½ to 1 tea-spoonful, mixed up with an equal quantity of honey, syrup of roses, or syrup of violets. The white fibrous sediment which forms in the recently expressed oil, is the "*amurca*" of Pliny, and was formerly highly esteemed in medicine.

Olive-oil Droppings, Sweet-oil do. The "foots" or "deposits," and the "drippings" of the casks, cisterns, and utensils. *Used* for machinery, making soap, &c.

Olive Oil (Oxygenated); *Oleum Olivæ Oxygenatum,*—Ph. Batav. *Olive oil,* 16 oz., is placed in a receiver surrounded with *ice* or *very cold water,* and *chlorine* is slowly transmitted through it for several days, or until it becomes thick and viscid, after which it is well washed with *warm water.*

Palm Oil, Palm Butter; Oleum Palmæ, Ol. Cocois Butyraceæ,—Lat. From *elais guineensis, cocos butyracea,* or *oil palm.* Orange or red-coloured; butyraceous or solid; smells of violets; unchanged by alkalies; bleached by sun-light, age, exposure, chlorine, chromic acid, and oil of vitriol; melts at 117½° Fahr. Sp. gr. 0·968. Demulcent. *Used* to colour and scent ointments, pommades, &c.; but chiefly to make soap and candles. From Africa.

Oil of Pine Nuts; Oleum Nucis Pini,—Lat. From the *kernels* of *pinus pinea* (Willd.) or stone pine. *Prod.* 31%.

Oil of Pine-tops; Oleum Cacuminum Pini,—Lat. From the *pinus abies* or *Norway spruce fir.* Drying. Sp. gr. 0·9285.

Piney Oil, Piney Tallow, Pænoe do. From *vateria Indica* (Linn.) or *pænoe tree.* Resinous flavoured, fragrant; made into candles. Sp. gr. 0·926.

Oil of Pistachio Nuts. From the *kernels* of *pistacia vera,* var. *β.* (Linn.) Sweet and pale. *Used* for salads and emulsions. *Prod.* 34%.

Oil of Plum-stones. From the *kernels* of *prunus domestica* (Linn.) or *common plum.* Burnt in lamps in Wurtemburg. Sp. gr. 0·9127. *Prod.* 31%.

Poppy Oil; Oliete, Huile Blanche; Oleum Papaveris,—Lat. From the *seeds* of *papaver somniferum* (Linn.) or *white poppy.* Sweet; pale; dries and keeps well. *Used* for salads, paints, and soaps; also (extensively) to adulterate almond oil, for the inferior qualities of which it is frequently sold. It does not freeze until cooled to 0° Fahr. Sp. gr. 0·9243 to 0·9245. *Prod.* 48% to 54%.

Oil of Prune-stones; Oleum Lapidum Prunorum,—Lat. Closely resembles oil of almonds, but soon gets rancid. Congeals at 16° Fahr. Sp. gr. 0·9127. *Prod.* 30%.

Oil of Radish Seed. From *raphanus sativus oleifer,* a variety of raphanus sativus (Linn.) Sp. gr. 0·9187. *Prod.* 42%.

Rape Oil, Brown do.; Oleum Rapæ,—Lat. From the *seed* of *brassica napus,* (Linn.; *cole* or *rape,*) and from *brassica campestris,* (Linn.; *wild navew* or *rape.*) Originally exclusively from *brassica rapa* (Linn.), the *true rape* or *wild turnip.* Glutinous; buttery at 25° Fahr. Dries slowly; makes soft soaps, and good ointments, but bad plasters; smokes much in burning, unless well refined. Sp. gr. 0·9135 to 0·9136. *Prod.* 32%.

Rape Oil (Refined); *Pale Rape Oil; Oleum Rapæ Refinum, Ol. R. Album,*—Lat. From *crude rape oil,* by agitating it with about 2% of *oil of vitriol,* previously diluted with about twice its weight of *water,* and after 10 or 12 days' repose, decanting the clear oil, and filtering it through Canton flannel or felt. The quality is improved by washing it with hot water or steam, before filtration. *Used* for lamps, blacking, and machinery; also extensively employed to adulterate both almond and olive oil. It forms the common "*sweet oil*" of the oilmen and druggists. Sp. gr. 0·9136 to 0·9140.

Summer Rapeseed Oil. From the *seed* of *brassica præcox.* Sp. gr. 0·9138 to 0·9139. *Prod.* 32%.

Oil of Sabadilla; Oleum Cebadillæ,—Lat. From *cebadilla* or the *seeds* of *asagræa officinalis.* Greenish.

Oil of Sassafras Nuts; Oleum Pichurium, Ol. P. Fabarum,—Lat. From the *seeds* or *nuts* of *nectandra puchury* and *aydendron cujumary.* White, butyraceous. *Prod.* 10%.

Seal Oil; Oleum Phocæ,—Lat. From the *hood seal,* and *harp seal,* and other species of phocidæ. *Pale seal oil* is that which drains from the blubber before putrefaction commences, and forms about 60% of the whole quantity of oil obtained. It is very clear, free from smell, and when recently prepared, not unpleasant in its taste. *Refined seal oil* is the last washed and filtered. Ranks close after sperm oil. *Brown* or *dark seal oil* is that which subsequently drains from the putrid mass. It is very strong-scented and nauseous, and smokes in burning. Both are used for lamps and dressing leather. A full-grown seal yields 8 to 12 gall. of oil; a small one, 4 to 5 gall.

Oil of Sesamum. See *Oil of Gingelie.*

Shark-liver Oil. The *lightest* of the fixed oils. Sp. gr. 0·865 to 0·867.

Skate Oil; Oleum Raiæ,—Lat. From the *livers* of *raia batis* (Linn.) or *common skate*, as cod-liver oil; also from *raia rhinobatus* or *white skate*, and *raia clavata*, or thornback. Often sold for and mixed with cod-liver oil.

Spermaceti Oil, Sperm do.; Oleum Cetacei,—Lat. From the "*head matter*" of *physeter macrocephalus* or *spermaceti whale*, a species once common in all the principal seas, but now chiefly confined to the Southern Ocean. It is very limpid, smells little, and burns well; and has long been reputed the best oil for lamps and machinery, as it does not thicken by age or friction. It is frequently adulterated with refined seal oil. Sp. gr. 0·875.

Spindle-tree Oil. From *euonymus Europæus* (Linn.) Glutinous, emetic, and purgative. Sp. gr. 0·9380.

Sunflower Oil; Oleum Helianthi,—Lat. From the *seeds* of *helianthus annuus* and *h. perennis.* Clear, pale yellow, tasteless; thickens at 60° Fahr. *Used* for salads and lamps. Sp. gr. 0·9261. *Prod.* 15%.

Oil of Tea; Oleum Theæ,—Lat. From the *seeds* of *camellia sesanqua* and *c. oleifera;* not from any species of thea.

Teel Oil. See *Gingelie Oil.*

Tobacco Seed Oil; Oleum Tabaci (Expressum),—Lat. From the *seeds* of *nicotiana tabacum* (Linn.) or *true tobacco plant.* Pale; dries well; equal to nut oil. Its production has recently been carried on with considerable success in some parts of Russia. Sp. gr. 0·9232.

Oil of Touloucouna. See *Kundah Oil.*

Walnut Oil; Oleum Juglandis, Ol. Nucis J.,—Lat. From the *kernels* of the nuts of *juglans regia* (Linn.) or common walnut tree. Soon gets rank; dries well. *Used* in paints, and occasionally in plasters. When "*cold drawn*" and washed, it is sometimes eaten with salads. Sp. gr. 0·9260 to 0·9262. *Prod.* 48% to 52%.

Oil of Wax, Butter of Wax; Oleum Ceræ;—Lat. From *bees' wax* by quick distillation in a close vessel. Butyraceous. By rectification along with *quicklime* it yields a *liquid oil.*

Oil of Weld. From the *seed* of *reseda luteola* (Linn.) or *dyer's weld.* Sp. gr. 0·9358.

Whale Oil, Train do., Whale-train do.; Oleum Balænæ, Ol. Ceti,—Lat. From the blubber of the *balæna mysticetus* (Linn.) or the *common* or *Greenland whale*, by heat. Coarse; stinking. *Southern whale oil* is the best. *Used* for lamps, machinery, &c. Sp. gr. 0·9231. *Product* per fish, about 1½ ton for each foot of bone.

Oil of Wheat; Oleum Tritici,—Lat. From bruised *Colne wheat*, with heat. In chilblains, ringworm, and several other skin diseases.

Oil of Wine-stones, Grape-stone Oil; Oleum Vitis Viniferæ Lapidum,—Lat. From the *seeds* of *grapes*, separated from the marc. Pale yellow, bland, emollient. *Used* for salads and lamps. Sp. gr. 0·9202. *Prod.* 14% to 18%.

⁂ The numbers given above, under "*products*," unless when otherwise stated, refer to the respective fruits, kernels, nuts, seeds, &c., deprived of their husks, pods, shells, and every other portion destitute of oil.

OILS (Medicated). Syn. *Olea Cocta, O. Infusa, O. Medicata,*—Lat. These are prepared by infusion or decoction. The *bruised ingredients* are either simply digested in 2 to 4 times their weight of *olive oil* for some days, or they are *gently* boiled in it until they become dry and crisp, great care being taken that the heat towards the end of the process is not greater than that of boiling water. As soon as the process is complete, the oil is allowed to drain from the ingredients, which are then (if necessary) submitted to the action of the press. The product is commonly run through flannel or a hair sieve whilst still warm, after which it is allowed to repose for a week or ten days, when the clear portion is decanted from the dregs. The *green* or *recent plants* are usually employed for this purpose, but, in many cases, the *dried plants*, reduced to powder, and digested for 6 or 8 hours in the *oil*, at the heat of hot water, with frequent agitation, yield a much more valuable product. They are nearly all employed as external applications only. (See *below.*)

Oil of Adder's Tongue; Oleum Ophioglossi,—Lat. From the *herb*, as oil of belladonna. A popular vulnerary.

Oil of Ants; Oleum Formicarum,—Lat. From *ants*, 1½ oz.; *olive oil*, ¼ pint; digested together at a gentle heat for 24 hours. Stimulant, rubefacient, and aphrodisiac. Niemann directs a much stronger oil. Obsolete in this country.

Oil of Balsam Apple; Oleum Balsaminæ,—Lat. From the *fruit*, deprived of the seed, digested, with heat, in 4 times its weight of *oil.* *Used* as a vulnerary balsam.

Oil of Belladonna; Oleum Belladonnæ,—P. Cod. From the *fresh leaves,* bruised, 1 part; *olive oil,* 4 parts; digested together at a gentle heat until the moisture is evaporated; the oil is then strained off, with pressure, and filtered.

Oil of Cantharides; Oleum Cantharidis, Ol. Cantharidibus,—P. Cod. 1839. From *Spanish flies* (powdered), 1 part; *olive oil,* 8 parts; as oil of belladonna. Stimulant and rubefacient. *Used* as a dressing to indolent sores, blisters, &c.; and in dropsy, rheumatism, gout, &c. *Oil of the Oil-beetle* (meloe proscarabæus,—Linn.) is prepared in a similar manner.

Oil of Capsicum; Oleum Capsici,—Dr. Turnbull. From *powdered capsicum* or *Cayenne pepper,* 4 oz.; *olive oil,* 1 pint; digested together for 6 hours, with heat, and strained. Stimulant; rubefacient; in colic, cholera, &c.

Oil of Chamomile; Oleum Anthemidis, Ol. Chamæmeli,—Lat. From the *dried flowers* (rubbed to pieces), 1 part; *olive oil,* 8 parts; digested together, with heat, for 6 hours. Stimulant, emollient, and vermifuge.

Oil of Colocynth; Oleum Colocynthidis,—Lat. From the *pulp,* as oil of chamomile. Diuretic. In dropsy, neuralgia, rheumatism, worms, &c.

Oil of Earthworms; Oleum Lumbricorum,—Ph. E. 1744. From *earthworms* (washed), ½ ℔; *olive oil,* 1½ pint; *white wine,* ½ pint; boiled gently to dryness, and then pressed, and strained. Formerly thought to possess many virtues; now obsolete. *Oil of mucilages* is now sold for it.

Oil of Elder-flowers, White Oil of Elder; Oleum Sambuci Album, Ol. Sambucinum,—P. Cod. From the *flowers,* as oil of chamomile. Emollient and discussive.

Oil of Elder-leaves, Green Oil, Green Oil of Elder, Oil of Swallows; Oleum Viride, Ol. Sambuci Viride,—Lat. *Prep.* 1. *Green elder leaves,* 1 *lb.; olive oil,* 1 quart; boil gently until the leaves are crisp, press out the oil, and again heat it till it turns green.

2. As before, but by maceration, at a heat under 212° Fahr. More odorous than the last.

3. *Elder leaves,* 1 cwt.; *linseed oil,* 3 cwt.; as No. 1.

Obs. The last form is the one usually employed on the *large scale.* It is generally coloured with verdigris, ½ *lb.* to the *cwt.,* just before putting it into the casks, and whilst still warm; as, without great skill and a very large quantity of leaves, the deep-green colour so much admired by the ignorant, cannot be given to it. The oil is got from the leaves by allowing them to drain in the pan or boiler (with a cock at the bottom) kept well heated. Emollient; in great repute among the vulgar as a liniment, in a variety of affections.

Oil of Fenugreek; Oleum Fœnugræci,—P. Cod. From the *seeds,* as oil of cantharides or of chamomile. Emollient and resolvent.

Oil of Foxglove; Oleum Digitalis,—P. Cod. From the *fresh leaves,* as oil of belladonna. *Used* as an application to chronic ulcers and indurations, painful swellings, &c. As usually met with, it is nearly inert.

Oil of Garden Nightshade; Oleum Solani,—P. Cod. From the *leaves,* as oil of belladonna. Anodyne and discussive.

Oil of Garlick; Oleum Allii Infusum,—Lat. From *garlic,* as oil of belladonna. *Used* as a liniment in deafness, diarrhœa, infantile convulsions, palsy, rheumatism, &c.

Green Oil; Oleum Viride,—Lat. From *bay leaves, origanum, rue, sea wormwood,* and *elder leaves,* of each, 2½ *oz.; olive oil,* 1 quart; as oil of elder. Detergent, stimulant, and resolvent. Green oil of elder is now usually sold for it.

Oil of Hemlock; Oleum Conii,—P. Cod. As oil of belladonna. Anodyne and emollient; in painful ulcers, glandular tumours, &c.

Oil of Henbane; Oleum Hyoscyami,—P. Cod. As oil of belladonna. *Used* as the last, in various painful local affections.

Oil of Juniper (by Infusion); *Oleum Juniperi Infusum,*—Lat. From the *crushed berries,* as oil of belladonna. Diuretic and vulnerary; in frictions, &c.

Oil of Lilies; Oleum Liliorum,—Ph. L. 1746. From *white lilies,* 1 ℔; *olive oil,* 3 ℔; as oil of belladonna. Emollient; used to soften and ripen tumours, indurations, &c.

Oil of Melilot; Oleum Meliloti,—Lat. As the last, avoiding much heat. Emollient and resolvent.

Oil of Mucilages; Oleum Mucilaginum, Ol. cum Mucilaginibus,—Lat. 1. (Ph. L. 1746.) *Marshmallow root,* ½ ℔; *linseed* and *fenugreek seed,* of each, bruised, 3 oz.; *water,* 1 quart; boil 1 hour, add of *olive oil,* 2 quarts, and boil until the water is consumed.

2. *Fenugreek seeds,* 8 *oz.; linseed oil,* 1 quart; infuse a week, and strain. Once a highly popular emollient application in various local affections.

Oil of Mudar; Oleum Mudaris,—Lat. From *mudar bark* (in coarse powder), 1 dr.; *warm olive oil,* ¼ pint; digest 24 hours and strain. *Used* as an application to cutaneous ulcers, the bites of venomous animals, &c.; and as a friction in worms.

Oil of Opium, Anodyne Oil, Opiated do.; Oleum Opiatum,—Lat. From *opium* (in powder), 1 dr.; *olive oil,* 2½ fl. oz.; digest at a gentle heat, with frequent agitation, for 5 or 6 hours. The powder should be rubbed in a mortar with a few drops of the oil before adding the remainder. As a local anodyne. The above is the only reliable formula for this preparation. Others are extant, but whilst the products of several are much stronger, those from others have only 1-5th or 1-6th the strength.

Oil of Pellitory; Oleum Pyrethri,—Lat. From bruised *pellitory root,* as oil of belladonna. *Used* as the last.

Oil of Black Pepper (by Infusion); *Oleum Piperis Infusum,*—Lat. From *black pepper,* in coarse powder, as oil of capsicum. Stimulant and rubefacient; in frictions.

Oil of Poison Oak; Oleum Rhois Toxicodendri,—Lat. From the *leaves,* as oil of belladonna. Externally; in paralysis, &c.

Oil of Rhubarb; Oleum Rhei,—Lat. From *rhubarb* (in powder), 1 part; *oil of almonds,* 8 parts; digested together in a gentle heat for 4 hours, and strained, with expression. As an application to indolent ulcers, and as a friction over the abdomen in diarrhœa, English cholera, &c., or as a laxative when the stomach will not bear medicine.

Oil of Roses; Oleum Rosæ, Ol. Rosaceum, Ol. R. Infusum, Ol. Rosatum,—Lat. From the *fresh petals,* pulled to pieces, crushed, and digested for 2 or 3 days in the sun, or a warm situation, in 4 times their weight of *olive oil,* and then pressed; the process being repeated with fresh roses. Ph. E. 1744 and P. Cod. are nearly similar. *Almond, ben,* or *olive oil,* coloured with *alkanet,* and scented with *attar of roses,* is now almost universally sold for it. *Used* for the hair.

Oil of Rue; Oleum Rutæ (Infusum),—P. Cod. From *fresh rue,* bruised, as oil of chamomile. Reputed antispasmodic, emmenagogue, stimulant, and vermifuge. In frictions.

Oil of St. John's Wort; Oleum Hyperici,—Ph. L. 1746. *Ol. H. Simplex, Balsamum H., &c.,*—Lat. var. From the *flowers,* 1 part; *olive oil,* 6 parts; digested together until the oil is well coloured. Antispasmodic, stimulant, and resolvent. A mixture of equal parts of *rape oil* and *green elder oil* is usually sold for it.

Oil of Scammony; Oleum Scammonii; Ol. Purgans,—Van Mons. From *scammony* (in powder), 1 dr.; *hot oil of almonds,* 3 fl. oz.; triturate together until cold, and the next day decant the clear portion. *Dose.* ½ to 1 table-spoonful.

Oil of Scorpions; Oleum Scorpionum,—Lat. From *live scorpions,* 30 in number; *almond oil,* 2 ℔; exposed to the sun or in a warm place for 40 days, and then filtered. Centipedes are commonly substituted for scorpions. Formerly reputed emollient, diaphoretic, and rubefacient. Obsolete. The druggists now sell for it a mixture of *rape oil* and *oil of turpentine,* in which a little *cantharides* has been infused.

Oil of Stramonium; Oleum Stramonii,—P. Cod. From the *leaves* of *thorn apple* or *stramonium,* as oil of belladonna. Anodyne and discussive; as an application to painful tumours, joints, &c.

Oil of Tobacco (by Infusion); *Oleum Tabaci, Ol. T. Infusum,*—Lat. From *fresh tobacco leaves* (bruised), like oil of chamomile. As an application in ringworm, irritable ulcers, pediculi, &c.; and as a friction in itch, neuralgia, painful indurations, &c. It must be used with extreme caution, as it is poisonous.

Oil of Toothwort; Oleum Squamariæ,—Lat. From the *herb* of *lathræa squamaria* (Linn.), as oil of St. John's wort. Astringent and vulnerary. This must not be confounded with another preparation sometimes called *oil of toothwort* (*oleum plumbaginis Europææ*), and which has been occasionally used in itch, as the latter is acrid and apt to cause much irritation.

Oil of Wormwood; Oleum Absinthii,—Ph. E. 1744. From the *fresh herb,* as oil of lilies. The P. Cod. and Ph. Wurtem. order only 1 part of the *herb* to 8 parts of *oil.* Applied to the abdomen in dyspepsia, diarrhœa, heartburn, worms, &c. It is seldom used in this country.

OILS (Mixed). Syn. *Compound Oils; Olea Composita, Olea Mixta,*—Lat. Under these names are commonly included various mixtures of oils and other substances that possess an unctuous appearance. When not otherwise stated, they are *prepared* by simply agitating the ingredients together, and after a sufficient time decanting the clear portion, which, in some cases, is then filtered. A few of them only possess any importance. Some of them are highly esteemed as remedies among the vulgar, and the use of others is confined to veterinary medicine.

The following include most of the mixed oils of the shops, to which the names of a few other compounds, which are frequently called *oils* by the ignorant, are added, for the purpose of facilitating a reference to them:—

Acoustic Oil, Ear Oil; Oleum Acousticum; Ol. Terebinthinæ Acousticum,—Mr. Maule. From *oil of turpentine,* 1 part; *oil of almonds,* 6 parts; mix. In atonic deafness, accompanied with induration of the wax. 1 or 2 drops are poured into the ear, or on a piece of cotton wool, which is then gently placed in it.

Ammoniated Oil. See *Liniments.*

Bezoar Oils. See *Wedel's Oil.*

Black Oil; Oleum Nigrum,—Lat. 1. *Oil of turpentine,* 1 pint; *rape oil,* 3 pints; *oil of vitriol,* ¼ *lb.;* agitate well together with care; then add of *Barbadoes tar,* 3 *oz.;* again agitate well, and in 10 days decant the clear portion. *Linseed oil* is preferred for the above by many persons.

2. (Mr. Percivall.) *Sweet oil,* 1 pint; *oil of turpentine,* 2 *oz.;* mix, add gradually of *oil of vitriol,* 1¼ *oz.,* again mix, and leave the bottle open until the next day. Detersive, stimulant. Used by farriers for mange, &c.

British Oil, Common Oil of Petre; Oleum Britannicum, Ol. Petræ Vulgare,—Lat. From *oil of turpentine,* 1 quart; *Barbadoes tar,* 1 *lb.; oils of rosemary* and *origanum,* of each, 1 *oz.* Stimulant. Formerly reputed to possess the most astonishing virtues.

Camphorated Oil; Oleum Camphoratum,—Lat. This is the *liniment of camphor* noticed at *page* 699. A little *oil of turpentine* is commonly added to that used in veterinary medicine.

Oil of Camphor (Nitric); *Oleum Camphoræ Nitricatum; Ol. C. Nitricum,*—Fee. From *camphor,* 3½ dr., dissolved, without heat, in *nitric acid,* 1 oz.; and the oil which separates after repose decanted. Soluble in alcohol; decomposed by water. See *Nitrate of Camphor* and *Oils* (Volatile).

Carron Oil. See *Lime Liniment.*

Chabert's Oil, Chabert's Empyreumatic do.; Oleum Chaberti, Ol. contra Tæniam Chaberti,—Lat. *Oil of turpentine,* 3 parts; *Dippel's animal oil,* 1 part; mix, and distil 3 parts. It must be preserved from the air and light. *Used* in tapeworm. *Dose.* 1 to 2 tea-spoonfuls, in water, night and morning, until 5 or 6 fl. oz., or more, have been taken; a cathartic being given every third day.

Darby's Oil. A mixture of *oil of amber, Barbadoes tar,* and *balsam of sulphur,* equal parts.

Driffield Oils. From *Barbados tar,* 1½ *oz.; oil of turpentine,* ¼ pint; *linseed oil,* 1 pint; mix, add (carefully) of *oil of vitriol,* 1½ *oz.,* agitate well, and in a few days decant the clear portion.

Exeter Oil; Oleum Excestrense,—Ph. L. 1677. From *castor, euphorbium, mustard,* and *pyrethrium,* of each, bruised, 1 oz.; digested in *green elder oil,* 1 pint, for 10 days. Another very old formula has 31 ingredients. The following is the one now generally employed:—*Green oil of elder,* 1 pint; *oil of turpentine,* ¼ pint; *oil of origanum,* 1 *oz.*

Furniture Oil, Mahogany do., Oil Stain. 1. From *refined linseed oil,* 1 pint; *alkanet root,* ¼ *oz.;* digested together in a warm place until the former is sufficiently coloured, when it is poured off and strained.

2. *Pale boiled oil,* 1 pint; *bees' wax,* ¼ *lb.;* melted together and coloured as before. Gives a superior polish, which becomes very tough by age.

3. *Linseed* or *boiled oil,* 1 pint; *Venice turpentine* (pure), 6 *oz.;* as before. The above are used for mahogany and other dark-coloured woods.

4. (Pale.)—*a.* As the preceding, omitting the *alkanet.*

b. From *nut oil,* ¾ pint; *bees' wax* (finest), 3 *oz.;* melted together.

c. To the last, add of *copal varnish,* 3 or 4 *oz.* The last three are employed for pale woods. They are all applied by means of a rag, and are "polished off" with a "woollen rubber" or "furniture-brush." A little *strong vinegar,* or a *few drops* of *hydrochloric acid,* are sometimes added. See *Pastes, Polishes,* and *Revivers.*

Hair Oil. See *Oils* (Perfumed).

Oil and Hartshorn. See *Liniment of Ammonia.*

Iron Oil; Oleum Ferri, Ol. Martis,—Lat. The old name for the liquid formed when *sesquichloride of iron* is allowed to deliquesce by free exposure to the air. It is excessively caustic and corrosive.

Lime Oil. See *Chloride of Calcium.*

Macassar Oil. See *Oils* (Perfumed).

Oil for Machinery. See *Oils* (Fixed).

Oil of Male Fern, Peschier's do.; Oleum Filicis Maris, Ol. F. Peschieri, Extractum Filicis Æthereum, Balsamum F. Æ.,—Lat. var. By evaporating the *ethereal tincture* of the *rhizomes* (or the buds) *of male fern. Prod.* 1 lb. of rhizomes yield 1½ oz. of a thick, black oil. (Soubeiran.) By employing *hot alcohol* the product little exceeds ⅓rd of that obtained by ether, and is regarded as less valuable as a remedy. *Dose.* ½ to 1 dr., made into an electuary or boluses with powdered sugar, followed, in about an hour, by a full dose of castor oil. In tape-worm. It is in high repute on the

Continent, but has proved less successful against the tape-worm of this country.

Marrow Oil. From *clarified beef-marrow,* 1 part; *oil of almonds,* 3 parts; melted together, and strained through muslin. It is usually scented with *ambergris, cassia,* or *mace,* and slightly tinged with *palm oil* or *annotta. Used* for the hair.

Marshall's Oils. From *linseed oil* and *rape oil,* of each, 1 *lb.; green oil* and *oil of turpentine,* of each, ½ *lb.; oil of origanum,* ½ fl. oz.; *oil of vitriol,* ¼ *oz.*; well shaken together.

Mixed Oils; Oleum Mixtum Commune,—Lat. From *linseed oil* and *green oil,* of each, 1 *lb.; oil of turpentine,* ½ *lb.; Barbados tar* and *balsam of sulphur,* of each, 2 *oz.; oils of spike* and *origanum,* of each, 1 *oz.* Stimulant and rubefacient. *Used* by farriers for sprains, &c. See *Stamford's Oils* (below).

Neat's-foot Oil. See *Oils* (Fixed).

Newmarket Oils. From *oils of linseed, turpentine,* and *St. John's wort,* of each, 3 *lb.; oil of vitriol,* 1½ *oz.;* well shaken together, and the clear portion decanted in a few days. A favorite remedy for sprains in horses.

Nine Oils, Old Mixed-oils; Oleum ex Omnibus. From *train oil,* 1 gall.; *oil of turpentine,* 1 quart; *oil of amber* and *oil of bricks,* of each, 5 *oz.; oil of spike* and *oil of origanum,* of each, 2 *oz.; Barbados tar,* 2½ *lb.; oil of vitriol,* 2 *oz.; camphorated spirit,* ½ pint; mixed together as the last. A favorite remedy with provincial farriers.

Oil of Petre; Oleum Petræ Vulgare,—Lat. From *oil of turpentine,* 1 pint; *Barbados tar,* ½ *lb.; oils of rosemary* and *origanum,* of each, ½ *oz.* Stimulant. *Used* by farriers.

Phosphorated Oil; Oleum Phosphoratum,—Lat. 1. (Ph. Bor.) *Phosphorus* (dried and sliced small), 6 gr.; *oil of almonds,* 1 oz.; mix, place the phial in hot water, agitate for some time, and when cold, decant the clear oil from the undissolved phosphorus.

2. (Magendie.) *Phosphorus* (sliced), ½ dr.; *almond oil,* 1 oz.; macerate in the dark, with frequent agitation, for 14 days, then, after repose, decant the clear portion, and aromatize it with a little *essence of bergamotte.*

Obs. A fl. oz. of oil dissolves rather less than 5 gr. of pure phosphorus. The large excess ordered in the second formula must be merely for the purpose of increasing the extent of surface acted on. It is, however, with the other precautions given, quite unnecessary. The products of both formulæ have the same strength. *Dose.* 5 to 10 or 12 drops, in milk, barley water, or gruel, or made into an emulsion; in chronic rheumatism, gout, &c., and as a powerful, diffusible stimulant in various diseases with debility and general prostration of the vital powers, &c. *Externally,* as a friction. It is chiefly to the presence of phosphorus that cod-liver oil owes its wonderful remedial power in these affections.

Quitter Oil.—1. *Red precipitate,* 2 dr.; *aquafortis,* 1 *oz.;* dissolve, add of *olive oil, oil of turpentine,* and *rectified spirit,* of each, 2 *oz.;* and agitate well and frequently for 3 or 4 hours.

2. *Ointment of nitrate of mercury* (Ph. L.), 1 part; *nut oil,* 3 parts; melt together, and stir until the mixture is cold. *Used* by farriers for quitters, &c.

Radley's Oils. From *Barbados tar,* ½ *lb.; linseed oil* and *oil of turpentine,* of each, ¼ pint; gently warmed, and shaken together.

Oil of Roses. See *Oils* (Medicated, Perfumed, and Volatile).

Shaving Oil. See *Essence of Soap.*

Sheldrake's Oil. From pale *boiled nut-oil* and *copal varnish,* equal parts, melted together by the heat of *hot water,* and, when perfectly mixed, placed aside in a bottle for a week to settle, after which the clear portion is decanted. *Used* by artists to grind their colours in, to brighten them.

Oil of Spike, Factitious do., Farrier's do. From *oil of turpentine,* 1 quart; *Barbados tar,* 1½ *oz.; alkanet root,* ½ *oz.;* digested together for a week. *Used* as a stimulating liniment by farriers.

Oil of Spike (Painter's).—1. From *rectified oil of turpentine,* 3 pints; *oil of lavender,* 1 pint; mix.

2. *Oil of turpentine* (warm), 5 parts; *lavender oil bottoms* (genuine), 3 parts; agitate well together, and in a fortnight decant the clear portion. *Used* by artists and enamellers.

Stamford's Oils, Lord Stamford's Mixed do. Dissolve *camphor,* 1 *oz.,* in *rectified spirit of wine,* ¼ pint; add *oil of origanum,* 2 *oz.; oil of turpentine,* ½ pint; *green elder oil,* 2 *lb.;* and agitate until mixed. The *rectified spirit* is now generally omitted, the camphor being dissolved in the green oil by aid of heat before adding the other ingredients. Stimulant. *Used* by farriers.

Sulphurated Oil. See *Balsam of Sulphur.*

Three Oils; Oleum de Tribus,—Van Mons. *Oils of bricks, lavender,* and *turpentine,* equal parts. As a stimulant liniment.

Oil of Vitriol. See *Sulphuric Acid.*

Oil of Vitriol (Sweet). See *Ethereal Oil* (*p.* 881).

Ward's Oils, Ward's White Oils. From *powdered camphor*, *rape oil*, *oil of turpentine*, *rectified spirit*, and *liquor of potassa*, equal parts, agitated together for some time, and again before use. *Beef brine* was formerly used instead of liquor of potassa.

Watchmaker's Oil. Prepared by placing a clean *strip* or *coil of lead* in a small white-glass bottle filled with *pure almond* or *olive oil*, and exposing it to the sun's rays at a window for some time, till a curdy matter ceases to be deposited, and the oil has become quite limpid and colourless. *Used* for fine work; does not become thick by age. See *Oleine*.

Wedell's Oil, Bezoar Oil; Oleum Bezoardicum,—Lat. From *nut oil*, ¼ pint; *camphor*, ½ oz.; dissolve by a gentle heat, and when cold, add of *essence of bergamot*, 1 dr.; and let it stand over a little *alkanet root*, until sufficiently coloured.

White Oils, White Egg-oils.—1. *Yelks of eggs*, 4 in number; *oil of turpentine*, ¼ pint; mix, add of *liquor of ammonia*, 3 fl. oz.; *oil of origanum*, ½ oz.; *soaper's lye*, ¼ pint; *water*, ¾ pint; agitate well, and strain through a coarse hair sieve.

2. *Rape oil*, ¾ pint; *liquor of ammonia* and *oil of turpentine*, of each, 3 *oz.*; agitate until they form a milk.

3. (Redwood.) *Whites and yelks of* 2 *eggs; oil of turpentine*, 1½ *oz.;* triturate together, add of *Goulard's extract*, ½ *oz.*, mix, next add of *distilled vinegar*, 1½ pint; and, lastly, of *rectified spirit*, 1½ *fl. oz.* Stimulant and detergent. *Used* by farriers.

Worm Oil (Canine); *Oleum Vermifugum Caninum.* From *oil of turpentine* and *castor oil*, equal parts; tinged yellow with a little *palm oil* or *annotta*. *Dose*, for a middle-sized dog, ½ *oz.*, repeated in 2 or 3 hours if it does not operate.

OILS (in Perfumery). Syn. *Scented Oils; Olea Fixa Odorata,*—Lat. The oils which usually form the basis of these articles are those of *almonds*, *ben*, or *olives;* but others are occasionally used. The methods adopted for their preparation vary with the nature of the substances whose fragrance it is intended to convey to the oil. The Continental perfumers employ three different processes for this purpose, which they technically distinguish by terms indicative of their nature. These are as under:—

1. A sufficient quantity of the *essential oil of the plant*, or of the *concentrated essence* of the substance, if it does not furnish an oil, is added to the *fixed oil* which it is desired to perfume, until the latter becomes agreeably fragrant; the whole is then allowed to repose for a few days, and, if any sediment falls (which should not be the case when the ingredients are pure), the clear portion is decanted into another bottle. When *alcoholic essences* are thus employed, the *fixed oil* should be gently warmed, and the admixture made in a *strong bottle*, so as to permit of it being corked and well agitated with safety; and in this case the agitation should be prolonged until the whole has become quite cold. In this way, all the ordinary *aromatized* and *perfumed oils* of the *English druggists* and *perfumers*, as those of *bergamotte*, *cassia*, *cloves*, *lavender*, *lemon*, *millefleurs*, *neroli*, *nutmeg*, *oranges*, *roses*, *&c.*, are made; but those of a few of the more delicate flowers, and of certain other substances, can only be prepared of the "*first quality*" by one or other of the processes described below.

In general, 1 to 1½ *dr.* of the pure *essential oils*, or 3 to 4 *fl. dr.* of the *alcoholic essences*, are found sufficient to render 1 *pint* of *oil* agreeably fragrant. ½ *dr.* of pure *attar of roses* is, however, enough for this purpose, owing to the very powerful character of its perfume; but even a less quantity than this is commonly employed, on account of its costliness, the deficiency being made up by a mixture of the *oils* of *rhodium*, *rosemary*, and *bergamotte*. Most of the oils of this class are intended for hair cosmetics.

2. (By "*Infusion.*") *Dry substances*, after being reduced to powder, or sliced very small,—*flowers* or *petals*, after being carefully selected, and picked from the stems and other scentless portions,—and *soft* or *unctuous matters*, as ambergris, civet, or musk, after being rubbed to a paste with a little oil, either with or without the addition of about twice their weight of *clean sand* or *powdered glass*, to facilitate the reduction, are digested in the *fixed oil* for about 1 hour, at a gentle heat obtained by means of a water bath, continual stirring being employed all the time; the mixture is then removed from the heat, covered up, and left to settle until the next day, when the clear portion is decanted into clean bottles. When *flowers* are employed, the free oil is drained off, and the remainder obtained by the action of a press. The process is then *repeated* with *fresh flowers*, 5 or 6 times, or even oftener, until the oil is sufficiently perfumed. For *ambergris*, *musk*, or *civet*, the digestion is generally

continued for 15 to 20 days, during which time the vessel is either freely exposed to the sunshine, or kept in an equally warm situation.

The "first quality" of the *oils* of *ambergris*, *balsam of Peru*, *benzoin*, *cassia*, *cinnamon*, *civet*, *orange-flowers*, *orris*, *roses*, *styrax*, and *vanilla*, are made by infusion.

3. (By "*the flowers.*")—*a.* Upon an *iron frame* a piece of *white spongy cotton cloth* is stretched, and then moistened with almond or olive oil, usually the latter; on the cloth is placed a thin layer of the fresh-plucked flowers; another frame is similarly treated, and in this way a pile of them is made. In 24 or 30 hours, the flowers are replaced by *fresh ones*, and this is repeated every day or every other day, until 7 or 8 different lots of flowers have been consumed, or the oil is sufficiently loaded with their odour. The *oil* is then obtained from the *cotton cloth* by powerful pressure, and is placed aside in bottles to settle, ready to be decanted into others for sale. Sometimes thin layers of *cotton wool*, slightly moistened with *oil*, are employed instead of cotton cloth.

The *oils* of *honeysuckle*, *jasmin* or *jessamine*, *jonquil*, *may-blossom*, *myrtle-blossom*, *narcissus*, *tuberose*, *violet*, and, in general, of all the more delicate flowers, are prepared in the above manner.

b. The *native perfumers* of India prepare their scented oils of *bela*, *chumbul*, *jasmin*, *&c.*, in the following manner:—A layer of the *scented flowers*, about 4 inches thick, and 2 feet square, is formed on the ground; over this is placed a layer of moistened *tel* or *sesamum seeds*, 2 inches thick, and on this another 4-inch layer of *flowers*. Over the whole a sheet is thrown, which is kept pressed down by weights attached round the edges. The *flowers* are replaced with *fresh ones* after the lapse of 24 hours, and the process is repeated a *third*, and even a *fourth* time, when a very highly scented oil is desired. The *swollen sesamum seeds*, rendered fragrant by contact with the flowers, are then submitted to the action of the press, by which their bland oil is obtained strongly impregnated with the aroma of the flowers. The expressed oil is then set aside in *dubbers* (bottles made of untanned hides) to settle. We have employed *poppy seed* in this country, in a similar manner, with great success.

c. The *flowers* are crushed in a mortar or mill, with *one half* their weight of *blanched sweet almonds*, and the next day the mass is gently heated and submitted to the action of a powerful press; the liquid thus obtained is allowed to repose for a week, when the upper portion of oil is decanted and filtered. This plan is occasionally adopted in this country for the *oils of roses*, and of a few other flowers. (See *below.*)

The solution of a few grains of *benzoic acid*, or of *gum benzoin* (preferably the first) in any of the above oils, will materially retard the accession of rancidity, if it does not prevent it altogether. (See *p.* 448.)

The oils of the last two classes (2 and 3) are chiefly used to impart their respective odours to the simple oils, pommades, &c.; and in the manufacture of *scented spirits* or *esprits*. The following formulæ are given as examples of both classes of preparations:—

Oil of Ambergris. From *ambergris*, 2 dr.; *oil*, 1 pint; by infusion.

Oil of Benzoin. From *gum benzoin*, 7 dr.; *oil*, 1 pint; by infusion.

Oils for the Hair; Huiles Antiques. These are numerous. All those scented with the simple perfumes are prepared in the way explained under *class* 1 (above). The selection depends entirely upon the judgment of the operator, or the fancy of the purchaser. In general, a mixture of two or three perfumes is preferred in these countries, to the pure fragrance of any single flower, and a grossness of taste is exhibited in these matters which surprises our Continental neighbours, and the inhabitants of Italy more particularly. Some of these oils are coloured. A RED tinge is given to them by allowing the oil to stand for a few hours over a little *alkanet root* (2 dr. to the pint) before scenting it. The application of a gentle heat facilitates the process. YELLOW and ORANGE are given by a little *annotta* or *palm oil;* and GREEN, by steeping a little *green parsley* or *lavender* in them for a few days; or by dissolving 2 or 3 dr. of *gum guaiacum* in each pint, by the aid of heat, and when cold, decanting the clear portion. *Huile antique au jasmin*, *huile antique à la fleurs d'oranges*, *huile antique à la rose*, *huile antique à la tuberose*, *huile antique à la violette*, *&c.*, are simple oils flavoured with the respective perfumes or their preparations.—*Huile antique rouge à la rose* is the ordinary oil of roses coloured with alkanet root.—*Huile antique verte* is simple oil coloured green as above, and scented.—*Huile antique aux mille fleurs* is so scented with several perfumes that none predominate. A mixture of bergamotte, lemons, lavender, neroli, pimento, and ambergris or musk, is commonly employed for the purpose.

Macassar Oil, Huile de Macassar.—1. (Rowland's.) *Oil of ben* or *almonds* (reddened by alkanet root), 1 pint; *oils of rosemary* and *origanum* (white), of each, 1 dr.; *oil of nutmeg* and *attar of roses*, of each, 15 drops; *neroli*, 6 drops; *essence of musk*, 3 or 4 drops.

2. (De Naquet.) *Oil of ben*, 1 quart; *nut oil*, 1 pint; *rectified spirit*, ¼ pint; *essence of bergamotte*, 3½ dr.; *tincture of musk, esprit de Portugal*, of each, 2 dr.; *otto of roses*, ½ dr.; *alkanet root*, q. s. to colour.

Marrow Oil (Perfumed).—1. *Simple marrow oil* (see *p.* 859) scented at will.

2. (Fluide de Java.) *Marrow oil*, coloured with a little *palm oil*, and scented.

3. (Huile Comogene.) *Marrow oil*, 4 *oz.*; *spirit of rosemary*, 1½ *oz.*; *oil of nutmeg*, 12 drops.

4. (Huile Philocome d'Aubril.) *Cold-drawn nut oil* and *marrow oil*, equal parts; scent, at will, q. s.

5. (Huile de Phénix.) *Clarified beef marrow, lard, pale nut oil*, and *expressed oil of mace*, of each, 4 oz.; melt together by the heat of *hot water*, strain through linen into a warm *stone mortar*, add of *oils of cloves, lavender, mint, rosemary, sage*, and *thyme*, of each, ½ dr.; *rectified spirit*, 1 oz., in which has been dissolved by a gentle heat, *balsam of tolu*, 4 dr.; *camphor*, 1 dr.; triturate until the whole is cold, and then put it into bottles. All the above are used to make the hair grow, and to prevent it falling off.

Oil of Musk. From *grain musk*, 1 dr.; *ambergris*, ½ dr.; *oil of lavender*, 20 drops; *oil*, 1 pint; by infusion. A *second quality* is made by working the same ingredients, after the oil is poured from them, with ¾ pint of *fresh oil.* This also applies to *oil of ambergris* and *huile royale.*

Oil of Musk and Ambergris; Huile Royale. From *ambergris*, 2 dr.; *grain musk*, ½ dr.; *oils* of *cassia, lavender, neroli*, and *nutmeg*, of each, 10 drops; *oil*, 1 pint; by infusion. (See *above.*)

Oil of Styrax. From *liquid styrax* (pure), 5 dr.; *oil of nutmeg*, 10 drops; *ambergris*, 6 gr.; *oil*, 1 pint; by infusion.

Oil of Vanilla; Huile à la Vanille. From purest *olive* or *almond oil*, 1½ pint; *vanilla*, (finest, in powder), 2 *oz.*; *oil of bergamotte*, 1 dr.; *attar of roses* (finest), 15 drops; by infusion.

OILS (Volatile). Syn. *Olea Destillata, Olea Distillata, Olea Essentialia, Olea Volatilia*,—Lat. *Huiles Volatiles*,—Fr. The volatile oils are an extensive and important class of bodies, derived from the vegetable kingdom, and found in almost every part of the majority of the plants which produce them, except the cotyledons of the seeds, in which, in general, the fixed oils are exclusively stored up. Their presence confers upon flowers, leaves, fruit, seeds, roots, bark, and woods, their peculiar and characteristic odours; but among these they are not equally distributed in the same individual, and are often altogether absent from some of them. To them we are indebted for our most delightful perfumes, and our choicest spices and aromatics. Some of them are found to possess valuable medicinal properties, and others are invested with the highest possible interest on account of their peculiar chemical constitution, and the reactions which occur when they are brought into contact with other bodies.

The *volatile oils* are often called "*Essences*," and the same loose and unmeaning term is also commonly applied to their alcoholic solutions.

Prop. The volatile or essential oils are usually more limpid and less unctuous than the fixed oils; but some of them are butyraceous or crystalline. Nearly all of them consist of two or more oils, differing in their sp. gr. and boiling points, one of which is generally liquid,—the other, in some cases, crystalline. All of them, when perfectly pure, are colourless, though before rectification nearly the whole of them have a pale-yellow tint, and some of them are brown, blue, or green. Their odour is that of the plants which yield them, and is usually powerful; their taste is pungent and burning. They mix in all proportions with the fixed oils, dissolve freely in both alcohol and ether, and are sparingly soluble in water, forming "*perfumed*" or "*medicated waters.*" Their boiling point usually ranges between 310° and 325° Fahr., and is always considerably higher than that of water. They resist saponification, and (excepting *oil of cloves*) do not combine with the salifiable bases. The name "*Starkey's soap*" applied to the substance formed by adding oil of turpentine, drop by drop, to caustic soda, and triturating the two together in a mortar, until the mixture acquires the consistence of soap, is a misnomer. Their density fluctuates a little on either side of water. The *lightest oil* is that of citrons (sp. gr. 0·847), and the *heaviest*, that of sassafras (sp. gr. 1·096). When cooled sufficiently they all solidify. The common temperature of the atmosphere is sufficient for this with some of them, as the oils of roses and aniseed; whilst others require to be cooled below the freezing point of water before they assume the solid form. In this state they appear to consist of a crystalline or semi-crystalline substance (*stearoptène, stearessence*), and a fluid portion (*eleoptène, oleiessence*). The two may be separated by pressing the concrete oil between the folds of bibulous paper, in the cold. The first corresponds to the margarine of the fixed oils. By exposure to the air they rapidly absorb oxygen, and become partially converted into resin. This is the cause of the deposit that usually forms in them (especially in the expressed oil of orange) when kept in an ill-corked vessel. The solid crystalline matter which separates from them when kept in closed vessels is *stearoptène.*

Var. These are too ill-defined and indistinct to admit of a useful application. Chemically considered, the *essential oils* may be divided into three great classes:—

1. *Oils* composed of *carbon* and *hydrogen* only, of which oil of turpentine may be regarded as the type. These are characterised by being less soluble in rectified spirit and in water than the other essential oils. The *oils* of *bergamot, capivi, cubebs, elemi, hops, juniper, lemons, orange-peel, pepper*, the *grass oil* of India, the *laurel oil* of Guiana, and some others, belong to this class.

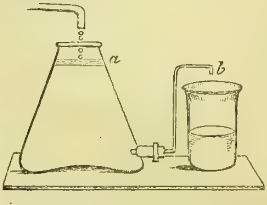
2. *Oils* containing *carbon, hydrogen,* and *oxygen,* including most of those used in medicine and perfumery. These are more soluble in rectified spirit and in water than those containing carbon and hydrogen only. According to Saussure their solubility in alcohol is in direct proportion to the quantity of oxygen which they contain. To this class belong the *oils* of *almonds, aniseed, cassia, cedar-wood, cinnamon, cumin, jasmin, lavender, meadow-sweet* (spiræa ulmaria), *orange flowers, pennyroyal, peppermint, spearmint, rosemary, rose-petals, valerian, winter green* (gaultheria procumbens), and others too numerous to mention.

3. *Oils* containing *sulphur.* These are characterised by their extreme pungency, suffocating odour, vesicating power, property of blacking silver, and being decomposed by contact with most other metallic bodies. The *oils* of *assafœtida, black mustard seed, garlic,* and *onions,* are of this kind; but only the second and third of these have been minutely examined.

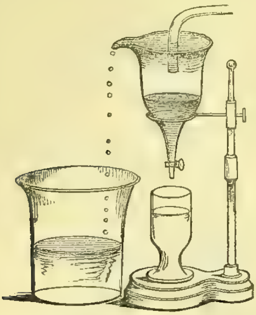
Prep. The volatile oils are generally procured by *distilling* the odoriferous substances along with water; but in a few instances they are obtained by *expression,* and still more rarely by the *action of alcohol.*

According to the common method of proceeding, *substances* which *part freely* with *their oil,* are put into the still along with about *an equal weight* of *water,* and are at once submitted to distillation. Those *substances* which *give out their oil* with *difficulty,* are first soaked for 24 hours, or longer, in about *twice their weight of water,* to each gallon of which 1 *lb.* of *common salt* has been added, in order to raise its boiling point. The distillation is conducted as quickly as possible, and, when one half the water has come over, it is returned into the still, and this cohobation is repeated, when necessary, until the distilled water ceases to be mixed with oil. The heat of *steam* or a *salt-water bath* should be preferably employed. When a naked fire is used, the still should be deep and narrow, by which means the bottom will be better protected by the gradually decreasing quantity of water towards the end of the process, and empyreuma prevented. When the distilled water is to be repeatedly cohobated on the ingredients, a convenient and economical plan is to so arrange the apparatus that, after the water has separated from the oil in the receiver, it shall flow back again into the still. An ordinary *worm-tub,* or other like condensing apparatus, may be employed; but in the case of those oils which readily solidify, the temperature of the water in the condenser must not fall below about 55° Fahr.

The mixed vapours which pass over condense and fall as a milky-looking liquid into the receiver. This separates after a time into two portions, one of which is a solution of a part of the newly eliminated oil in water, and the other is the oil itself. The latter either occupies the upper or the lower portion of the receiver, according as its specific gravity is less or greater than that of distilled water. The separation of the oil and water is effected by allowing the mixed liquids to drop into a "*Florentine receiver*" (see *engr.*) when the oil is the *lighter* of the two, by which means the latter accumulates at *a,* and the water flows over by the spout *b.*



The same receiver may be employed for oils *heavier* than water, by reversing the arrangement; but a glass "*separator*" (see *engr.*) is, in general, found more convenient. In this case the oil accumulates at the bottom of the vessel, and may be drawn off by the stop-cock provided for the purpose.



The *essential oils of lemons* and *oranges* of commerce, and of some other fruits, are chiefly obtained by submitting the yellow rind to powerful pressure; but in this way they are not so white, nor do they keep so well as when distilled, although in the case of the fruits referred to, the oils are more fragrant than when prepared by any other method.

The *London College* has excluded the usual directions for the preparation of the essential oils from their present pharmacopœia, on the ground, we suppose, that these substances are seldom prepared by the druggist or apothecary, or at all on the *small scale.*

"The *fruit* of *anise, caraway*, and *juniper*, the *flowers* of *chamomile, lavender*, and *elder*, the *berries* of *allspice*, the *tops* of *rosemary*, and the *entire recent plants* of the *other herbs*, are to be employed." "Put any one of these into an alembic, then pour in as much *water* as will cover it, and distil the *oil* into a large vessel, kept cool." (Ph. L. 1836.)

The *Edinburgh College* directs — "As much water only is to be employed as will prevent empyreuma during the distillation. The distillation may be immediately commenced after a proper maceration, and the oil afterwards separated from the water" in the manner already noticed.

"It is also necessary to observe in preparing these *oils*, as well as the distilled waters, that the quality of the substances, their texture, the season of the year, and similar circumstances, must occasion so many differences, that it is scarcely possible to give any certain and general rules which shall strictly apply to every example. Many things, therefore, must be regulated by the judgment of the operator."

The *Dublin College* directs the *vegetable substances* to be macerated in the *still* with about 5 times their weight of *water*, for 24 hours, when one half of the water is to be drawn over. The oil having been separated from this in the usual manner, it is to be returned to the still, and the same quantity drawn over, as before, from which the oil must again be separated.

Chevallier gives the *following rules* for the distillation of *essential oils*:—

1. Operate upon *as large quantities as possible*, in order to obtain a *greater product*, and one of *finer quality.*
2. Conduct the distillation *rapidly.*
3. Divide the substances *minutely*, in order to *facilitate* the *extrication* of the oil.
4. Employ *only sufficient water* to prevent the matter operated on *from burning*, and the product from being contaminated with empyreuma.
5. For *substances* whose oil is *heavier* than water, *saturate* or *nearly saturate the water in the still* with *common salt*, to raise the boiling-point, and thus to enable the vapour to carry over *more oil.*
6. Employ, when possible, *water which has been already distilled from off the same substances*, and has thus become saturated with oil.
7. For *oils naturally fluid*, keep the water in the refrigeratory cool; but for *those oils which easily become solid*, preserve it at 80° to 90° Fahr. (?)

To the above may be added:

8. Collect the oil as soon as possible after it separates from the water with which it passes over, and in its subsequent treatment *keep it*, as much as possible, *from free contact with the air.*

Dr. Ure remarks, "The *narrower* and *taller* the *alembic* is, within certain limits, the *greater* will be the *proportion of oil* relative to that of the aromatic water, from like proportions of aqueous and vegetable matter employed." "Some place the *plants* in *baskets*, and suspend these immediately over the bottom of the still, under the water, or above its surface in the steam; but the *best mode*, in my opinion, is to *stuff* an *upright cylinder* full of the plants, and to *drive down through them steam* of any desired force, its tension and its temperature being further regulated by the size of the outlet-orifice leading to the condenser. The cylinder should be made of strong copper, tinned inside, and encased in the worst conducting species of wood, such as soft deal or sycamore."

The *newly-distilled oils* may be separated from adhering water, which frequently renders them partially opake or "cloudy," by repose in a temperature between 60° and 70° Fahr., and subsequent decantation; but to render them *quite dry* (anhydrous) it is necessary to let them stand over some fragments of *fused chloride of calcium.* This is not, however, required with the commercial oils.

The *rectification* of the *volatile oils* is commonly performed without water, by the careful application of a heat just sufficient to make them flow over pretty rapidly, so that they may be kept heated for as short a time as possible. One half, or at most two thirds only, is drawn off; that left in the retort being usually mixed with raw oil intended to be sold in that state. This method often leads to much loss and disappointment, and we have known more than one rather dangerous explosion result from its use. A better plan is to rectify the oil from *strong brine,* and then to separate any adhering water, either by repose or chloride of calcium.

Pres. Volatile oils should be preserved in well-closed and nearly-full bottles, in the shade, and should be opened as seldom as possible. By age they darken, lose much of their odour, increase in density, and become thick and clammy. It is then necessary to distil them, by which the undecomposed portion is separated from the resin. Agitation along with *animal charcoal* will restore their clearness and original colour, but nothing more.

Pur. The *essential* or *volatile oils* of *commerce* are very frequently adulterated with the *fatty oils, resins, spermaceti,* or *alcohol,* or with *other essential oils* of a cheaper kind or lower grade. The presence of the *first three* of these may be readily detected by placing a drop of the suspected oil on a piece of *white paper,* and exposing it for a short time to heat. If the oil is pure it will entirely evaporate; but if adulterated with one of these substances, a greasy or translucent stain will be left on the paper. These substances also remain *undissolved* when the oil is agitated with thrice its volume of *rectified spirit.*

The *presence* of *alcohol* may be detected by agitating the *oil* with a few small pieces of *dried chloride of calcium.* These remain unaltered in a pure essential oil, but dissolve in one containing alcohol, and the resulting solution separates, forming a distinct stratum at the bottom of the vessel. When only a very little alcohol is present, the pieces merely change their form, and exhibit the action of the solvent on their angles or edges, which become more or less obtuse or rounded.

Another test for *alcohol* in the *essential oils* is the *milkiness* occasioned by agitating them with a *little water,* as well as the loss of volume of the oil when it separates after repose for a short time.

A *more delicate test* of *alcohol* in the essential oils than either of the preceding, is *potassium,* as employed by M. Beral:—12 *drops* of the *oil* are placed on a *perfectly-dry watch-glass,* and a piece of *potassium,* about the size of an ordinary pin's head, set in the middle of it. If the small fragment of metal retains its integrity for 12 or 15 *minutes, no alcohol* is present; but if it disappears after the lapse of 5 *minutes,* the oil contains at least 4% of *alcohol,* and if it disappears in less than 1 *minute,* it contains not less than 25% of *alcohol.*

This species of adulteration is very common, as it is a general practice of the druggists to add a little of the *strongest rectified spirit* to their oils to render them transparent, especially in cold weather. *Oil of cassia* is nearly always treated in this way.

The *admixture* of an *inferior essential oil* with one more *costly,* may be best detected by pouring a drop or two on a piece of *porous paper* or *cloth,* and shaking it in the air, when, if occasionally smelled to, the difference of the odour at the beginning and the end of the evaporation will show the adulteration, especially if the added substance is turpentine. The presence of the *latter* may also be detected by agitating the *oil* with *rectified spirit,* when it will remain undissolved.

The *purity* of *essential oils* may likewise, in many cases, be determined by taking their sp. gr.; or, with still greater accuracy and convenience, by measuring their *index of refraction,* as suggested by Dr. Wollaston. A single drop of oil is sufficient for the application of the last method.

The adulteration of a *heavy oil* with a *light one,* or the *reverse,* may be detected by agitating the suspected oil with *water,* when, in most cases, the two will separate and form distinct strata.

Uses, &c. The volatile oils are chiefly used by *perfumers* and *rectifiers,* and in *medicine.* Some of the cheaper kinds are largely employed as *vehicles for colours,* and in the manufacture of *varnishes.* The *dose* of the *aromatic* and *carminative oils,* is from 1 to 10 drops, on sugar, or dissolved in a little weak spirit. This does *not* apply to *oil of bitter almonds*, the dose of which is ¼ to ½ a drop.

The following list includes a short notice of nearly all the volatile oils which have been examined, as well as of some other substances of a similar character, which commonly pass under the name:—

Oil of Alliaria. From the *roots* of *alliaria officinalis* (Andrz.) or *sauce-alone.* Identical with the oil of *black mustard.*

Oil of Allspice. See *Oil of Pimento.*

Oil of American Arbor Vitæ; Huile Cedre Blanc. From the *fresh tops* of *thuja occidentalis* (Willd.) or *American arbor-vitæ tree.* Yellow; fragrant; stimulant. *Used* in frictions for rheumatism. *Prod.* 1½ to 2% (nearly).

Oil of Angelica. From the *dried root* of *angelica archangelica. Prod.* 0·25% (fully).

Oil of Aniseed; Oleum Anisi,—Ph. L. E. & D. *Ol. Essentiale Anisi,*—Ph. L. 1788. From the *fruit* (seeds) of *pimpinella anisum.* Nearly colourless. It is very frequently adulterated with one or other of the cheaper oils, in which case spermaceti or camphor is added to it, to make it "candy." When pure it congeals into a solid crystalline mass on being cooled to 50° Fahr., and does not melt again until heated to about 63°. Treated with *iodine* it quickly congeals into a solid hard mass, with a perceptible increase of temperature, and the development of orange-coloured and gray fumes. Sulphuric acid, with heat, turns it of a rich purple-red colour, and the compound soon afterwards becomes inspissated and hard (*resinified*). In alcohol of 0·806 it is soluble in all proportions, but rectified spirit (0·838) dissolves only 42% of this oil. Sp. gr. (*recent*) 0·9768; (*one year old*) 0·9853 to 0·9855; (*old*) 0·9856 to 0·9900. The *foreign oil* is generally the heaviest.

Oil of aniseed is carminative and pectoral; and both itself and preparations have long been in favour with the masses in coughs, colds, &c. In preparing it care must be taken that the temperature of the water in the receiver and refrigerator does not fall lower than about 68° Fahr. *Prod.* (From the dried fruit of commerce) av. 2% (nearly).

Oil of Star-anise, Badian Oil; Oleum Badiani, Ol. Anisi Stellati,—Lat. From the *capsules* of *illicium anisatum* or *star-anise.* It continues liquid at 35½° Fahr. This, and its weaker reaction with iodine, distinguish it from the preceding compound, which it is commonly used to adulterate. *Prod.* 2% (fully).

Apple Oil, Valerianate of Oxide of Amyle. This is one of the newly discovered artificial "*fruit oils.*" It is formed during the preparation of *valerianic acid* from *potato oil*, and is recognized by the offensive odour of rotten apples evolved during the process. By treating the *crude product* of the distillation with a *solution of pure potassa*, the valerianic acid is removed, and the *volatile oil* obtained nearly pure. Dissolved in *rectified spirit* it forms the new "*Apple Essence*" now so much employed as a flavouring ingredient for confectionery and liqueurs. See *Essences.*

Oil of Arnica; Oleum Arnicæ, Ol. A. Radicum,—Lat. From the *roots* of *arnica montana.* Yellowish-brown. Sp. gr. 0·940. *Prod.* 16 *lb.* yielded 1 *oz.* of oil. The oil from the *flowers of arnica* is blue.

Oil of Asarabacca; Oleum Asari, Ol. Asari Liquidum,—Lat. From the *roots* of *asarum Europæum.* Yellow; glutinous. Two butyraceous oils pass over at the same time.

Oil of Assafœtida; Oleum Assafœtidæ, —Lat. From the *gum resin.* Contains sulphur, and probably phosphorus. Very fœtid and volatile.

Oil of Balm; Oleum Melissæ,—Lat. From the *herb* (melissa officinalis). Pale yellow, fragrant. Sp. gr. 0·970 to 0·975. *Prod.* 100 *lb.* of the *fresh flowering herb* yielded ¼ *oz.* of oil. (M. Raybaud.) A mixture of oil of lemons and rosemary is commonly sold for it.

Oil of Balsam of Peru. See *Cinnameine.*

Oil of Bergamot, Bergamot, Essence of do.; Oleum Bergamii, Ol. Bergamotæ,—Lat. By expression from the *yellow portion* of the *rind* of the fruit of *citrus bergamia* or *bergamot orange.* Pale greenish-yellow; highly fragrant. It is obtained purer by distillation, but its perfume is then slightly less delicate. Sp. gr. 0·875 to 0·885. *Prod.* The rind of 100 bergamot oranges yielded by distillation nearly 3 *oz.* of oil. (M. Raybaud.)

Oil of bergamot is frequently adulterated with rectified spirit, or with the oils of lemons, oranges, or turpentine. The presence of these substances may be detected in the manner explained at page 865, as well as by the altered density of the oil. Pure bergamot oil is *much more* soluble in rectified spirit than either of the others, and is further distinguished from them by its free solubility in liquor of potassa, forming a clear solution.

Oil of Bitter Almonds, Essence of do.; Oleum Amygdalæ Amaræ, Ol. A. Essentiale, —Lat. From the *ground cake of bitter* *almonds* from which the fixed oil has been expressed. The common plan is to soak the cake (crumbled to fragments) for about 24 hours in twice its weight of water, to which ⅓rd or ¼th of its weight of *common salt* has been added, and then to submit the whole to distillation, allowing the first half of the water that passes over to deposit its oil, and to run back again into the still. Pale golden-yellow; colourless when rectified; tastes and smells strongly nutty, like peach-kernels. It consists of 85% to 90% of *hydruret of benzoyle* and 8% to 12% of *hydrocyanic acid*, with a variable quantity of *benzoic acid* and *benzoine.* The density varies a little with the age of the oil, and the temperature and rapidity with which it has been distilled. Sp. gr. (*recent*) 1·0525; (*trade crude oil*) 1·079, (Mr. G. Wippel); (*old*) 1·081, (1·0836,—Pereira.) "Essential oil of almonds, free from adulteration, should have a sp. gr. at most of 1·052." (Ure.) According to Prof. Redwood, the density may vary from 1·0524 to 1·0822. The *light oil* contains the most hydruret of benzoyle, and the *heavy oil* the most benzoine. *Prod.* From less than 0·2 to 0·5%.

Pur. This oil is very generally adulterated with cheaper oils, and in nearly every case with alcohol. When it is pure—Mixed with *oil of vitriol* it strikes a *clear* crimson-red colour, without visible decomposition.—Mixed with an *alcoholic solution of potassa*, crystals are eliminated.—*Iodine* dissolves only partially and slowly in it, without further visible results.—*Chromate of potassa* does not affect it.—*Nitric acid* (sp. gr. 1·42) causes no immediate reaction, and in the course of 3 or 4 days crystals of benzoic acid begin to appear; but if only 8% or 10% of alcohol or rectified spirit is present, a violent effervescence speedily commences, and nitrous fumes are evolved. By using *nitric acid*, sp. gr. 1·5, the smallest quantity of alcohol may be detected.

Obs. This oil does not pre-exist in the almond, but is formed by the action of amygdaline on emulsine, in the presence of water. It is essentially a mixture of hydruret of benzoyle and prussic acid, and, owing to the presence of the last substance, is highly poisonous. It is occasionally employed as a substitute for hydrocyanic acid in medicine; but its principal consumption is as a flavoring ingredient and a perfume by cooks, confectioners, liquoristes, and perfumers. For this purpose it is dissolved in rectified spirit. See *Essences. Dose.* ¼ to 1 drop.

An oil closely resembling that from bitter almonds is obtained by distillation from the leaves of the peach and cherry-laurel, the bark of the plum-tree, the bruised kernels of cherries, plums, and peaches, the "pips" of apples, and from several other vegetable substances that possess a nutty odour and flavour.

Oil of Almonds (Non-poisonous). This is simply the ordinary *oil of commerce* freed from hydrocyanic acid, and is intended to be substituted for the crude, poisonous oil for domestic purposes. Unfortunately, the purified essence does not keep well, and is often converted after a few months into little else than a solution of benzoic acid, almost devoid of the usual odour and flavour of the bitter almond. "No wonder then, under such circumstances, that the public preferred the preparations they had been accustomed to, which were not so liable to change." (Redwood.) The following methods have been adopted for this purpose:—

1. (Liebig.) Agitate the *crude distilled oil* with *binoxide of mercury*, in slight excess, and after a few days' contact, rectify the oil from a little *fresh binoxide of mercury.* The product is quite pure, when the process is properly managed. The bicyanide of mercury thus formed may be either employed as such, or reconverted into *oxide of mercury* and *hydrocyanic acid.*

2. (Mr. Mackay.) *Commercial oil of almonds*, 1 *lb.*; *fresh-slaked lime*, q. s. to form a milk-like liquid; afterwards add of *liquor of potassa*, 1½ *lb.*; *water*, 3 pints; agitate occasionally for 48 hours, then distil over the oil, and rectify it from a *fresh* mixture of *lime* and *potassa.*

3. (Redwood.) The *oil* is mixed with an equal quantity of *water*, and the mixture is digested in a water-bath with *red oxide of mercury*, and small quantities of *fresh-slaked lime* and *protochloride of iron*, with as little access of air as possible; as soon as decomposition of the acid has taken place, the whole is introduced into a *copper retort*, and submitted to distillation. The *product* is *perfectly free* from hydrocyanic acid. The first process is, however, the simplest, cheapest, and best.

Prop., &c. Sp. gr. 1·051. (Mr. G. Wippell.) That of pure, colourless hydruret of benzoyle is 1·043; it boils at 356° Fahr.; is soluble in 35 parts of water, and in all proportions in alcohol and ether. Exposed to the air it greedily absorbs oxygen, and becomes converted into a mass of crystallized benzoic acid. The "purified oil of almonds" does the same, only less rapidly.

Oil of Almonds (Artificial); *Essence of Mirbane, Nitrobenzole.* The preparation of this article on the *small scale* is explained at *page* 824. It is now extensively prepared as a substitute for the oil of almonds obtained by distillation. The following is Messrs. Mansfield's process:—The *apparatus* consists of a large glass worm, the upper end of which is divided into two branches, gradually dilating so as to form two funnel-shaped tubes. Into *one* of these *concentrated nitric acid* is poured, and into the other *benzole*, which need not, for this purpose, be chemically pure. These bodies meet at the point of junction of the two tubes, and the rate of their flow is regulated by any appropriate means. Chemical reaction instantly takes place, and the new compound is cooled by its passage through the worm, which is refrigerated for the purpose. It has then only to be washed with water or a very weak solution of carbonate of soda for the process to be complete. The *product* has the sp. gr. 1·209, boils at 415° Fahr., has an intensely sweet taste, and an odour closely resembling, but not actually identical with that of oil of bitter almonds. Unlike genuine oil of almonds or hydruret of benzoyle, it is insoluble in water, and does not distil without suffering partial decomposition. It is chiefly used to scent soaps, and to adulterate the genuine oil. The *benzole* for this purpose is obtained from coal-tar. See *Benzonitrile* and *Nitrobenzole.*

Brandy Oil. See *Grape Oil.*

Oil of Buchu; Oleum Barosmæ, Ol. Diosmæ. Yellow, lighter than water; smells of the leaves.

Oil of Cajeput, Cajaputi Oil, Kyapootie do.; Oleum Cajuputi,—Ph. L. E. & D. From the *dried leaves* of the *malaleuca leucadendron* (Linn.); or according to some from *m. minor.* (Smith.) Colourless, when pure, (that of commerce is usually green;) odorous; aromatic; taste, hot and penetrating. Its odour has been compared to a mixture of those of camphor and cardamoms. It boils at 343° Fahr. Sp. gr. 0·925 to 0·927. When rectified, about ¾ths of the quantity passes over *colourless*, and has the density 0·897; the remaining portion is *green*, and has the density 0·920 to 0·925. Its green colour is derived from chloride of copper, the presence of which may be recognized by the red precipitate occasioned by agitating the oil with a solution of ferrocyanide of potassium. (Guibourt.) From the East Indies.

Pure oil of cajeput is slightly soluble in water; entirely and freely soluble in alcohol; dissolves iodine; and when dropped on water rapidly diffuses itself over the surface, and soon completely evaporates. A spurious kind, made of oil of rosemary, flavoured with camphor and the oils of peppermint and cardamoms, and coloured with verdigris, is occasionally met with in the shops.

Oil of cajeput is a powerful antispasmodic and diffusible stimulant. *Dose.* 3 to 6 drops, on sugar; in cholera, colic, epilepsy, hysteria, rheumatism, spasms, toothache, &c.

Oil of Camphor; Oleum Camphoræ, Ol. C. Volatile,—Lat. Obtained from incisions in the *wood* of the *camphor tree* of Borneo and Sumatra (*dryobalanops aromatica* or *camphora*), in which it exists in cavities in the trunk; also by *distillation* from the *branches* of the *laurus camphora* or *laurel* (true) *camphor tree.* Colourless, when rectified. Sp. gr. 0·910. *Prod.* 60 *lb.* of the crude brown oil yields 40 *lb.* of *pure white oil*, and 20 *lb.* of *camphor.* It rapidly oxidizes in the air. *Used* to scent soap.

Oil of Camphor (Nitric). See *Mixed Oils.*

Oil of Caraway; Oleum Carui,—Ph. L. E. & D. *Ol. C. Essentiale,*—Ph. L. 1788. From the *seeds of carum carui.* Nearly colourless; aromatic; carminative. Sp. gr. 0·940; (*old*) 0·946 to 0·950. *Prod.* Av. 5% (nearly). It is frequently adulterated with oil of cumin.

Oil of Cardamoms; Oleum Cardamomi, Ol. C. Essentiale,—Lat. From the *seed* of *elettaria cardamomum* (Maton), or *true cardamom.* Colourless; fragrant; carminative. Sp. gr. 0·943. *Prod.* 5% (nearly). The *capsules* (lesser cardamoms) yield only about 1% of oil. (M. Raybaud.)

Oil of Carline Thistle; Oleum Carlinæ, Ol. C. Radicis, — Lat. From the *root.* Odorous; heavier than water.

Oil of Cascarilla; Oleum Cascarillæ,—Lat. From the *bark* of *croton eleuteria* (Swartz.) or *cascarilla tree.* Very fragrant. *Prod.* 0·4% to 0·75%.

Oil of Cassia, Oil of China Cinnamon; Oleum Cassiæ,—Ph. E. From *cassia buds*, or from *cassia bark.* Golden yellow; aromatic; fragrant. It is generally adulterated with rectified spirit. Nitric acid converts the pure oil into a crystalline mass. Sp. gr. 1·071 to 1·073; (*old*) 1·078 to 1·090. *Prod.* From the *buds*, 1% (barely); from the *bark* of commerce, 0·75%. It is frequently sold for oil of cinnamon.

Oil of Cebadilla, Oil of Sabadilla; Oleum Cebadillæ, — Lat. A green butyraceous matter, obtained from *asagræa officinalis.*

Oil of Cedar-wood. From the *wood* of *pinus cedrus*, or *larix cedrus.* It consists of two hydrocarbons. One, a volatile liquid (*cedrene*), and the other, a solid, crystalline compound containing oxygen. *Prod.* 0·2 to 0·25%.

Oil of Cedrat, Essence of Cedra; Oleum Cedri, Ol. Citri Finum,—Lat. From the *exterior yellow rind* of the *fruit* of *citrus medica* (Risso), or *citrons*, either by expression or distillation, as oil of begamot. The first portion of oil that comes over is colourless; the latter portion, greenish. Very fragrant. Sp. gr. 0·847. *Prod.* 100 citrons yield nearly 1 fl. oz. of pale, and ½ fl. oz. of green oil.

Oil of Celery Seed; Oleum Apii,—Lat. From the *fruit* (seed) of *apium graveolens* (Linn.) Diuretic; stimulant. *Prod.* ¾ to 1% (nearly).

Oil of Chamomile, Oil of Roman do.; Oleum Anthemidis,—Ph. L. E. & D. *Ol. Chamæmeli; Ol. C. Florum,*—Ph. L. 1721. *Ol. Essentiale ex Floribus C.,*—Ph. L. 1746. From the *flowers* of *anthemis nobilis* (Linn.) In the Ph. L. *English oil of chamomile* ("anthemidis oleum, Anglicum") is ordered. Blue; turns yellow and brown by exposure and age; odour characteristic. Sp. gr., *English* (from the flowers), 0·9083; *foreign*, 0·9289. *Prod.* Fresh flowers, 0·1% (barely); recently dried (finest commercial), 0·5%; av. of 6 dried samples, 0·25% (nearly). If much water is employed, even the above small quantities of oil will not be obtained.

Oil of chamomile is reputed antispasmodic, tonic, and stomachic. 1 to 3 drops on a lump of sugar, taken just before retiring to rest, is an excellent preventive of nightmare, and will frequently induce quiet sleep where more active substances have failed. Unfortunately the oil of the shops is generally either adulterated or old, and commonly both, in which case the oil acts as an irritant. A common plan is to mix it with old oil of lemons, a fraud which may be detected by the lessened density of the oil, and by its diminished solubility in rectified spirit.

Oil of Cherry-laurel; Oleum Lauro-cerasi,—Lat. From the *leaves* of *prunus lauro-cerasus* (Linn.), or *common laurel.* Closely resembles oil of almonds, but is said to be weaker. Like that substance it is powerfully *poisonous. Prod.* 100 *lb.* fresh leaves (*undeveloped*, June), 10·13 *oz.;* do. (*half-grown*, June), 7·2 *oz.;* do. (*full-grown*, 8 weeks on tree, July), 4·96 *oz.;* do. (*do.*, 3 months on tree, Sep.), 7·04 *oz.;* do. (15 months on tree), 2·24. (Christison.)

Oil of Chervil; Oleum Chærophylli,—Lat. From the bruised *fresh herb*, macerated for 2 or 3 days in *salt-and-water*, and then distilled.

Oil of Cinchona; Oleum Cinchonæ,—Lat. From *cinchona bark.* Butyraceous; smells of the bark. 20 *lb.* yield only 2 gr. (Trommsdorff.) *The odour of bark* is imitated by a solution of turmeric in potash, and by chloride of iron.

Oil of Cinnamon, Hydruret of Cinnamyle, Hydride of do.; Oleum Cinnamomi, —Ph. L. E. & D. *Ol. C. Veri.* From the *bark* of *laurus cinnamomum* (Linn.; *cinnamomum zeylanicum,*—Nees), macerated for several days in *salt-and-water*, and then distilled. Yellowish or red; very aromatic; both odour and taste resemble that of the bark. Sp. gr. 1·035. *Prod.* 11 *lb.* yielded 1 *oz.;* 100 *lb.* yielded 1·56 *oz.* (M. Raybaud.)

Pur. Oil of cinnamon, owing to its high price, and the consequent premium for its adulteration, can scarcely be obtained pure from the shops of this country. Oil of cassia and highly rectified spirit are the substances usually employed for this purpose. The increased sp. gr. resulting from the *first*, and the diminished sp. gr. from the *second*, afford ready means of detecting these frauds. The presence of oil of cassia may also be detected by an experienced person by the odour, which differs a *little* from that of pure oil of cinnamon. Oil of cassia is less limpid than oil of cinnamon, and it stands a greater degree of cold without becoming turbid or congealing. "Wine-yellow, when recent; cherry-red, when old: odour, purely cinnamomic; nitric acid converts it nearly into a uniform crystalline mass." (Ph. E.) During this reaction the odour of bitter almonds is perceptible. Both oil of cassia and oil of cinnamon are thus converted into a brown balsam; with oil of cassia, however, a brisk decomposition occurs sooner, and at a slighter heat. It also forms a crystalline compound with ammonia. These reactions, unfortunately, are not characteristic. "The most distinguishing characteristic of the cinnamon oils is, perhaps, their relation to the alcoholic solution of caustic potash. Both dissolve in it *readily* and *clear*, with a reddish yellowish-brown colour; after some time, however, the solution becomes *very turbid*, and a rather heavy undissolved oil precipitates, when the solution gradually becomes clear again." (Ure.) The palest oil is considered the best.

Obs. Oil of cinnamon is chiefly imported from Ceylon, where it is distilled from bark that is unfit for exportation. The *dark coloured oil* is usually rectified, when two *pale oils* are obtained; one *lighter*, and the other *heavier* than water; but 10% of oil is lost by the process. The oil distilled from the *root* of the tree (*ol. cinnamomi radicis*) is much weaker than that from the bark. The oil from the *leaves* (*ol. c. foliorum*), also imported from Ceylon, smells of cloves, but has a less density than oil of cloves.

Oil of cinnamon consists essentially of *hydruret of cinnamyle*, but, unless when very recently prepared, it also contains a variable proportion of cinnamic acid, formed by the oxidation of the hydruret.

Oil of Citrons, Essence of do.; Oleum Citri,—Lat. From the *lees* of *citron juice;* or, from the *peels*, as oil of lemons or bergamot. The last generally goes by the name of *oil of cedrat*. Both are fragrant. (See above.)

Oil of Citron-flowers; Oleum Citri Florum,—Lat. Amber-coloured; highly fragrant. *Prod.* 60 *lb.* yield 1 *oz.*

Oil of Cloves, Essence of do.; Oleum Caryophyllorum; Ol. Caryophylli,—Ph. L. E. & D. *Ol Eugeniæ C.*,—Ph. D. 1826. From the *unexpanded flowers* (cloves) of the *caryophyllus aromaticus* (Linn.) or *Molucca clove-tree*, soaked for some time in salt-and-water, and then submitted to distillation; the distilled water, after having deposited its oil, being returned 3 or 4 times into the still, and again "worked off" from the same materials. Nearly colourless, when recent, gradually becoming pale-yellow, and ultimately light-brown by age; highly aromatic, with the characteristic odour and flavour of cloves. It is the least volatile of all the essential oils. Sp. gr. 1·055 to 1·061. *Prod.* 16% to 22%.

Pur. Oil of cloves is frequently adulterated with inferior essential oils, especially with those of pimento, pinks, and clove-gillyflowers, and occasionally, with castor-oil. —1. *Pure oil of cloves* forms a butyraceous coagulum when shaken with pure *liquor of ammonia*, which crystallizes after fusion by a gentle heat.—2. Treated with an *alcoholic solution of potassa*, it entirely congeals into a crystalline mass, with *total loss* of its characteristic odour.—3. Shaken with an equal volume of strong *caustic soda lye*, it forms, on repose, a mass of delicate lamellar crystals.—4. *Solution of chromate of potassa* converts it into brown flakes, whilst the salt loses its yellow colour. — 5. *Chlorine* turns it first *green*, and then brown and resinous.—6. *Nitric acid* turns it red, and a reddish-brown solid mass is formed; with heat it converts it into oxalic acid.—7. It dissolves freely in *sulphuric acid* (oil of vitriol), yielding a transparent, deep-reddish brown solution, without any visible decomposition.—8. Mixed, *gradually*, with about ⅓rd of its weight of *oil of vitriol*, an acid liquor is formed, together with a resin of a rich purple colour, which, after being washed, is hard and brittle, and forms a red tincture with rectified spirit, which is precipitated of a blood-red colour by water.—9. It dissolves *iodine* freely, without any marked reaction.—10. It dissolves *santaline* freely.

Obs. In the distillation and rectification of clove oil, a heavy oil, sp. gr. 1·079 (*Clovic acid, Eugenic acid, Caryophyllic acid*), comes over first, followed by a light oil, sp. gr. 0·918, (*clove hydrocarbon*); by rectification much of the light oil is lost, and the product becomes denser. (1·361,—Bonastre.)

Cognac Oil. See *Oil of Grape Spirit.*

Oil of Copaiba, Oil of Capivi; Oleum Copaibæ,—Ph. L. & E.—1. (Ph. E.) *Balsam of capivi*, 1 oz.; *water*, 1½ pint; distil, returning the water into the still, until oil ceases to pass over.

2. (*Wholesale.*) From the *crude oil* which separates during the manufacture of "*specific solution of copaiba*" and "*soluble capivi*," by distillation along with a little salt-and-water.

Pur., &c. Colourless, when pure; that of commerce has frequently a greenish tinge, derived from the copper utensils; odour, not disagreeable when recent. Sp. gr. 0·876 to 0·878. *Prod.* 50% to 55%. When adulterated with oil of turpentine, its solubility in rectified spirit is greatly diminished, and the solution is turbid. *Dose.* 10 to 15 drops, in sugar; in the usual cases in which copaiba is ordered.

Oil of Coriander; Oleum Coriandri,—Lat. From the *seeds* of *coriandrum sativum.* Yellowish; aromatic; carminative. *Prod.* (Dried fruit) 5½ to 6%.

Corn Oil. The name given by Mulder to a peculiar fatty compound found in the *fusel oil* of the distilleries of Holland. It has a very powerful odour, resembling that of some of the umbelliferous plants, and is unaffected by caustic potassa. See *Fusel Oil.*

Oil of Cubebs; Oleum Cubebarum; Ol. Cubebæ,—Ph. E. & D. From the *fruit* of *piper cubeba*, or *cubebs*, coarsely ground. Aromatic; hot; and bitter tasted; odour, that of the fruit; colourless, when pure. Sp. gr. 0·929. *Prod.* 9% to 11%.

Pur., &c. When pure, *iodine* has little action on this oil, and immediately gives it a violet colour, without any very marked reaction; *nitric acid* turns it opaque, and the mixture changes to a pale red when heated; *sulphuric acid* turns it of a crimson-red. When *adulterated* with *oil of turpentine*, both its viscidity, solubility in rectified spirit, and its density, are lessened; when mixed with *castor oil*, it leaves a greasy stain on paper.—*Dose.* 10 to 15 drops, in the usual cases in which cubebs in substance is given.

Oil of Cumin; Oleum Cumini, Ol. Cymini, —Lat. From the *fresh fruit* (seed) of *cuminum cyminum* or *cumin.* Pale yellow; smells and tastes strongly of the seeds. Sp. gr. 0·975. *Prod.* 2½ to 3%.

Obs. Oil of cumin is a mixture of two oils differing in volatility, and which may be separated by careful distillation. The more volatile one has been named *cymol;* the other, *cuminol.*

Oil of Dill; Oleum Anethi,—Ph. L. & E. From the bruised *fruit* (seed) of *anetheum graveolens.* Pale yellow; odour, that of the fruit; taste, hot and pungent; carminative. Sp. gr. 0·881 to 0·882. *Prod.* 4% (nearly).

Oil of Elder, Attar of Elder Flowers; Oleum Sambuci,—Ph. L. 1836. From *elder flowers* (sambucus nigra). Butyraceous; odour not very marked.

Oil of Elemi; Oleum Elemi,—Lat. From the resin. Isomeric with oil of turpentine.

Oil of Ergot, Ethereal do. do.; Oleum Ergotæ, Ol. E. Æthereum, Ol. Secalis Cornuti,—Lat. Prepared by evaporating the *ethereal tincture* at a very gentle heat, and, preferably, allowing the last portion of the ether to escape by spontaneous evaporation. Brownish-yellow; lighter than water; soluble in ether and liquor of potassa; only partly soluble in alcohol. It appears to be a mixture of volatile and fixed oil, with some resinous matter. *Dose.* 10 to 20 drops, in hemorrhages; 10 to 12 drops every 3 or 4 hours, in diarrhœa; 20 to 50 drops, as a parturifacient, &c. *Externally,* in rheumatism, toothache, &c.

Obs. The above is the oil of ergot now employed in medicine. It must not be confounded with other preparations occasionally called by the same name, but which differ from it in character. Among the latter are the following:—

a. A *fixed oil* obtained by distilling off the spirit from the *alcoholic tincture.* It has the odour of rancid fish-oil, and the distilled spirit has also a putrid odour.

b. A *fixed oil,* obtained from *coarsely powdered ergot* by strong pressure between iron plates, at a heat of about 212° Fahr. It is fluid, coloured, smells strongly of the drug, but is nearly destitute of its leading qualities. Both the preceding contain some volatile oil and resinous matter.

c. An *empyreumatic oil* obtained by distilling ergot *per se.* It is light-brown, viscid, acrid, and nauseous.

d. A *volatile oil,* obtained by digesting *powdered ergot* in *liquor of potassa* at 125° Fahr., diluting the saponaceous mass thus formed, with one-half to an equal weight of *water,* neutralizing the alkali with *dilute sulphuric acid,* and then submitting the whole to distillation in a chloride of sodium or oil bath. It is white, adhesive, butyraceous, and tasteless. It appears a product, rather than a simple educt.

e. This is the *ethereal oil,* first described, in its purest form. It is colourless, translucent, oily, and acrid-tasted, with the odour of ergot; it has a high boiling-point, at which it suffers partial decomposition, but may be volatilized at a lower temperature, like the other oils. By long exposure to heat it thickens and partly solidifies; light and air darken it; it is lighter than water; very slightly soluble in water, but sufficiently so to impart to it its peculiar odour; it is soluble in pure alcohol, in ether, the volatile and fixed oils, alkaline lyes, liquor of ammonia, creasote, and naphtha. The dilute mineral acids clear it, but do not produce any marked reaction.

Ethereal Oil. See *Oil of Wine.*

Oil of Fennel; Oleum Fœniculi,—Ph. L. *Ol. F. Officinalis,*—Ph. E. & D. *Ol. F. Dulcis.* From the *fruit* or *seed* of *fœniculum dulce* or *sweet fennel* (Ph. L.) Colourless; odour that of the plant; tastes hot and sweetish; congeals at 50° Fahr.; carminative and stomachic. It consists of two oils; the one solid and identical with that of oil of aniseed. When treated with nitric acid it affords benzoine. Sp. gr. 0·997. *Prod.* Dried fruit (*of commerce*), 3% to 3·5%. The *flowering herb* yields 0·35% of a similar oil.

Obs. The oil of fennel of the shops is the product of the fruit of *fœniculum vulgare,* or common, wild, or bitter fennel (*anethum fœniculum,*—Linn.) It closely resembles that of sweet fennel, but is scarcely so agreeable either in taste or smell. According to Dr. Ure, it does not congeal until cooled to 14° Fahr. (?) It is chiefly used to scent soaps.

Fruit Oils, Fruit Essences. The highly interesting artificial productions of this kind, which attracted so much attention in the Great Exhibition of 1851, are noticed under the heads *Apple Oil, Bitter Almond do., Jargonell-pear do., Pine-apple do., &c.*

Fusel Oil, Fousel do., Fuselol; Potato Oil, Oil of Potato Spirit; Grain Oil. This is the common name given to the offensive, strong-smelling oil produced along with alcohol during the fermentation of grain, potatoes, &c., on the large scale, and which gives the peculiar and disagreeable flavour and odour to raw whiskey. It is found chiefly in the last portion of the spirit which passes over, called the "*feints*," to which it imparts its characteristic odour and flavour. By rectifying the *feints* at a very gentle heat, most of the alcohol and water first pass over together with only a little fusel oil, whilst the latter forms the residuum in the still. The names of *grain-spirit oil*, *marc-brandy oil*, *potato-spirit oil*, *&c.*, are given to the *crude oil* thus obtained, according to its source. In each case it essentially consists of *hydrated oxyde of amyle* (noticed at page 65), but trifling and variable quantities of other organic compounds are mixed with it, which slightly modify its character, more particularly its odour and flavour. The *oil of potato-spirit* is the purest form of *crude fusel oil.*

The exertions of the distiller are directed, as much as possible, to lessen the formation of fusel oil during the fermentation of his worts, and to eliminate, during the distillation and rectification of his liquors, the greatest possible proportion of that with which they may be contaminated.

Fusel oil is a nearly colourless volatile liquid, with a rather high boiling-point, a durable, penetrating, offensive smell, and an acrid burning taste; when swallowed, it occasions nausea, giddiness, headache, &c.; in slightly larger quantities, vomiting, delirium, oppressive respiration, and lessened sensibility to pain; its vapour also produces these effects. In quantity, it is a narcotic poison. The greater intoxicating power of whiskey, more especially that from raw grain, than other spirit, is due to the larger quantity of fusel oil which it contains. This appears to be well known to the lower class of *whiskey drinkers* in these countries, and to the consumers of *corn brandy* in some of the northern parts of Europe. The last are said to frequently demand to be served with "a glass of good fusel." In England, fusel oil is chiefly used for lamps and varnishes. See *Corn*, *Grain*, and *Potato Oil*, *Amyle*, *Distillation*, *&c.*

Fusel Oil (Purified); *Amylic Alcohol; Alcohol Amylicum*,—Ph. D. Introduce the *ordinary fusel oil* of the distilleries into a small still or retort, connected with a condenser, and apply heat; as soon as the oil begins to flow over, unmixed with water, the receiver should be changed, and the distillation resumed, and carried nearly to dryness; the product in the second receiver, and the oily matter which separates from the water in the first receiver, are to be reserved for use. It is employed in the preparation of *valerianate of soda*, Ph. D. Pure *amylic alcohol* can only be obtained by the process given at page 55.

Oil of Galbanum, Oleum Galbani,—Ph. Bor. From *galbanum*, 2 ℔; *water*, 16 fl. oz.; distilled together. Yellow; resembles oil of assafœtida, but milder.

Oil of Garlic; Sulphuret of Allyle, Sulphide of do. From the bruised *bulbs* or "*cloves*" of *allium sativum* (Linn.) or *garlic.* It possesses the peculiar odour, taste, and other properties of the bulbs in a highly exalted degree. When a mixture of oil of black mustard and sulphuret of potassium is exposed in a sealed glass-tube to a temperature above that of 212° Fahr., *sulphocyanide of potassium* and *garlic oil* are formed. On the other hand, when the compound of garlic oil and bichloride of mercury (formed by adding to an alcoholic solution of the oil a like solution of the bichloride) is gently heated with sulphocyanide of potassium, *mustard oil*, with all its characteristic properties, are called into existence.

Oil of Garlic (Artificial). See *above.*

Oil of Gaultheria. See *Oil of Partridge Berry.*

Oil of Gentian; Oleum Gentianæ,—Lat. From the *root.* Butyraceous; smells strongly of gentian. 3 cwt. yield 1 dr. (barely).

Oil of Geranium. The oil of commerce which passes under this name is imported from the East Indies, and is not obtained from any species of geranium or pelargonium. A small quantity of a highly fragrant oil may, however, be obtained from the herbaceous portions of some of the cultivated varieties of the latter.

Oil of Ginger; Oleum Zingiberis,—Lat. From the *dried root* (rhizome) of *zingiber officinale* (Roscoe) or *ginger* of commerce. Bluish-green; possesses a less agreeable odour than that of good ginger, without any pungency. *Prod.* $\frac{11}{16}$ of 1% (M. Raybaud.)

Oil of Grain-spirit, *Grain Oil.* Two distinct substances are found in spirit distilled from fermented grain; one of which is butyraceous and highly offensive (*corn oil* of Mulder—?), the other liquid (*crude fusel oil*). The relative proportions of these substances to each other, and to the spirits which they contaminate, vary with the materials and the management of the process. The *grain oil* of the *London rectifiers*, consists chiefly of fusel or potato oil, mixed with alcohol and water, and with small and variable proportions of solid ethyle and amyle compounds of certain fatty acids (œnanthic and margaric ?). The latter are said to be similar to the butyraceous matter before referred to, as well as the solid fat of the whiskey-distilleries conducted on the old plan. According to Mr. Rowney, the fusel oil of the Scotch distilleries contains capric acid. See *Corn Oil, Fusel Oil, &c.*

Grape Oil, Brandy do., Cognac do. This is sulphate of oxide of amyle. It is *prepared* by dissolving the *fusel oil of marc-brandy* in *strong rectified spirit*, and then adding a sufficient quantity of *concentrated sulphuric acid* to form a sulphate; alcohol and excess of acid is removed by washing the newly-formed compound with water. Dissolved in rectified spirit, it forms "*brandy essence*," which is used to impart the Cognac flavour to *plain spirit.* See *Essences* and *Oil of Marc-brandy.*

Grass Oil. Several of the grasses (*gramineæ*) yield fragrant volatile oils, among the most remarkable of which are those obtained from *andropogon nardus, a. schœnanthus* and *anthoxanthum odoratum.* See *Grass Oil* (of Namur), *Oil of Lemon-grass, Oil of Spring-grass, &c.*

Grass Oil (of Namur); *India Grass-oil.* From *andropogon calamus aromaticus* (Royle), supposed to have been the "sweet cane" and "rich aromatic reed from a far country," of Scripture; formerly supposed to be obtained from *andropogon ivrandcusa.* Stimulant and highly fragrant.

Oil of Guiana-laurel. Isomeric with oil of turpentine, but differs from it in its physical properties.

Oil of Hemlock; Oleum Conii Volatile, —Lat. Smells of the plant. It is said not to be poisonous when distilled at a low temperature.

Oil of Hops; Oleum Lupuli,—Lat. From *commercial hops* by distillation along with *water.* It may also be collected during the brewing of beer. Odorous; acrid; narcotic; soluble in water; becomes resinous by exposure and age. Sp. gr. 0·910. Chiefly used to increase the aroma and flavour of old or damaged hops.

Oil of Horse-mint; Oleum Monardæ,—Ph. U. S. From the *fresh herb* of *monarda punctata*, a plant indigenous in the U. S. of America. Dark amber-coloured; fragrant; pungent; carminative; rubefacient; and vesicant.

Oil of Horse-radish; Oleum Armoraciæ, Lat. From the *fresh roots* of *cochlearia armoracia* (Linn.) or *common horse-radish.* Pale yellow; heavier than water; acrid; vesicant; identical with that from black mustard. *Prod.* 0·5% (nearly.)

Oil of Hyssop; Oleum Hyssopi,—Lat. From the *flowering herb* of *hyssopus officinalis.* Aromatic; stimulant. *Prod.* 0·25 to 0·33%.

Oil of Jargonelle Pear. See *Pear Oil.*

Oil of Jasmin (Volatile); *Oil of Jessamine; Oleum Jasmini, Ol. J. Volatile,*—Lat. From the *flowers* of *jasminum grandiflorum* (Linn.), carefully picked, by placing them in alternate layers with *cotton wadding* imbued with *olive oil,* in any suitable vessel, and renewing the flowers till the fixed oil becomes strongly odorous, and then distilling the wadding along with a *little water.* The *volatile oils* of *hyacinths, jonquil, tuberose, violets,* and most of the more delicate flowers, are obtained in the same way. *Used* in perfumery. From the East Indies.

Oil of Juniper; Oleum Juniperi,—Ph. L. E. & D. *Ol. è baccis, J.,*—Ph. L., 1721. *O. Essentiale è b. J.,*—Ph. L., 1746. From either the *wood, tops,* or *berries,* preferably the last. The berries should be chosen *fully grown,* but still *slightly green,* and should be bruised before being placed in the still. In the Ph. L., English oil of juniper (*ol. juniperi, Anglicum*) is ordered. Colourless, or very pale greenish-yellow; odour and taste, sweet and terebinthinate; rather viscid; soluble in rectified spirit; rendered opaque and resinous by exposure and age. It is reputed carminative and diaphoretic, and possesses powerful diuretic properties. Sp. gr. 0·911 (*English,* 0·8688, *Foreign,* 0·8834,—Brande). *Prod.* Green berries, 0·25%; ripe, do. (*one year old*), ¾ to 1% (fully).

Pur. It is frequently adulterated with oil of turpentine, a fraud readily discovered by the lessened density, viscidity, and solubility in rectified spirit, of the oil.

Obs. Oil of juniper consists of two oils,—*one,* white and most volatile, sp. gr. 0·8393; the *other,* dark-coloured and less volatile, sp. gr. 0·8784; together with some resin left in the retort.

Krumholz Oil; Oleum Templinum,—Lat. From *Hungarian balsam,* a terebinthinate exudation from the *pinus pumilio* (Willd.), or *mountain pine* of Southern Europe. Fragrant; golden-yellow; tastes oily, acidulous, and resinous.

Oil of Laurel (Volatile); *Oil of Sweet Bay; Oleum Lauri Volatile, Ol. L. Essentiale,*—Lat. From either the *berries* or *leaves* of *laurus nobilis* (Linn.) or *sweet bay-tree.* Pale-yellow, clear, odorous, aromatic, stimulant, and narcotic. Sp. gr. 0·871. *Prod.* From the leaves, ¾ to 1% (fully).

Oil of Laurel (Native); *Laurel Turpentine; Oleum Lauri Æthereum Nativum,*—Lat. From incisions in the *bark* of *azeyte de sassafras.* Sp. gr. 0·8631. From Demerara. Resembles the oils of the balsamic turpentines.

Oil of Lavender, Essence of do.; *Oleum Lavandulæ,*—Ph. L. *Ol. L. Veræ,*—Ph. E. & D. *Ol. L. Spicæ; Ol. L. Essentiale,*—Ph. L., 1788. *Ol. L. Florum,*—Ph. L., 1726. The "oil (*oleum lavandulæ, Anglicum*) distilled from the flowers" of "*lavandula vera* (*l. spica,* var. *a.,* Linn.),"—Ph. L. Very pale lemon-yellow; highly fragrant; taste, warm and not disagreeable; carminative, antispasmodic, and stimulant. Sp. gr. 0·877 to 0·905. According to Mr. Brande, the sp. gr. of the oil obtained from the flowers only, is 0·8960; that from the *whole plant,* 0·9206. The lightest is esteemed the best. *Prod.* Flowers, 1½ to 2% (nearly). The whole of the *flowering herb* is commonly distilled. According to Raybaud, the herb, after flowering (Sept.), yields the most oil.

Pur. Alcohol is the substance commonly used to adulterate this oil; but, occasionally, oil of bergamot is used for the same purpose. If the density is below 0·87, there is reason to suspect adulteration. When pure,—1. *Sulphuric acid* turns it reddish-brown, and the reaction is accompanied by strong inspissation.—2. It fulminates quickly and violently with iodine, and the thick syrupy residue possesses a pungent, acid, balsamic odour. The oils of the other labiate plants fulminate much less powerfully with iodine. The presence of alcohol weakens but does not destroy the action of this test, unless it is added in an equal volume, when only a lively effervescence, and a disengagement of orange-coloured vapours are produced by the iodine, without fulmination.—3. *Santaline* is nearly insoluble in pure oil of lavender, and exerts no marked action on it, but is freely soluble in oil of lavender adulterated with alcohol or rectified spirit.

Obs. English oil of lavender possesses the purest fragrance; and of this, the variety known as "*Mitcham oil of lavender,*" from the place of its preparation, is esteemed the best. The *foreign oil* (*ol. l. latifoliæ*) is distilled from *lavandula latifolia* or *French lavender,* and is inferior. This last is improved by rectification. See *Oil of Spike.*

Oil of Lemons, Essence of do.; *Oleum Limonis, Ol. Limonum,*—Ph. L. E. & D., From the *yellow portion of the rind,* grated, placed in hair bags, and exposed to powerful pressure; also by distillation, but the product is then less agreeably fragrant and sweet, but keeps better. Nearly colourless; odour that of the fruit. Sp. gr. 0·8752 to 0·8785. *Expressed oil,* 0·8517, *distilled do.,* 0·847, at 72° Fahr., (Ure). *Prod.* 100 lemons yield, by *expression,* 1¾ to 2 *oz.* (nearly); by *distillation,* 1¼ to 1½ *oz.*

Pur. Commonly adulterated with oil of turpentine, and occasionally with nut or poppy oil. These may be detected in the manner already explained. When pure, it is soluble in all proportions in absolute alcohol, but rectified spirit only dissolves 16% of it. It also boils at 148° Fahr., whereas oil of turpentine boils at 312°, and mixtures of the two, at intermediate temperatures, depending on the proportions.

Oil of Lemon Grass, Essence of do., Indian Grass-oil. From *andropogon schœnanthus* (Linn.), the *camel's hair, lemon-grass,* or *sweet rush* of Arabia. Pale yellow; powerfully fragrant. From India.

Oil of Lemon Thyme; Huile de Tain; Oleum Serpylli,—Lat. From the *fresh flowering-herb* of *thymus serpyllum* (Linn.), the *lemon* or *wild thyme* of our hills and pastures. Very fragrant. *Used* to scent soaps, &c. Sp. gr. 0·867. *Prod.* 100 *lb.* yields 2½ to 5½ *oz.* of oil. When pure, it is scarcely affected by iodine, but solution of chromate of potassa acts on it with energy.

Oil of Lettuce; Oleum Lactucæ Virosæ,—Lat. From *lactuca virosa* (Linn.) or *strong-scented wild lettuce.* Closely resembles the odorous matter of opium.

Oil of Limes; Oleum Limettæ,—Lat. From the *rind* of the *fruit* of *citrus medica acida,* or *limes,* as oil of lemons, which it somewhat resembles. *Prod.* 100 limes yield 2¼ to 2½ *oz.* of oil.

Oil of Lovage; Oleum Levistici,—Lat. From the *leaves* or *fruit* of *ligusticum levisticum* (Linn.) or *lovage.* Pale yellow, aromatic, carminative. *Prod.* Fresh herb, 0·1% to 0·15%.

Oil of Mace (Essential); *Oleum Macidis, O. M. Essentiale, O. M. Stillatitium,*—Lat. From the *arillus* of *myristica officinalis* (*commercial mace*). Nearly colourless; fragrant; lighter than water; closely resembles oil of nutmeg. Sp. gr. 0·945. *Prod.* 4½ to 9%.

Oil of Marc-brandy, Fusel Oil of do., Oil of Grape Spirit. Obtained after the spirit (*marc brandy*) has passed over, during the distillation of the fermented residuum of expressed grapes. Limpid; odorous; acrid; offensive; soon turns yellow in the air; soluble in 1000 parts of water, and in all proportions in rectified spirit; 6 or 7 drops will spoil a hogshead of brandy. According to M. Balard this oil is a compound of potato oil and œnanthic ether.

Oil of Marjoram, Oil of Sweet do.; *Oleum Marjoranæ; Ol. Origani M.*,—Ph. E. From the *fresh flowering-herb* of *origanum marjorana*, or *sweet* or *knotted marjoram*. Pale yellow; odorous; tonic; stimulant. Sp. gr. 0·925 (0·940,—Baumé). *Prod.* 0·33 to 0·5%. See *Oil of Origanum.*

Oil of Meadow-sweet; Oleum Spirææ Ulmariæ,—Lat. From the *flowers* or *flowering-tops* of *spiræa ulmaria* (Linn.) or common *meadow-sweet.* This oil is a native *hydruret* or *hydride of salicyle.* It is yellow, sweet-scented, and slightly soluble in water, which then strikes a deep violet-colour with the sesquisalts of iron. It boils at 385° Fahr. Sp. gr. 1·172. (See *below.*)

Oil of Meadow-sweet (Artificial); *Hydrosalicylic Acid, Salicylous Acid.* This is prepared as follows:—*Salicine*, 1 part, is dissolved in *distilled water*, 10 parts, and being placed in a glass retort, *bichromate of potassa* (in powder), 1 part, is added, followed by *oil of vitriol*, 2½ parts, previously diluted with 4 times its weight of *water;* a gentle heat is next applied to the retort, and after the first effervescence resulting from the mutual reaction of the ingredients is over, the heat is increased, and the mixture is distilled for the oil in the usual manner. The *product* is absolutely identical with the natural oil of meadow-sweet. (See *above.*)

Oil of Milfoil; Oleum Millefolii,—Lat. From the *flowers* of *achillæa millefolium* (Linn.) or *yarrow.* Blue. Sp. gr. 0·852. *Prod.* 14 *lb.* of the *dry flowers* yielded 3 dr. of oil.

Mixed Oils (Essential); *Olea Mixta Essentialia.* From the *oils* of *bergamotte* and *lemons*, of each, 1 *oz.*; *oils* of *lavender* and *pimento*, of each, ½ *oz.* *Used* to scent "*sal volatile drops*," *smelling bottles, &c.*

Oil of Mustard (Volatile); *Sulphocyanide of Allyle; Oleum Sinapis Nigræ, Ol. S. Essentiale*,—Lat. From the *seeds* of *sinapis nigra* (Linn.) or *black mustard*, as oil of bitter almonds. Nearly colourless; intensely acrid, pungent, rubefacient, and vesicant; slightly soluble in water; boils at 289° Fahr. It contains sulphur. Sp. gr. 1·035 to 1·038; 1·015, at 68° Fahr. *Prod.* Av. 0·5% (fully).

Obs. This oil, like that of bitter almonds, does not pre-exist in the seed, but is the result of the action of *myronic acid* on a peculiar substance, *myrosine*, in the presence of water. Oil of black mustard has been used as a stimulant or counter-irritant in palsy, &c.; and the distilled water, or a solution of the oil in water, is said to be an excellent and cleanly remedy for the itch.

Oil of Myrrh; Oleum Myrrhæ, O. M. Essentiale,—Lat. Colourless; thin; heavier than water; stimulant; smells strongly of the drug.

Oil of Myrtle (Volatile); *Essence of do.*; *Oleum Myrtæ Essentiale*,—Lat. From the *flowers* and *leaves* of *myrtus communis.* 100 *lb.* of the *fresh leaves* yield 2½ to 5 *oz.*

Oil of Namur Grass. See *Grass Oil.*

Oil of Narcissus, Essence of Jonquil; Oleum Narcissi,—Lat. As oil of jasmine. Delightfully odorous.

Oil of Neroli. See *Oil of Orange-flowers.*

Oil of Nutmeg (Volatile); *Oleum Myristicæ*,—Ph. E. & Ph. L., 1836. *Ol. M. Moschatæ*,—Ph. D. From the *officinal nutmeg* or *kernel of the fruit of myristica moschata* (m. officinalis,—*Linn.*). Nearly colourless; odour and flavour that of the fruit, but more powerful. By agitation with water it is separated into *two* oils,—one *lighter*, the other *heavier* than water; the last is butyraceous. Sp. gr. 0·948. *Prod.* 4½ to 7%. It is reputed to make the hair grow, and to prevent baldness.

Oil of Onions. From the *bulbs* of *allium cepa* (Linn.) or *common onion.* Contains sulphur, and smells strongly of the herb.

Oil of Orange, Essence of do.; *Oleum Aurantii, Ol. Aurantiorum, Ol. A. Corticis*, —Lat. From the *yellow portion* of the *rind* of either the *Seville* or *sweet orange*, preferably of the last; as oil of bergamot or lemons. Closely resembles oil of lemons, but is more agreeably fragrant. The expressed oil is very apt to become opaque and deposit a stearescence, especially in cold weather, unless well kept from the air. Sp. gr. 0·875. *Prod.* 100 fruits yield 4 to 5 *oz.*

Oil of Orange-berries; Essence de petit grain; Oleum Aurantii Baccæ,—Lat. Does not keep well. (See *below.*)

Oil of Orange-flowers, Neroli, Oil of do., *Essence of do.*; *Oleum Naphæ, Ol. Aurantii Florum; Aurantii Oleum*,—Ph. E. & D. From the *flowers* of either the *bitter* (Seville) or *sweet orange* (citrus vulgaris *or* c. aurantium, *Risso*), by distillation with water. That from the first is said to be preferred, but there does not appear any actual difference between the two. Very fluid; lighter than water, in which it is slightly soluble; it is delightfully aromatic and fragrant; but the odour differs slightly from that of the flowers. *Prod.* 100 *lb.* of flowers gathered in May or Dec. yield 3 to 6 *oz.* of oil; 6 cwt. of the *fresh* flowers yielded 1 *lb.* of oil.

Pur. Neroli is commonly adulterated

with alcohol or essence de petit grain, and generally with both of them. The presence of the first is easily determined (see *above*); that of the *second* can only be discovered by comparing the odour evolved during the evaporation of a drop of the suspected oil placed on a piece of white paper, with a like drop of pure neroli similarly treated.

Oil of Orange-leaf; Essence de petit grain; Oleum Aurantii Folii,—Lat. From the *leaves* of either the *bitter* or *sweet orange;* that from the first being preferred. Constitutes the best *essence de petit grain.* Delightfully fragrant. Extensively used to adulterate oil of neroli, and is itself commonly sophisticated with both alcohol and oil of orange-berries. (See *above.*)

Oil of Seville Orange, Essence of Bitter do. From the rind of the *bigarade* or *bitter orange* (citrus bigaradia). It scarcely, if at all, differs from the oil of the sweet orange (citrus aurantium); but has the advantage of keeping better. The two are not distinguished from each other in commerce.

Oil of Origanum; Oleum Origani,—Ph. L., 1836, & Ph. D., 1826. *Ol. O. Essentiale*,—Ph. L., 1788. *O. O. Herbæ*,—Ph. L., 1721. From the *flowering herb* of *origanum vulgare* (Linn.) or *common* or *winter marjoram.* Pale yellow colour; fragrant; acrid, pungent, and rubefacient. Sp. gr. 0·927 (0·940, —Baumé). *Prod.* 0·5% to 0·75%. The dark-coloured "oil of origanum" of the shops, is obtained from thymus vulgare. The "oil of origanum,"—Ph. E., is oil of origanum marjorana. See *Oils* of *Marjoram, Thyme*, and *Lemon Thyme.*

Oil of Orris, Essence of Violet; Oleum Iridis,—Lat. From the *dried rhizomes* of *iris Florentina* (Linn.) or *Florentine orris root.* Fragrant. Sold for *oil* and *essence of violets.*

Oil of Parsley; Oleum Petroselini,—Lat. From the *fresh herb* or *dried fruit* (seed) of *apium petroselinum* (Linn.) or *garden parsley.* Yellowish; smells strongly of the plant. It consists of two oils, separable by agitation with water, one of which is concrete, and melts at 86° Fahr.; the other, liquid. *Prod.* Herb, 0·50 to 1% (nearly); dried fruit, 1¼ to 2% (nearly).

Oil of Partridge Berry, Oil of Winter-green, Methylo-salicylic Ether, Salicylate of Oxide of Methyle; Oleum Gaultheriæ,—Ph. U. S. From the *leaves* or the *whole plant* of *gaultheria procumbens* (Linn.), a herb common in North America, and otherwise known by the names—*Box-berry, chequer-berry, partridge-berry, mountain tea, winter-green, &c.* Pale yellow, growing brown by exposure and age; aromatic; sweet; highly pungent; when diluted, agreeably fragrant; mixed with a dilute solution of potassa it solidifies to a crystalline mass of *gaultherate of potassa*, from which the oil may be again separated by the addition of an acid. It is the heaviest of all the essential oils. Sp. gr. 1·173. Boils at 412°, and, when purified, at 435° Fahr.

Oil of partridge-berry, dissolved in rectified spirit, is in common use in the United States of America as an antispasmodic, carminative, diuretic, emmenagogue, and stimulant; chiefly as an adjunct to mixtures, &c.; and also with the view of increasing the flow of milk during lactation. It is likewise extensively used in perfumery, and is an object of great interest to the organic chemist on account of its peculiar constitution and reactions.

Oil of Partridge-berry (Artificial). See *Salicine* and *Salicylic Acid.*

Pear Oil, Oil of Jargonelle Pear; Birnöl. This preparation, which attracted so much attention in the Great Exhibition of 1851, is simply *acetate of oxide of amyle* (amylo-acetic ether), the preparation of which has been already noticed. (See *p.* 64.) To render it quite free from water and sulphurous odour, it should be agitated with *dried chloride of calcium*, and then rectified from a *little litharge.* Dissolved in rectified spirit, it is much used as a flavoring ingredient by confectioners and liquoristes. See *Essences, &c.*

Oil of Pennyroyal; Oleum Pulegii,—Ph. L. *Ol. Menthæ P.*,—Ph. E. & D. and Ph. L. 1836. *Ol. P. Essentiale*,—Ph. L. 1788. *Ol. P. Herbæ*,—Ph. L. 1721. From the *flowering herb* of *mentha pulegium* (Linn.), or the common *pennyroyal* of our gardens. Pale yellow, growing reddish-yellow by age and exposure; antispasmodic, carminative, and emmenagogue. Boils at 395° Fahr. Sp. gr. 0·925 to 0·931. *Prod.* ¾ to 1%.

Oil of American Pennyroyal; Oleum Hedeomæ,—Ph. U. S. From *hedeoma pulegioides* (cunila *or* melissa pulegioides,—*Linn.*), as the last. Light yellow; closely resembles oil of pennyroyal, for which it passes in the U. S. Sp. gr. 0·945 to 0·948.

Oil of Pepper, Oil of Black do.; Oleum Piperis, Ol. P. Nigri,—Lat. From *bruised black pepper* (piper nigrum). Colourless, turning yellow; odorous; pungent; not so hot as the spice. Sp. gr. 0·9932. *Prod.* 1·25% to 1·5%. *White pepper* (of commerce), 1% (barely).

Oil of Peppermint; Oleum Menthæ Piperitæ,—Ph. L. E. & D. *Ol. Essentiale M.*

Piperitidis,—Ph. L. 1788. From the *fresh flowering herb* of *mentha piperita*, or *garden peppermint.* Nearly colourless, or at most a very pale greenish-yellow; powerfully odorous; tastes pungent, at the same time imparting a sensation of coldness to the tongue and palate. Boils at 365° Fahr. Sp. gr. 0·902 to 0·905. *Prod.* Fresh flowering herb, 0·25% to 0·4%; dried do., 1% to 1·25% (fully). In a warm dry season, 5 *lb.* of the *fresh flowering herb* yield 1 *oz.* of oil; in a wet and unfavorable one, 11 *lb.* yield barely the same quantity.

Pur. The oil of commerce usually contains fully a third part of rectified spirit, and is also frequently adulterated with the oils of rosemary, spearmint, and turpentine. When pure—1. It is soluble in its own weight of rectified spirit.—2. Mixed with 1-4th its volume of *nitric acid*, a rich purple-red colour is developed.—3. *Chromate of potash*, in solution, turns it of a deep reddish-brown colour, and converts it into a soft coagulum, which assumes a flaky form when divided with a glass rod, whilst the solution of the salt loses its yellow colour or becomes greenish-yellow. — 4. With *iodine* it forms a homogeneous mass, *without* fulmination. If it explodes with iodine it contains turpentine. The yellowish, resinous oil, sold under the name of "*American*" or "*crude oil of peppermint*," consists chiefly of oil of turpentine, and on evaporation leaves a residuum of pine resin.

Obs. English oil of peppermint is the best, a fact clearly shown by its price in the market being so greatly above that of the imported oil. The oil distilled at Mitcham, in Surrey (*Mitcham oil of peppermint*), is the most esteemed. It has usually a very pale-greenish colour, which is often imitated by steeping a leaf or two of green mint or parsley in the oil. Old dark-coloured oils are commonly bleached by exposure to the light, to the destruction of a portion of their other properties.

Oil of peppermint is stimulant, antispasmodic, and carminative, and has always been a favorite remedy in flatulence, nausea, vomiting, loss of appetite, cramp of the stomach, colic, griping pains, diarrhœa, the the early stage of cholera, &c. *Dose.* 1 to 3 drops, on sugar.

Oil of Petroleum (Volatile); *Oleum Petrolei Volatile*,—Lat. From *native petroleum*, distilled with about twice its weight of *water*. Stimulant and resolvent; in gout, paralysis, &c. See *Naphtha*, *Petroleum*, *&c.*

Oil of Pimento, Oil of Allspice; Oleum Pimentæ,—Ph. L. E. & D. From the *bruised fruit* of *eugenia pimenta* (De Cand.; *myrtus pimenta*,—Linn.), *allspice* or *Jamaica pepper.* Pale yellow, growing reddish-brown by age; odour, a combination of that of cloves and cassia; taste, pungent. Sp. gr. 1·021. *Prod.* 5% to 8%.

Obs. Oil of pimento contains two oils,—one (*light*) which distils over first, and another (*pimentic acid*) which comes over afterwards. When pure, *nitric acid* turns it red, with active effervescence, and the assumption of a rusty brown colour. It combines with the salifiable bases in a nearly similar manner to oil of cloves. It is much used in perfumery, especially in hair cosmetics.

Oil of Pimpernel; Oleum Pimpinellæ,—Lat. From the *root* of *sanguisorba officinalis* or *pimpernel.* Blue; carminative.

Pine-apple Oil. This is another *artificial essential oil* which dates its commercial importance from the Great Exhibition of 1851. It is essentially *butyric ether*, and may be regarded as simply the crude form of that substance. On the *large scale* it is prepared by saponifying *butter* or *crude butyric acid* with a *strong lye* of *caustic potassa*, and dissolving the resulting soap in the smallest possible quantity of *hot alcohol;* to the solution is added a mixture of *alcohol* and *oil of vitriol* in excess, and the whole is then submitted to distillation as long as the product has an aromatic fruity odour; the product is rectified from *dried chloride of calcium* and a *little litharge.* Dissolved in rectified spirit it is much used as a flavoring substance by confectioners and liquoristes. See *Butyric Ether*, *Essences*, *&c.*

Oil of Potato Spirit; Potato Oil, Fusel Oil, Hydrated Oxide of Amyle (Crude). Obtained by continuing the distillation after most of the *spirit* has passed over. It is purified by agitating it with *water* and then rectifying it from *dried chloride of calcium.* Colourless; limpid; odour strong and peculiar; taste, hot, bitter, and persistent; cooled below 0° Fahr. it congeals like oil of aniseed; slightly soluble in water, to which it imparts the property of frothing when shaken; soluble in alkaline lyes; freely soluble in alcohol; chlorine turns it green; oil of vitriol turns it crimson, and the liquid is precipitated yellow by water; boils at 257° Fahr. Sp. gr. 0·821 to 0·823. It burns with a clear white flame, and is now much used for lamps and varnishes. It is narcotic, but not in so great a degree as the oil of grain-spirit. It is a highly interesting compound on account of its constitution and its relation with the *amyl-series*, and its use in the preparation of *amylic alcohol* and *valerianic acid.* See *Fusel Oil, Amyle, &c.*

Oil of Ravensara; Oleum Ravensaræ,—Lat. From the *roots* of *ravensara aromatica.* Chiefly used to adulterate oil of cloves, which it somewhat resembles.

Oil of Rhodium; Oleum Rhodii,—Lat. From the *wood* of *convolvulus scoparius* (Linn.), or the *root* of *genista Canariensis* (Linn.), both of which are known as Canary rosewood, and furnish lignum rhodium. Very fluid and limpid; pale yellow; soon darkens by age and exposure; tastes bitter and aromatic; has a modified odour of roses. Chiefly used as a substitute for otto of roses in cheap perfumery, and to adulterate it. *Oil of sandal-wood* is frequently sold for it. *Prod.* 0·1% to 0·16%. Resinous old wood yields the most oil. See *Oil of Roses.*

Oil of Roses; Oleum Rosæ,—Lat. 1. From the *petals* of *rosa sempervirens* (Linn.), or the *musk rose,* as oil of cloves, observing to keep the water in the worm-tub at 85° Fahr., and afterwards subjecting the water in the receiver to refrigeration. Resembles otto of roses, of which it is merely a variety. *Prod.* $\frac{1}{20}$ to $\frac{1}{16}$ of 1%.

2. *Attar of Roses, Otto of do.; Oleum Rosæ,*—Ph. E. From the *petals* of *rosa centifolia* and *r. sempervirens,* Linn. (damask and musk rose), principally the first, by saturating the water, by returning it repeatedly on *fresh flowers,* and then exposing it to a low temperature. In the *East Indies* it is obtained by stratifying *gingilie seeds* in alternate layers with *rose petals,* for some days, and repeating the arrangement with fresh roses till the seeds are saturated, when the oil is expressed and distilled along with water. In the neighbourhood of *Mecca,* the *rose leaves* are macerated in *salt-and-water* for 2 or 3 days, and then distilled, the water being received in separate receivers at different parts of the process. The water is afterwards exposed in porous earthenware vessels, tied over with linen, in trenches dug in the earth, and over which moistened straw is thrown, when in a short time the otto separates and floats on the surface.

Prop., &c. Colourless, or nearly so; odour, intense, penetrating, and diffusive, and in a concentrated state far from pleasant, but when dilute, very agreeable; taste, bland and sweetish; when pure it congeals at 80° and does not re-melt until heated to fully 85° Fahr.; 1000 parts of alcohol of 0·806, dissolve only 7 parts of otto at 57° Fahr., and only 33 parts, at 72°. Sp. gr. 0·832 at 90°, to water 1·000 at 60° Fahr. *Prod.* 100 *lb.* of roses yield 2 to 3 dr.

Pur. Otto of roses is frequently adulterated with the oils of rhodium, sandal-wood, and geranium, and with camphor; and occasionally with spermaceti, to give the spurious compound the usual crystalline appearance. The following are reliable tests:—1. Pure otto has a *bland, sweet taste;* if it is bitter it contains oil of rhodium or sandal-wood; if it is pungent or "bites" the palate, it contains either oil of geranium or camphor, and probably both; if it imparts an unctuous sensation, it contains spermaceti.—2. Exposed for some hours to the *fumes* of a small quantity of *iodine* under a bell-glass in the cold, pure otto remains white, and continues so when exposed to the air; an adulterated sample, on the contrary, becomes yellow or brown, and afterwards, on exposure to the air, continues to darken in colour, until it becomes of a deep-brown, or even perfectly black, according to the quantity of foreign oil present. A single drop may be thus tested.—3. (Guibourt.) *One* or *two drops* of the *suspected oil* are put into a *watch-glass;* the same number of drops of *concentrated sulphuric acid* are added; and the two fluids are mixed with a glass-rod. All the oils are rendered more or less brown by this proceeding; but—*Otto of roses* retains the purity of its odour,—*Oil of geranium* acquires a strong and disagreeable odour which is perfectly characteristic,—the odour of the *oil of rhodium* is increased, and becomes somewhat unctuous, and, in general, it acquires an odour distinctly like that of cubebs. (Journ. de Pharm.)

Oil of Rosemary; Oleum Anthos, Ol. Rorismarini; Ol. Rosmarini,—Ph. L. E. & D. *Ol. Rorismarini Essentiale,*—Ph. L. 1788. *Ol. R. Herbæ,*—Ph. L. 1721. From the *flowering tops of rosmarinus officinalis* (Linn.) In the Ph. L. English oil of rosemary (*ol. rosmarini, Anglicum*) is ordered. Colourless; strongly fragrant, but scarcely agreeable unless compounded; carminative and stimulant. Boils at 365° Fahr. Sp. gr. 0·910; recent, 0·897; *rectified,* 0·8887. *Prod.* $\frac{3}{4}$ to 1% (nearly).

Pur., &c. It is frequently adulterated with oil of turpentine. When pure it dissolves in all proportions in spirit of 0·830. By age it deposits a crystalline stearoptène and acquires a terebinthinate odour. It is chiefly used as a stimulant in liniments, hair oil, pomatums, &c.

Oil of Rosewort, Oil of Rose-root; Oleum Rhodiolæ,—Lat. From the *roots* of *rhodiola rosea* (Linn.) Yellowish; odour resembles that of oil of rhodium, for which it is often sold, as well as the *distilled water* for rose water. 1½ *lb.* yields about 1 dr.

Oil of Rue; Oleum Rutæ,—Ph. L. & E. & Ph. D. 1826. The "oil distilled from the *flowering herb*" of "*ruta graveolens,* Linn." (Ph. L.), or common *rue.* Pale yellow, turning brown by age, and depositing a brownish, resinous sediment; congeals at about 40° Fahr.; acrid; bitter; odour, that of the plant; stimulant, antispasmodic, and emmenagogue. Sp. gr. 0·909 to 0·911. *Prod.* ¼ to 1% (nearly). According to Raybaud, the recent *dried seeds* yield fully four times as much oil as the flowering herb.

Pur. Nearly always adulterated. When pure,—1. It forms a clear solution with *rectified spirit.*—2. It does not form a camphor with *gaseous hydrochloric acid.*—3. *Iodine* dissolves in it slowly, without any apparent reaction, beyond a darkening and a slight increase of viscidity.—4. It is unaffected by a *solution* of *chromate of potassa.*—5. *Nitric acid* very slowly changes it into a greenish-yellow liquid balsam.—6. If it forms a reddish-brown solution with *liquor of potassa* and a still darker one with *oil of vitriol,* or if it fulminates with *iodine*, it is adulterated with the oil of some labiate plant.—7. It is more soluble in both rectified spirit and water than any of the oils used to adulterate it.

Oil of Saffron; Oleum Croci,—Lat. Yellow; heavier than water; acrid, pungent, and narcotic; decomposed by exposure to light and age, with the formation of a white solid matter, which is lighter than water.

Oil of Sage; Oleum Salviæ,—Lat. From the *herbaceous portion* of *salvia officinalis* (Linn.) or *common sage.*

Oil of Sandal wood; Oleum Santali, Ol. S. Albi,—Lat. From the *wood* of *sirium myrtifolium* (santalum album,—*Linn.*) or *sandal tree,* and preferably from that of Malabar. It has an odour somewhat resembling that of oil of rhodium, for which it is commonly used; also used to adulterate otto of roses. *Prod.* 9 *lb.* yield 1 *oz.*; 100 *lb.* yield 5 *oz.* (Raybaud).

Oil of Sarsaparilla; Oleum Sarzæ,—Lat. From the *root bark,* distilled along with *salt-and-water.* Acrid; odour and flavour same as the root.

Oil of Sassafras; Volatile Oil of do., Oleum Sassafras,—Ph. E., & Ph. D. 1826. *Ol. Lauri S., Ol. S. Officinalis,*—Lat. var. From bruised *sassafras chips,* the sliced root of *laurus sassafras* (Linn.), as oil of cloves. Pale yellow; highly odorous; hot, pungent, rubefacient, and stimulant; reputed alterative, sudorific, and diuretic, and, as such, occasionally given in rheumatism, cutaneous affections, &c. Sp. gr. 1·094 to 1·096. *Prod.* 1½ to 2% (fully),

Pur., &c.—1. If the density is lower than 1·094, it is adulterated.—2. *Nitric acid* acts on this oil, at first slowly, merely turning it of an orange-red, but afterwards with violence, and a reddish-brown resin is formed.—3. Mixed with about one-half its weight of *sulphuric acid,* a green colour is at first developed, which, by heat, is changed to a blood-red. A large quantity of sulphuric acid acts at once violently, white fumes are given off, and mere charcoal is left.—4. With *iodine* it forms a permanently clear solution, or at least one that remains so for some time.—5. By *agitation* with *water* it separates into *two* oils; one lighter, the other heavier than that fluid.

Oil of Savine; Oleum Juniperi Sabinæ, Ol. Sabinæ,—Ph. E. & D. From the *fresh tops* or *leaves* of *juniperus sabina* (Linn.) or *common savine.* Pale yellow; limpid; acrid, pungent, and stimulant. It possesses the general properties of the plant in a highly exalted degree. Sp. gr. 0·915. *Prod.* Fresh herb, 1·25 to 1·5%; dried do. (*recent*), 2½ to 3%. *Dose.* 2 to 6 drops, as an anthelmintic, diaphoretic, and emmenagogue. Its use must be carefully avoided during pregnancy, or disease of the abdominal viscera.

Pur., &c. It is less frequently adulterated than the other volatile oils. Its high sp. gr. and free solubility in rectified spirit, offer the means of detecting the presence of either oil of turpentine or alcohol, the substances occasionally added to it. A *mixture* of equal parts of *oil of savine* and *oil of vitriol,* by distillation from *milk of lime,* furnishes an oil apparently identical with "*oil of thyme.*" (Winckler.)

Oil of Senna; Oleum Sennæ Volatile,—Lat. Possesses the nauseous odour and flavour of the leaves, and, as well as the *distilled water,* is purgative.

Oil of Spearmint, Oil of Mint, Oil of Green do.; Oleum Menthæ Viridis,—Ph. L. E. & D. *Ol. M. Sativæ; Ol. Essentiale Menthæ S.,*—Ph. L. 1788. *Ol. Herbæ M.,*—Ph. L. 1721. From the *flowering herb* of *mentha viridis* (Linn.) or *garden* or *spearmint.* Pale yellow; reddened by age; odour and general properties resemble those of oil of peppermint, but it is less grateful. It boils at 320° Fahr. Sp. gr. 0·915 (0·9394,—Brand). *Prod.* 0·2% to

0·25%. Its common adulterants are alcohol and oil of turpentine.

Oil of Spike (True), *Foreign Oil of Lavender; Oleum Spicæ, Ol. S. Verum, Ol. Stœchadis, Ol. Lavandulæ S.*—Lat. *Huile d'Aspic,*—Fr. From *lavandula spica* (De Cand.) and *l. stœchas* (Linn.), or *French lavender.* It differs from English oil of lavender by its darker green colour and inferior odour. From France. *Used* by artists to mix their colours in, and to make varnishes. Oil of turpentine scented with lavender is commonly sold for it. *Prod.* From *l. spica* (fresh), ¾ to 1½%; *l. stœchas* (dried), ¾ to 1% (fully).

Oil of Spikenard; Oleum Nardi,—Lat. From *andropogon nardus* (Linn.), or *Indian spikenard.* Highly fragrant; smells like cyperus.

Oil of Spring Grass; Oleum Anthoxanthi Odorati,—Lat. From *anthoxanthum odoratum* (Linn.) or *sweet-scented vernal grass.* It is this oil gives the very agreeable odour to new hay.

Oil of Sweet Fennel. See *Oil of Fennel.*

Oil of Sweet Flag; Oleum Acori, Ol. A. Aromatici,—Lat. From the *rhizomes* or *roots* of *acorus calamus* (Linn.) or *sweet flag.* Yellow; agreeably fragrant. *Used* to scent snuff, aromatic vinegar, &c. *Prod.* Fresh rhizomes, ¾ to 1%; dried (*recent*), 1 to 1·25°.

Oil of Tansy; Oleum Tanaceti,—Lat. From the *flowering herb* of *tanacetum vulgare* (Linn.) or *tansy.* Pale greenish-yellow; very odorous; bitter; aromatic. Sp. gr. 0·946 to 0·950. *Prod.* Fresh, 0·25 to 0·5%; dried (*recent*), ¾ to 1% (fully).

Oil of Thyme; Oleum Thymi; Oil of Origanum, Oleum Origani (of the shops). From the *flowering herb* of *thymus vulgaris* (Linn.) or *garden thyme.* Nearly colourless; the *imported oil* has a reddish colour, which it loses by rectification; very fragrant; acrid, hot tasted, stimulant, and rubefacient; boils at 354° Fahr. Sp. gr. 0·867 to 0·875. *Prod.* 0·5% to 0·75%.

Obs. This is the dark-coloured *oil of origanum* of the shops. It is frequently adulterated with oil of turpentine. It is occasionally used in toothache and in stimulating liniments; but its chief consumption is in perfumery, more particularly for hair oils, pomatums, and hair-washes, as it is reputed to make the hair grow, and to prevent baldness.

Oil of Tobacco (Volatile). From the *leaves* of *nicotiana tabacum* (Linn.) or the *tobacco plant.* Concrete. See *Nicotianine.*

Oil of Turpentine, Spirit of do., Essence of do.; *Turps; Camphene, Camphine, Spiritus Terebinthinæ, Essentia T.*; *Oleum Terebinthinæ,*—Ph. L. & D. *Ol. T. Purificatum,*—Ph. E., & Ph. L. 1836. *Ol. Volatile Pini purissimum,*—Ph. E. 1839. *Ol. T. Rectificatum,*—Ph. L. 1824. *Ol. T. Æthereum,*—Ph. L. 1746. The oil of turpentine of commerce is obtained by distilling strained *American turpentine* along with *water.* The *residuum* in the still is "*rosin.*" The *product* in *oil* varies from 14% to 16%. The Colleges order it to be "*rectified*" before being employed for medicinal purposes. This is effected by redistilling it along with 3 or 4 times its volume of *water,* observing not to draw over quite the whole. The portion remaining in the retort (*balsam of turpentine*) is viscid and resinous. A *better plan* is to well-agitate it with an equal measure of *liquor of potassa* or *milk of lime* before rectifying it. This is the plan adopted for the *camphine* used for lamps. By agitating "crude oil of turpentine" with about 5% of *sulphuric acid* diluted with twice its weight of water, and after repose and decantation, rectifying it from 5 or 6 times its volume of the strongest *lime-water,* a very pure and nearly scentless oil may be obtained. Dr. Nimmo recommends oil of turpentine to be purified by agitation with ⅛th part of *rectified spirit,* after repose to decant the spirit, and to repeat the process 3 or 4 times. The product retains, however, fully ⅕th part of spirit in solution, and hence this method is objectionable, except for medicinal purposes, for which, according to Dr. Garrod, it is better than the oil purified by rectification. The "*sweet spirits of turpentine*" (spiritus terebinthinæ dulcis) vended of late years in the shops, is simply the common oil which has been agitated with, and rectified from, somewhat dilute sulphuric acid.

Prop. Pure oil of turpentine is colourless; limpid; very mobile; neutral to test-paper; has an odour neither powerful nor disagreeable when recently prepared, but becoming so by exposure to the air; dissolves ⅕th part of alcohol of 0·830; is soluble in 6 parts of ether, and in 7½ parts of rectified spirit; hot strong alcohol dissolves it freely, but the greater part separates in globules as the liquid cools. Oil of vitriol chars it, and strong nitric acid attacks it violently, even with flame. It congeals at 14°, and boils at 312° Fahr. Sp. gr. 0·867; that of the *oil of the shops* varies from 0·872 to 0·878. It possesses a very high refractive power. At 72° it absorbs 163 times its volume of hydrochloric acid gas (if kept cool), and in 24 hours from 26% to 47% of crystals (*Kind's camphor*) separate.

These have a camphoraceous odour, and after being washed with water, and sublimed along with some dry chalk, lime, or charcoal, assume the form of a white, translucent, flexible, crystalline mass, which is volatile, soluble in alcohol, and possesses a considerable resemblance to camphor. A nearly similar substance is produced by the action of oxygen gas on oil of turpentine.

Uses, &c. Oil of turpentine is extensively used in the manufacture of varnishes and paints; and under the name of *camphine,* to burn in lamps. For the last purpose it must be newly rectified and preserved from the air. By exposure it rapidly absorbs oxygen, resin is formed, its density increases, and it gives a dull fuliginous flame. In *medicine* it is employed as a diaphoretic, diuretic, stimulant, vermifuge, &c. *Dose.* 6 to 30 or 40 drops; in rheumatism, hemicrania, &c., 1 fl. dr., every four hours, in combination with bark or capsicum; in tapeworm, 3 fl. dr. to 1 fl. oz., either alone or combined with a little syrup of orange-peel, every 8 hours, until the worm is expelled. The common *symptoms* of *large doses* of this *oil* are dizziness, and a species of temporary intoxication, and occasionally, nausea and sickness, which subside after two or three alvine evacuations, leaving no other effect, when the oil is pure, than a certain degree of languor for a few hours. In *tape-worm,* a little castor oil may be advantageously combined with the second and subsequent doses. Oil of turpentine imparts a violet odour to the urine. For this purpose even the inhalation for a few minutes of the fumes from a small portion sprinkled on a piece of paper, or from a newly-painted surface, is sufficient. To *prevent loss* by *evaporation* and *resinification,* this oil should be kept in tin cans or glass bottles. For store vessels, closely-covered tin cisterns are the best. To *prevent accidents* it is proper to caution the operator of the extremely penetrating and inflammable nature of the vapour of this oil, even in the cold. During the process of its distillation, without the greatest precautions are taken, an explosion is almost inevitable.

Oil of Valerian; Oleum Valerianæ,—Ph. Bor. From the *root* of *valeriana officinalis* (Linn.), or *wild valerian.* Yellowish; viscid; lighter than water; smells strongly of the plant. By exposure to the air, it is partly converted into valerianic acid, and more readily so under the influence of an alkali. In its usual form it consists of *valerole, bornéene,* and *valerianic acid.* It is powerfully antispasmodic, emmenagogue, tonic, and stimulant, and, in large doses, narcotic. *Dose.* 2 to 6 drops; in epilepsy, hysteria, hemicrania, hypochondriasis, low fevers, &c. *Prod.* 1¼ to 2% (nearly).

Oil of Verbena; Oleum Verbenæ. From the *fresh flowering herb* of *verbena odorata. Prod.* 0·2% to 0·5%. The *oil of verbena* of the shops is imported from India, and is obtained from *andropogon schœnanthus,* (Linn.) See *Oil of Lemon Grass.*

Oil of Wine, Heavy do., Sweet do., Ethereal Oil, Oily Ethereal Liquor, Sulphatic Ether, Sulphate of Ether and Etherole; Oleum Æthereum,—Ph. L. *Oleum Vini,* —Ph. L. 1788. *Liquor Æthereus Oleosus,* —Ph. D. 1826. This is an artificial production which for convenience may be included under this head.

1. (Ph. L.) *Rectified spirit,* 2 pints, and *sulphuric acid,* 36 fl. oz., are cautiously mixed together in a glass retort, and submitted to distillation until a black froth appears, when the retort is immediately removed from the fire (*sand heat*); the lighter, supernatant liquor, is next separated from the fluid in the receiver, and exposed to the air for 24 hours; it is then agitated with a mixture of *liquor of potassa* and *water,* of each, 1 fl. oz., or q. s., and when sufficiently washed, is, lastly, separated from the aqueous liquid from which it has subsided. The formula of the Ph. L. 1836, is nearly similar.

2. (Ph. D.) *Rectified spirit* and *oil of vitriol* (commercial), of each, 1½ pint; as the last, employing a Liebig's condenser, and a capsule for the exposure to the air; the oil is then transferred to a *moistened* paper-filter, and washed with a *little cold water,* to remove any adhering acid.

3. (Ph. D. 1826.) From the *residuum in the retort* after the *process of preparing ether,* distilled to one half, by a moderate heat, and the oil treated as before.

4. From *rectified spirit* (sp. gr. 0·833), 2 parts; *oil of vitriol,* 5 parts; mix and distil, as before; wash the product with *distilled water,* and free it from adhering water, and undecomposed alcohol by exposure in the vacuum of an air pump, between two open capsules, the one containing *hydrate of potassa,* and the other *concentrated sulphuric acid.* Pure.

5. By distilling a *mixture* of *ether* and *oil of vitriol,* and treating the product as before.

6. By the *destructive distillation* of dry *sulphovinate of lime:* the product is freed from alcohol, &c., by washing it. This process yields the largest product.

Prop., &c. An oily liquid, nearly colourless, neutral, with an aromatic taste, and an odour resembling that of oil of peppermint. It is insoluble in water, but freely soluble in both alcohol and ether; boiling water converts it into *light* or *sweet oil of wine;* with an alkaline solution, this effect is produced with even greater facility. After being kept for some months it becomes viscid, and prismatic crystals (*stearoptène*) form in it, which are fusible and volatile, and soluble in alcohol and ether; in sulphuric acid these dissolve forming a pink solution, and in nitric acid a deep red one. Sp. gr. 1·05 (Hennel & Ph. L.); 1·13 (Serullas). Boils at 540° Fahr. "Dropped into water it sinks, the form of the globule being preserved." (Ph. L.) *Prod.* 1·25 to 1·5%; 33 *lb.* of rectified spirit, and 64 *lb.* of oil of vitriol, yield 17 *oz.* of this oil. (Hennel.)

Uses. Oil of wine is reputed anodyne, but is only used in the preparation of other compounds. See *Compound Spirit of Ether, &c.*

Oil of Wine (Light); *Sweet Oil of Wine.* See *Etherine*, *Etherole*, and *above.*

Wood Oil (of India). From the *chloroxylon Swietenia* (De Cand.), the tree which yields the *satin-wood* of the cabinet-makers. Another wood oil (*Gunjun balsam*) is obtained by incision from *dipterocarpus trinervis*, and other allied species. This balsam yields about 38% of a volatile oil by distillation, which in its general properties closely resembles oil of capivi. (O'Shaughnessey.)

Oil of Wormseed; Oleum Chenopodii,—Ph. U. S. From the *seeds* of *chenopodium anthelminticum* (Linn.; *chenopodium*, Ph. U.S.), or *Jerusalem oak* or *American wormseed.* Light yellow, or greenish; powerfully anthelmintic. Sp. gr. 0·908. *Dose.* For an adult, 25 to 30 drops, in sugar, honey, or milk, night and morning, for 3 or 4 days, followed by a good dose of castor oil, or some other suitable purgative.

Oil of Wormwood; Oleum Absinthii,—Lat. From the herbaceous portion of *artemisia absinthium* (Linn.) or *common wormwood;* green or brownish-green; odorous; acrid; bitter; stomachic. Sp. gr. 0·9703 (Brisson); 0·9720 (Pereira); 0·9725 (Brandes). *Prod.* Fresh herb (*picked*), ¼ to ⅓ %; dry herb (*a year old*), ½ % (fully); do. (*recent*), ¾ to 1% (fully).

Pur. That of the shops is nearly always either adulterated or partly spoiled by age; hence the discrepancies in the densities given for this oil by different authorities. A specimen of this oil distilled by ourselves from the green plant, had the sp. gr. 0·9712; but after being kept for 12 months it had increased to 0·9718. Nitric acid of 1·25, colours the pure oil first *green*, then *blue*, and, lastly, *brown.* The positive character of these reactions is in direct proportion to the purity and freshness of the sample.

OILY EMULSION. See *Emollient Linctus.*

OILY ETHEREAL LIQUOR. See *Oil of Wine.*

OINTMENT. Syn. *Unguentum,*—Lat. Any soft, fatty substance applied to the skin by inunction. The term is now commonly restricted to those which are employed in medicine.

Ointments (*unguenta*) differ from cerates chiefly in their consistence, and in wax not being a constant or essential constituent; and they are *made* and *used* in a nearly similar manner to that class of preparations. Their *proper degree* of *solidity* is that of good butter, at the ordinary temperature of the atmosphere. When the *active ingredients* are *pulverulent substances* nothing can be more suitable to form the body of the ointment than *good fresh lard*, free from salt; but when they are fluid or semi-fluid, *prepared suet*, or a *mixture* of *suet* and *lard*, will be necessary to give a due consistence to the compound. In some instances *wax* is ordered for this purpose. *Another excellent vehicle* for the more active ingredients, is a simple ointment formed by melting together 1 part of pure *white wax* with about 4 parts of *olive oil.* The use of the last excludes the possibility of the irritation sometimes occasioned by the accession of rancidity, when inferior lard is employed. In a *few* cases *butter* is employed to form the body of the ointment.

Some ointments are made from *recent vegetable substances* by *infusion* or *coction*, in the manner adopted for *medicated oils*, and explained at *page* 855.

The *precautions* to be used in the *choice* of *lard* are noticed at *p.* 675. Lard is now included in the Materia Medica of the London College. In the new Ph. D. lard for medicinal use (*adeps suillus præparatus*, Ph. D.) is ordered to be prepared by melting it in twice its weight of *boiling water*, stirring it constantly for some time, then setting the mixture aside to cool; and, lastly, separating the fat when it has solidified.

Ointments are best *preserved* by keeping them in salt-glazed earthen or stone-ware jars covered with tin foil, in a cool situation.

The *accession* of *rancidity* in ointments and other unctuous preparations, may be greatly retarded, if not wholly prevented, by previously dissolving in the fat about 2% of *gum-benzoin*, in fine powder, or a rather less quantity of *benzoic acid*, by the aid of heat. This addition renders the ointment peculiarly soothing to irritable or highly sensitive skins. *Poplar buds* act in a similar manner.

The *formulæ* for all the more *useful* and *generally employed ointments* are given below. Those not included in the list may be prepared of the proper strength for all ordinary purposes, by combining about 12 to 15 times the *medium dose* of the *particular medicinal* with 1 *oz.* of *lard* or *simple ointment*. For *substances* which possess *little activity*, ½ to 1 dr. per oz., or even more, may be taken. See *Cerate, Fat, &c.*

OINTMENT (Acetate of Lead). Syn. *Unguentum Plumbi Acetatis*,—Ph. E. & D. *Ung. Cerussæ Acetatæ*,—Ph. L. 1788. *Ung. Saturninum*,—Ph. L. 1746. *Prep.* 1. (Ph. E.) *Acetate of lead*, in fine powder, 1 oz.; *simple ointment*, 20 oz.; mix them thoroughly (by trituration).

2. (Ph. D.) *Ointment of white wax*, 1 *lb.*; melt by a gentle heat, then add, gradually, of *acetate of lead*, in very fine powder, 1 *oz.*, and stir the mixture until it concretes.

Obs. A useful cooling, astringent, and desiccative ointment. For the formula of Ph. L. see *Cerates.*

OINTMENT (Acetic). See *Vinegar Ointment.*

OINTMENT (Aconite). Syn. *Unguentum Aconiti*,—Lat. *Prep.* (Dr. Turnbull.) *Alcoholic extract of aconite*, 1 part; *lard*, 2 parts; carefully triturated together. In neuralgia, &c.

OINTMENT (Aconite, — Ammoniated). Syn. *Unguentum Aconiti Ammoniatum*,—Lat. *Prep.* (Turnbull.) *Ammoniated extract of aconite*, 1 part; *lard*, 3 parts. In neuralgia, paralysis, old rheumatic affections, &c. The use of the above preparations of aconite requires the greatest caution. They are intended as substitutes for *ointment of aconitina*, a still more dangerous preparation.

OINTMENT (Aconitina). Syn. *Unguentum Aconitinæ*, — Lat. *Prep.* 1. (Dr. Garrod.) *Pure aconitina*, 1 gr.; *lard*, 1 dr.; mix by careful trituration.

2. (Dr. Turnbull.) *Aconitina*, 2 gr.; *rectified spirit*, 6 or 7 drops; triturate together, then add of *lard*, 1 dr., and mix well.

Use, &c. As a topical benumber in neuralgic affections, rheumatic pains, &c. Its application generally occasions considerable tingling, and sometimes redness of the part to which it is applied, followed by temporary loss of sensation in the skin, and the cessation of the pain. For slight cases, Dr. Paris formerly employed only 1 gr. to the oz. Owing to the intensely poisonous nature of aconitina, this ointment must be both *prepared* and *used* with great caution, and must never be applied to an abraded surface. It is seldom employed, owing to its extreme costliness. See *Aconitina* (and *above*).

OINTMENT (Ague). See *Anti-periodic Ointment.*

OINTMENT (Albinolo's). See *Patent Medicines.*

OINTMENT (Alkaline). Syn. *Unguentum Alkalinum*, — Lat. *Prep.* 1. (Biett.) *Carbonate of soda*, 2 dr.; *fresh-slaked lime*, 1 dr.; *powdered opium*, 2 gr.; *lard*, 2 oz.; mix by trituration. In prurigo, ringworm, and some other cutaneous affections.

2. (Cazenave.) *Carbonate of potassa*, 1 dr.; *lard*, 1 oz. In psoriasis, lepra, and scorbutic eruptions.

3. (Devergie.)—*a.* From *carbonate* (not sesquicarbonate) *of soda*, 10 to 15 gr.; *lard*, 1 oz. In lichen.

b. From *carbonate of soda*, 20 to 30 gr.; *lard*, 1 oz. In ichthyosis, lepra, psoriasis, and some other scaly skin diseases.

c. From *carbonate of soda*, ½ to 1 dr.; *lard*, 1 oz. In porrigo favosa, especially when occurring in adults.

4. (Soubeiran.) *Carbonate of soda*, 1 to 2 dr.; *wine of opium*, 1 fl. dr.; *lard*, 1 oz. In any of the above affections, when there is much pain or irritation.

Obs. Carbonate of potassa is thought to be preferable to carbonate of soda, when the above affections occur in scorbutic habits. A little *camphor* is also occasionally added.

OINTMENT (Alum). Syn. *Unguentum Aluminis*,—Lat. *Prep.* 1. *Alum*, in very fine powder, 1 dr.; *lard*, 1½ oz. In piles.

2. To the last add of *powdered opium*, 7 gr. In piles, when there is much pain.

OINTMENT (Ammoniacal). Syn. *Unguentum Ammoniacale, Ung. Ammoniæ*,—Lat. *Liparole d'Ammoniaque, Pommade de Gondret*,—Fr. *Prep.* 1. (P. Cod.) *Suet* and *lard*, of each, 1 oz.; melt in a strong wide-mouthed bottle, add of *liquor of ammonia* (sp. gr. 0·923), 2 oz., at once close the bottle, and agitate it until its contents concrete. As little heat as possible should be employed, to prevent unnecessary loss of ammonia.

2. (Gondret.) *Lard*, 3 parts; *suet*, 2 parts;

almond oil, 1 part; *strong liquor of ammonia,* 6 parts; mix, as before. Rubefacient, vesicant, and counter-irritant. Smeared over the skin, and covered so as to prevent evaporation, it raises a blister in 5 or 6 minutes. Its general effects and uses are similar to those of *compound liniment of ammonia.* (See *page* 698.)

OINTMENT (Carbonate of Ammonia). Syn. *Unguentum Ammoniæ Carbonatis, Ung. A. Sesquicarbonatis,*—Lat. *Prep.* From *sesquicarbonate of ammonia,* 1 dr.; *lard,* 9 dr. An excellent application to painful joints, indolent tumours, scrofulous sores, &c.

OINTMENT (Ammonio-chloride of Mercury). Syn. *White Precipitate Ointment; Unguentum Hydrargyri Ammonio-chloridi,*—Ph. L. *Ung. H. Precipitati Albi,*—Ph. L. 1824. *Ung. Precip. A.,*—Ph. E. *Ung. H. Submuriatis Ammoniati,*—Ph. D. 1826. *Prep.* 1. (Ph. L.) *Ammonio-chloride of mercury,* 2 dr.; *lard,* 3 oz.; triturate together.

2. (Ph. E.) As the last, but employing heat.

Uses, &c. Alterative; detergent; stimulant. In itch, scald-head, and various other skin diseases; in inflammation of the eyes; as an application to scrofulous and cancerous tumours; to destroy vermin on the body; &c. It "may be safely used" (in small quantities) "on infants." (A. T. Thomson.)

OINTMENT (Anglo-Saxon). *Prep.* Heat *olive oil,* 1 pint, and *bees' wax,* ¼ *lb.,* until the mixture acquires a reddish-brown colour; then add *red lead* (levigated), ¼ *lb.,* and continue the heat, with constant stirring; when the union appears complete, add of *amber* and *burnt alum,* of each, in fine powder, ½ *oz.;* lastly, when considerably cooled, add of *powdered camphor,* 3 dr. As a dressing to foul ulcers.

OINTMENT (Anodyne). See *Ointments of Opium, Hemlock, &c.*

OINTMENT (Anthracokali). Syn. *Pommade de Anthracokali; Unguentum do.,*—Lat. *Prep.* (Dr. Polya.) *Anthracokali,* in very fine powder, 1 part; *lard,* 30 parts.

Obs. Said to have been tried by Dr. Gibert at the Hôpital St. Louis, in 24 cases of cutaneous disease, many of which were cured, and in all the symptoms were ameliorated.

OINTMENT (Antiherpetic). Syn. *Unguentum Antiherpeticum,*—Lat. *Prep.* 1. (Alibert.) *Red sulphuret of mercury,* 3 dr.; *powdered camphor,* 1 dr.; *lard,* 3 oz.

2. (Chevallier.) *Subsulphate of mercury,* 2 dr.; *chloride of lime,* 3 dr.; *almond oil,* 6 dr.; *lard,* 2 oz. In herpes or tetters.

OINTMENT (Antimonial). See *Ointment of Potassio-tartrate of Antimony.*

OINTMENT (Antiperiodic). Syn. *Unguentum Antiperiodicum, Ung. Febrifugum,*—Lat. *Prep.* 1. *Disulphate of quinine,* 1½ dr.; *saccharine carbonate of iron,* 1 dr.; *oil of cajeput,* 30 drops; *fresh butter,* 1 oz.

2. (Antonini.) *Sulphate of quinine,* 1 oz.; *rectified spirit* and *sulphuric acid,* of each, q. s.; *lard,* 4 oz.

Uses, &c. About ¼ *oz.* of either of the above to be rubbed on the vertebral regions once every 2 or 3 hours for 3 or 4 days, in intermittent fevers, more especially in those accompanied by vomiting; or, into the epigastrium, in cholera, diarrhœa, or dysentery. (Journ. de Chimie Méd.)

OINTMENT (Aromatic). Syn. *Balsamum Stomachale Wackeri, Unguentum Aromaticum,*—Lat. *Prep.* (Ph. Austr. 1836.) *Simple ointment,* 2½ ℔; *yellow wax* and *oil of laurel,* of each, 3 oz.; melt together, and when considerably cooled, add of *oils of juniper, mint, lavender,* and *rosemary,* of each, 2 dr. Anodyne, balsamic, and stimulant.

OINTMENT (Arsenical.) Syn. *Ointment of White Arsenic, Unguentum Arsenicale, Ung. Arsenici, U. Acidi A.,*—Lat. *Prep.* 1. *Arsenious acid* (levigated), 3 gr.; *lard* or *simple ointment,* 1 oz. In lepra, psoriasis, malignant whitlows, &c.

2. (Hosp. F.) *Levigated white arsenic,* 15 to 20 gr.; *lard,* 1 oz. As a dressing for cancerous sores.

3. (Soubeiran.) *White arsenic,* 1 dr.; *lard* and *spermaceti ointment,* of each, 6 dr. In malignant cancer. The above must be carefully prepared, and used with great caution. See *Cerates.*

OINTMENT (Arseniate of Iron). Syn. *Unguentum Ferri Arseniatis,*—Lat. *Prep.* 1. (Carmichael.) *Arseniate of iron,* ½ dr.; *phosphate of iron,* 2 dr.; *spermaceti ointment,* 6 dr.

2. (Dr. Pereira.) *Arseniate of iron,* ½ dr.; *lard,* 1½ oz. In cancer.

OINTMENT (Astringent.) Syn. *Unguentum Astringens,*—Lat. *Prep.* Triturate *powdered catechu,* 1½ dr., with *boiling water,* 2 fl. dr., add, gradually, of *spermaceti ointment* (melted), 1¼ oz., and continue the trituration until the mass concretes. An excellent dressing for ill-disposed sores and ulcers, especially during hot weather. See the several *lead ointments, Ointment of Galls, &c.*

OINTMENT (Atropia). Syn. *Unguentum Atropiæ,*—Lat. *Prep.* 1. *Atropia,* 1½ gr.;

simple ointment, 1 dr.; mix by careful trituration.

2. (Dr. Brookes.) *Atropia*, 5 gr.; *lard*, 3 dr.; *otto of roses*, 1 drop. In neuralgia, rheumatic pains, &c., when the affection is not deeply seated.

OINTMENT (Bailey's). See *Itch Ointment.*

OINTMENT (Balsam of Peru). Syn. *Unguentum Balsami Peruviani*, — Lat. *Prep.* 1. *Lard* or *spermaceti ointment*, 1 oz.; *balsam of Peru*, 1 dr.; melt together by the heat of boiling water, stir for 5 or 6 minutes, allow it to settle, and pour off the clear portion. In chaps and abrasions.

2. (*Ung. B. P. Compositum*,—Copland.) *Lard*, 1 oz.; *white wax*, ¼ oz.; *balsam of Peru*, 1 dr.; melt as before, and when nearly cold, add of *oil of lavender* 10 or 12 drops. As the last, and to restore the hair.

OINTMENT (Banyer's). Syn. *Compound Alum Ointment; Unguentum Aluminis Compositum, Ung. Calomelanos, Ung. Banyeri*,—Lat. *Prep.* From *burnt alum* and *calomel*, of each, 1½ oz.; *carbonate of lead* or *litharge* (levigated), 2 oz.; *Venice turpentine*, ½ ℔; *lard*, 2 ℔; carefully triturated together. In milk-scald, porrigo, &c.

OINTMENT (Bark). See *Ointment of Cinchona.*

OINTMENT (Basilicon). Syn. *Basilicon, Yellow do.*; *Unguentum Basilicum; Ung. B. Flavum*,—Ph. L. 1746. *Prep.* (Ph. L. 1746.) *Olive oil*, 16 fl. oz.; *yellow wax, yellow resin*, and *Burgundy pitch*, of each, 1 ℔; melt, remove the vessel from the fire, and stir in of *common turpentine*, 3 oz. This form is still occasionally employed in some shops, but is generally superseded by the *resin cerate* and *resin ointment* of the pharmacopœias. A nearly similar preparation, under the name of basilicon ointment, is contained in the Ph. Bor. 1847.

OINTMENT (Basilicon,—Black). See *Ointment of Pitch.*

OINTMENT (Basilicon,—Green). Syn. *Unguentum Basilicum Viride*,—Ph. L. 1746. *Prep.* (Ph. L. 1746.) *Prepared verdigris*, 1 oz.; *yellow basilicon*, 8 oz.; *olive oil*, 3 fl. oz. Detergent. *Used* to keep down fungous growths, to dress syphilitic ulcers, &c. See *Cerate* and *Ointment of Verdigris.*

OINTMENT (Bateman's). See *Itch Ointment.*

OINTMENT (Bay-leaves). See *Laurel Ointment.*

OINTMENT (Belladonna). Syn. *Unguentum Belladonnæ*, — Ph. L. *Prep.* 1. (Ph. L.) *Extract of belladonna* (deadly nightshade), 1 dr.; *lard*, 1 oz.; mix by trituration.

2. (Soubeiran.) *Fresh belladonna leaves* (bruised), 1 part; *lard*, 2 parts; simmer together until the leaves become crisp, and, after digestion for a short time longer, strain with pressure.

Uses, &c. As a local anodyne, in painful and indolent tumours, nervous irritations, &c. Also as an application to the neck of the uterus in cases of rigidity. (Chaussier.)

OINTMENT (Belladonna,—Compound). Syn. *Unguentum Belladonnæ Compositum*, —Lat. *Prep.* 1. (W. Cooley.) *Compound iodine ointment*, 7 dr.; *extract of belladonna*, 1 dr. Powerfully discutient. A most excellent application to all glandular tumours and indurations, buboes, &c., which it is desirable to disperse, instead of mature; more especially when there is much pain. It is particularly suitable to cases occurring on shipboard, and when its application (at least twice a day) is accompanied with the internal use of the mixture of iodine and gold (see *Antiscrofulous mixture*, page 793). This treatment has seldom failed, even when the parties were dieted chiefly on salt food.

2. (M. Debreyne.) *Extract of belladonna* and *lard*, of each, 3 dr.; *powdered opium*, ½ dr. As an external anodyne and benumber, more especially in neuralgia, painful cancerous tumours, &c. A small piece is to be applied to the part, and the friction continued for 6 or 8 minutes. The above preparations are useless, unless the extract employed is recent, and of good quality.

OINTMENT (Bichloride of Mercury). Syn. *Unguentum Hydrargyri Bichloridi, Ung. H. Oxymuriatis*,—Lat. *Prep.* 1. From *corrosive sublimate*, 2 to 5 gr.; rub it to powder in a glass or Wedgewood-ware mortar, add of *rectified spirit* 6 or 7 drops, or q. s.; again triturate; lastly add, gradually, of *spermaceti ointment* (reduced to a cream-like state by heat), 1 oz., and continue the trituration until the whole concretes. *Used* as a stimulant, detergent, and discutient application in various local affections; in lepra, porrigo, acne, &c., and as a dressing to syphilitic and some other ulcers.

2. (Ph. Chirur.) *Corrosive sublimate*, 10 gr.; *yelk of* 1 *egg; lard*, 1 oz. As a dressing.

3. (*Pommade de Cirillo*,—P. Cod.) *Corrosive sublimate*, 1 dr.; *lard*, 1 oz. Caustic; must not be confounded with the preceding.

OINTMENT (Bismuth). Syn. *Unguentum Bismuthi*,—Lat. *Prep.* 1. *Trisnitrate of bismuth*, 1 dr.; *simple ointment*, 1 oz.

2. (Fuller.) *Trisnitrate of bismuth*, 1 dr.; *spermaceti ointment*, 19 dr. In itch, and some chronic cutaneous diseases.

OINTMENT (Blistering). See *Ointment of Cantharides* and *Veterinary Medicine.*

OINTMENT (Blue). This is the vulgar name in England of mercurial ointment. On the Continent, an ointment made of *smalts* and *Goulard water*, is commonly so called.

OINTMENT (Borax). Syn. *Unguentum Boracis*,—Lat. *Prep.* From *borax* (in very fine powder), 1 dr.; *simple ointment* or *lard*, 7 dr. In excoriations, chaps, &c.

OINTMENT (Bromide of Potassium). Syn. *Unguentum Potassii Bromidi, Ung. Potassæ Hydrobromatis*,—Lat. *Prep.* (Magendie.) *Bromide of potassium*, ½ dr.; *lard*, 1 oz. Resolvent; in bronchocele, scrofula, &c.

OINTMENT (Bromine). Syn. *Unguentum Brominii, Ung. B. Compositum*,—Lat. *Prep.* (Magendie.) *Bromide of potassium*, 20 gr.; *bromine*, 6 to 12 drops; *lard*, 1 oz. As the last, but more active.

OINTMENT (Brown). Syn. *French Poor-man's Friend; Unguentum Fuscum, Ung. Hydrargyri, F.*,—Lat. *Prep.* (P. Cod.) *Nitric oxide of mercury* (levigated), ½ dr.; *resin ointment*, 1 oz. In ophthalmia (cautiously), after the inflammatory stage is over; as an application to sore legs, &c.

OINTMENT (Cadmium). Syn. *Unguentum Cadmii, Ung. C. Sulphatis*,—Lat. *Prep.* (Radius.) *Sulphate of cadmium*, 1 to 2 gr.; *pure lard*, 1 dr.; carefully triturated together. In specks on the cornea.

OINTMENT (Calamine). Syn. *Unguentum Calaminæ*,—Ph. D. 1826. *Ung. Lapis Calaminaris, Ung. Zinci Carbonatis Impuri, Ceratum Epuloticum*,—Lat. var. *Prep.* (Ph. D. 1826.) *Prepared calamine*, 1 ℔; *ointment of yellow wax*, 5 ℔. Desiccative and healing. This is the old Dublin form for *Turner's cerate.* (See *p.* 221.)

OINTMENT (Calomel). Syn. *Unguentum Calomelanos, Ung. Hydrargyri Chloridi*,—Lat. *Prep.* From *calomel*, 1 dr.; *lard* or *simple ointment*, 1 oz.

Obs. "Were I required to name a local agent preeminently useful in skin diseases generally, I should fix on this. It is well deserving a place in the Pharmacopœia." (Pereira.) Dr. Underwood uses *elder-flower ointment* as the vehicle.

OINTMENT (Calomel,—Compound). Syn. *Unguentum Calomelanos Compositum*,—Lat. *Prep.* (Dr. A. T. Thomson.) *Calomel*, 1 dr.; *tar ointment*, 4 dr.; *spermaceti ointment*, 1 oz. In lepra.

OINTMENT (Camphor). Syn. *Unguentum Camphoræ*,—Lat. *Prep.* 1. *Camphor*, 1 to 2 dr.; *lard*, 1 oz.; dissolve by a gentle heat and stir until the mass is nearly cold. Stimulant and anodyne; in prurigo, psoriasis, &c.

2. (*Compound.*)—*a.* From *powdered opium*, ½ dr.; *powdered camphor*, 1½ dr.; *lard*, 1¼ oz.; mix by trituration. As an anodyne friction in rheumatic pains, swelled joints, colic, &c.

b. (Ferriar.) *Camphor* and *powdered mustard*, of each, 1 dr.; *soap* (soft?), ½ oz.; *resin ointment*, 1 oz. As a friction in lumbago, &c.

OINTMENT (Cantharides). *Unguentum Cantharidis, Ung. Pulveris C.*,—Ph. E. *Ung. Epispasticum Fortius*,—P. E. 1817. *Prep.* (Ph. E.) *Resin ointment*, 7 oz.; melt, add of *cantharides* (in fine powder), 1 oz., and stir until the whole is nearly cold. See *Cerates* (and *below.*)

OINTMENT (Cantharides). Syn. *Unguentum Cantharidis*,—Ph. L. D. & U. S. *Ung. Infusi C.*,—Ph. E. *Ung. Lyttæ*,—Ph. L. 1809. *Ung. Epispasticum Mitius*,—Ph. E. 1817. *Prep.* 1. (Ph. L.) *Cantharides* (in very fine powder), 3 oz.; *distilled water*, 12 fl. oz.; mix, boil to one-half, to the strained liquid add of *resin cerate*, 1 ℔, and evaporate to a proper consistence.

2. (Ph. E.) *Powdered cantharides*, 1 oz.; *boiling water*, ¼ pint; infuse one night (12 hours), strain with expression, add of *lard*, 2 oz., and boil until the water is expelled; then add *bees' wax* and *resin*, of each, 1 oz., and when these are liquefied, remove the vessel from the fire, and further add of *Venice turpentine*, 2 oz.

3. (Ph. D.) *Liniment of Spanish flies*, 8 fl. oz.; *white wax*, 3 *oz.*; *spermaceti*, 1 *oz.;* melt together with a gentle heat, and stir until it concretes.

Obs. The above preparations are frequently called "*blister ointment*" or "*epispastic ointment.*" They are used to keep blisters open after they have been produced by stronger compounds. The last three compounds are regarded as milder than the first, which contains the flies in substance. The P. Cod. contains an ointment (*ung. epispasticum flavum*) which is weaker than the above, prepared by digesting the *bruised flies* in *lard*, for 3 hours, over a water bath; about ⅛th part of *wax* is next added to the strained fat, which is then coloured with *turmeric*, and scented with *oil of lemon.* See *Pommades.*

OINTMENT (Cantharidine). Syn. *Unguentum Cantharidinæ*,—Lat. *Prep.* (Soubeiran.) *Cantharidine*, 1 gr.; *white wax*, 1 dr.; *lard*, 7 dr.; mix thoroughly. (See *above.*)

OINTMENT (Capsicum). Syn. *Unguentum Capsici*,—Lat. *Prep.* (Dr. Turnbull.) *Tincture of capsicum* (pure), q. s.; gently evaporate it until it begins to gelatinize, then mix the extract with twice its weight of *lard.* As a powerful stimulant and rubefacient. When very freely used, it vesicates.

OINTMENT (Carbonate of Ammonia). See *Ammoniacal Ointments.*

OINTMENT (Carbonate of Lead). Syn. *White Lead Ointment; Unguentum Plumbi Carbonatis,*—Ph. E. & D. *Ung. Cerussæ,*—Ph. D. 1807. *Ung. Album,*—Ph. E. 1744. *Prep.* 1. (Ph. E.) *Carbonate of lead,* 1 oz.; *simple ointment,* 5 oz.; mix thoroughly.

2. (Ph. D.) *Carbonate of lead,* 3 *oz.; ointment of white wax,* 1 *lb.;* mix with heat.

Uses, &c. Cooling; desiccative. Useful to promote the healing of excoriated parts and slight ulcerations. The *camphorated white ointment* of old pharmacy (*ung. album camphoratum,*—Ph. L. 1744) was made by adding 40 gr. of *camphor* to the first of the above.

OINTMENT (Catechu). Syn. *Unguentum Catechu,*—Lat. *Prep.* From *alum,* 1 *oz.; catechu,* 3 *oz.* (both in very fine powder); added to *olive oil,* ½ pint, and *yellow resin,* 4 *oz.,* previously melted together. *Used* to dress ulcers in hot climates, where the ordinary fat ointments are objectionable; also in this country during hot weather. See *Astringent Ointment.*

OINTMENT (Charcoal). Syn. *Unguentum Carbonis,*—Lat. *Prep.* 1. *Resin ointment,* 10 dr.; *recently burnt charcoal* (levigated), 3 dr. As a dressing to foul ulcers, especially those of the legs.

2. (Caspar.) *Lime-tree charcoal* and *dried carbonate of soda,* of each, 2 dr.; *rose ointment,* 1 oz., or q. s. In scald-head.

3. (Radius.) *Animal charcoal* (recent), 1 part; *mallow ointment,* 2 parts. As a friction in glandular enlargements and indurations, as a dressing to fœtid ulcers, &c.

OINTMENT (Cherry-laurel). Syn. *Unguentum Lauro-cerasi,*—Lat. *Prep.* (Soubeiran.) *Essential oil of cherry-laurel,* 1 dr.; *lard,* 1 oz. To alleviate the pain in cancer, neuralgia, and other local affections.

OINTMENT (Chilblain). Syn. *Unguentum ad Perniones,*—Lat. *Prep.* 1. From *made mustard* (very thick), 2 parts; *almond oil* and *glycerine,* of each, 1 part; triturated together. To be applied night and morning.

2. (Cottereau.) *Acetate of lead, camphor,* and *cherry-laurel water,* of each, 1 dr.; *tar,* 1½ dr.; *lard,* 1 oz.

3. (Devergie.) *Creasote* and *goulard's extract,* of each, 12 drops; *extract of opium,* 1½ gr.; *lard,* 1 oz. Twice or thrice daily.

4. (*Giacomini's.*) *Sugar of lead,* 2 dr.; *cherry-laurel water* (distilled), 2 fl. dr.; *lard,* 1 oz.

5. (Linnæus.) *Balsam of Peru,* 1 dr.; *hydrochloric acid,* 2 dr.; *spermaceti ointment,* 2½ oz.

6. (Swediaur.) Same as *Swediaur's paste.* See p. 237.

7. (*Vance's.*) See *Chilblains.*

8. (*Wahler's*) See *Chilblains.*

OINTMENT (Chloride of Calcium). Syn. *Unguentum Calcii Chloridi, Ung. Calcis Muriatis,*—Lat. *Prep.* (Sundelin.) *Chloride of calcium* (dry), 1 dr.; *strong vinegar,* 40 gr.; *foxglove* (recent, in fine powder), 2 dr.; *lard,* 1 oz. In bronchocele, scrofulous tumours, &c.

OINTMENT (Chloride of Lead). Syn. *Unguentum Plumbi Chloridi,*—Lat. *Prep.* (Mr. Tuson.) *Chloride of lead,* 1 part; *simple cerate,* 8 parts; carefully triturated together. In painful cancerous ulcerations and neuralgic tumours. See *Chloride of Lead.*

OINTMENT (Chloride of Lime). See *Ointment of Hypochlorite of Lime.*

OINTMENT (Chloride of Mercury). See *Ointments of Calomel* and *Bichloride of Mercury.*

OINTMENT (Chlorine). Syn. *Unguentum Chlorinii,*—Lat. *Prep.* (Augustin.) *Chlorine water,* 1 part; *lard,* 8 parts; well triturated together. In itch, lepra, ringworm, fœtid ulcers, &c.

OINTMENT (Chloriodide of Mercury). Syn. *Unguentum Hydrargyri Chloriodidi,*—Lat. *Prep.* (M. Recamier.) *Chloriodide* (iodo-bichloride) *of mercury,* 3 gr.; *lard,* 5 dr. Recommended as a powerful discutient or resolvent.

OINTMENT (Chloroform). Syn. *Unguentum Chloroformi,*—Lat. *Prep.* (M. Louis.) *Chloroform,* 1 dr.; *simple ointment,* 1 oz. In neuralgia and rheumatic pains, &c. It must be kept in a stoppered wide-mouthed phial.

OINTMENT (Cinchona). Syn. *Ointment of Bark; Unguentum Cinchonæ,*—Lat. *Prep.* (Biett.) *Red cinchona bark* (in very fine powder), and *almond oil,* of each, 1 part; *beef marrow* (prepared), 3 parts. In the variety of scald-head termed porrigo decalvans. A little oil of mace or tar is a useful addition.

OINTMENT (Citrine). See *Ointment of Nitrate of Mercury.*

OINTMENT (Cocculus Indicus). Syn. *Unguentum Cocculi,*—Ph. E. *Prep.* (Ph. E.) *Kernels* of *cocculus Indicus,* 1 part; beat them to a smooth paste in a mortar, first alone, and next with a little lard; then further add of *lard,* q. s., so that it may be equal to 5 times the weight of the kernels.

Used to destroy pediculi, and in scald-head, &c.

OINTMENT (Cod-liver Oil). Syn. *Unguentum Olei Morrhuæ, Ung. O. Jecoris Aselli,*—Lat. *Prep.* 1. *Cod-liver oil* (pale and recent), 7 parts; *white wax* and *spermaceti,* of each, 1 part; melted together. In ophthalmia and opacity of the cornea, either alone or combined with a little citrine ointment; as a friction or dressing for scrofulous indurations and sores; in rheumatism, stiff joints, and in several skin diseases. It often succeeds in porrigo or scald-head when all other remedies have failed. Scented with oil of nutmeg and balsam of Peru, it forms an excellent pommade for strengthening and restoring the hair.

2. (Deschamps.) *Caustic soda,* 1 oz.; *hot water,* 2½ oz.; dissolve, add of *cod-liver oil,* 8 fl. oz., and agitate briskly. It may be afterwards melted with a little *white wax,* if not consistent enough.

OINTMENT (Colocynth). Syn. *Unguentum Colocynthidis,*—Lat. *Prep.* (Chrestien.) *Colocynth pulp* (in very fine powder), 1 part; *lard,* 8 parts. *Used* in frictions on the abdomen as a hydragogue purgative, in mania, dropsy, &c.

OINTMENT (Cosmetic). Syn. *Unguentum Cosmeticum,*—Lat. *Pommade de la Jeunesse,*—Fr. *Prep.* (Quincey.) *Spermaceti,* 3 dr. (better, 4½ dr.); *oil of almonds,* 2 oz.; melt together, and, when cooled a little, stir in of *trisnitrate of bismuth,* 1 dr.; and lastly, of *oil of rhodium,* 6 drops. In itch, and some other cutaneous eruptions; but chiefly as a pommade for the hair. Its frequent use is said to turn the latter black.

OINTMENT (Creasote). Syn. *Unguentum Creasoti,*—Ph. L. E. D. & U. S. *Prep.* 1. (Ph. L.) *Creasote,* ½ fl. dr.; *lard,* 1 oz.; triturate together.

2. (Ph. E.) *Lard,* 3 oz.; melt it by a gentle heat, add of *creasote,* 1 dr., and stir the mixture until it is nearly cold.

3. (Ph. D.) *Creasote,* 1 fl. dr.; *ointment of white wax, 7 dr.;* as the last.

Uses, &c. In several skin diseases, especially ringworm; as a friction in tic douloureux; a dressing for scalds and burns; an application to chilblains, &c., &c.

OINTMENT (Croton Oil). Syn. *Unguentum Crotonis,*—Lat. *Prep.* 1. *Croton oil,* 15 to 30 drops; *lard* (softened by heat), 1 oz.; mix well. This is the usual and most useful strength to prepare this ointment. Rubefacient and counter-irritant; in rheumatism and various other diseases. When rubbed repeatedly on the skin it produces redness and a pustular eruption. It also often affects the bowels by absorption. The only advantage it possesses over other preparations of the class, is the rapidity of its action.

2. (*Rubefacient Pommade,*—Caventou.) *White wax,* 1 part; *lard,* 5 parts; melt together, and when quite cold mince it small, add of *croton oil,* 2 parts, and mix by trituration. Stronger than the last.

OINTMENT (Cyanide of Mercury). Syn. *Unguentum Hydrargyri Cyanidi,* — Lat. *Prep.* 1. (Cazenave.) *Bicyanide of mercury,* 8 gr.; *lard,* 1 oz.; carefully triturated together.

2. (Pereira.) *Bicyanide of mercury,* 10 to 12 gr.; *lard,* 1 oz. As a dressing for scrofulous and syphilitic ulcers, &c.; as an application in psoriasis, moist tetters, and some other skin diseases, &c. Biett orders the addition of a few drops of essence of lemon.

OINTMENT (Cyanide of Potassium). Syn. *Unguentum Potassii Cyanidi,* — Lat. *Prep.* (Cazenave.) *Cyanide of potassium,* 12 gr.; *oil of almonds,* 2 dr.; triturate, add of *cold cream* (dry), 2 oz., and mix by careful trituration. As an anodyne in neuralgia, rheumatism, swelled joints, &c.; also as a friction over the spine in hysteria, and over the epigastrium in gastrodynia, &c.

OINTMENT (Delphine). Syn. *Unguentum Delphiniæ,*—Lat. *Prep.* (Dr. Turnbull.) *Delphine* or *delphinia,* 10 to 30 gr.; *olive oil,* 1 dr.; *lard,* 1 oz.; mix as the last. *Used* as a friction in rheumatism, and the other cases in which veratrine is employed.

OINTMENT (Depilatory). Syn. *Unguentum Depilatorium,*—Lat. See *Pommade Epilatoire* (*p.* 324).

OINTMENT (Desiccative). Syn. *Drying Ointment, Unguentum Desiccativum, Ung. Exsiccans,*—Lat. See the *Ointments* of *Calamine, Lead, Zinc, &c.*

OINTMENT (Detergent). Syn. *Unguentum Detergens,*—Lat. The ointments of nitrate of mercury, nitric oxide of mercury, tar, verdigris, &c., when not too strong, come under this head.

OINTMENT (Digestive). Syn. *Unguentum Digestivum,*—Lat. *Prep.* 1. (P. Cod.) *Venice turpentine,* 2 oz.; *yelks* of 2 *eggs;* mix, and add of *oil of St. John's wort* (see *p.* 857), ½ oz.

2. (*Digestif Animé,*—P. Cod.) As the last, with an equal weight of *liquid styrax.*

3. (*Digestif Mercuriel,*—P. Cod.) As No. 1, with an equal weight of *mercurial ointment.*

4. (*Ung. D. Viride,*—Dr. Kirkland.) *Bees' wax, gum elemi,* and *yellow resin,* of each,

1 oz,; *green oil,* 6 oz.; melt them together, and when considerably cooled, add of *oil of turpentine,* 2 dr.

OINTMENT (Edinburgh). Two compounds are known under this name:—1. (*Brown.*) From *black basilicon,* 6 parts; *milk of sulphur,* 2 parts; *sal ammoniac,* 1 part.

2. (*White.*) From *white hellebore,* 3 *oz.; sal ammoniac,* 2 *oz.; lard,* 1 *lb.* Both are used in itch.

OINTMENT (Eggs). Syn. *Unguentum Ovorum,*—Lat. *Prep.* 1. *Yelk of* 1 *egg; honey* and *fresh linseed oil,* of each, 1 oz.; *balsam of Peru,* ½ dr.; mix well.

2. (Soubeiran.) *Bees' wax,* 4 dr.; *oil of almonds,* 1½ oz.; *yelk of* 1 *egg.* As an emollient and soothing dressing to excoriations, irritable ulcers, &c.

OINTMENT (Egyptian). *Prep.* (Giordano.) *Burnt alum,* 1 part; *verdigris,* 10 parts; *strong vinegar,* 14 parts; *purified honey* (thick), 32 parts; mix by heat and agitation. As a detergent application to foul ulcers. It is a modification of the *unguentum Ægyptiacum* of old pharmacy.

OINTMENT (Elder-flower). Syn. *White Elder-ointment; Unguentum Sambuci Florum; Ung. Sambuci,*—Ph. L. *Prep.* 1, (Ph. L.) *Elder flowers* and *lard,* of each. 1 ℔; boil them together until the flowers become crisp, then strain, with pressure, through a linen cloth. The same precautions must be observed as are necessary in the preparation of the *medicated oils,* by infusion. (See *p.* 855.) Emollient; less white and odorous than the following:—

2. (*Wholesale.*) Take of *lard* (hard, white, and sweet), 25 *lb.; prepared mutton suet,* 5 *lb.;* melt them in a well-tinned copper or earthen vessel, add of *elder-flower water,* 3 gall., agitate briskly for about ½ an hour, and set it aside; the next day gently pour off the water, re-melt the ointment, and add of *benzoic acid,* 5 dr.; *otto of roses,* 20 drops; *oil of bergamot* and *oil of rosemary,* of each, 1 dr.; again agitate well, let it settle for 10 minutes, and then pour off the clear portion into pots for sale. Very agreeable, and keeps well.

Obs. The last formula is the one now generally adopted by the large wholesale houses.

OINTMENT (Elder-leaf). Syn. *Elder Ointment, Green do.; Unguentum Viride, Ung. Sambuci Viride; Ung. Sambuci,*—Ph. D. 1826. *Ung. Sambucinum,*—Ph. L. 1746. *Prep.* 1. (Ph. D. 1826.) *Fresh elder-leaves* (bruised), 3 ℔; *suet,* 4 ℔; *lard,* 2 ℔; boil together, as above.

2. (Ph. L. 1746.) *Green oil,* 3 ℔; *bees' wax,* 10 oz.; melt together. Does not "grain."

3. (*Wholesale.*) Good *fresh lard,* 1 cwt.; *fresh elder leaves,* 56 *lb.*; boil till crisp, strain off the oil, put it over a slow fire, add hard *prepared mutton-suet,* 14 *lb.,* and gently stir it until it acquires a bright green colour.

Obs. The above ointment is reputed to be emollient and cooling, and has always been a great favorite with the common people. Both elder-flower and elder-leaf ointment are, however, unnecessary preparations. "They are vestiges of the redundant practice of former times." (A. T. Thomson.) The first and last formulæ are those now almost exclusively employed in trade. The ointment should be allowed to cool very slowly, and after its temperature has fallen a little, and it begins to thicken, it should not be stirred, in order that it may "*grain*" well, as a granular appearance is much admired. It is a common practice to add powdered verdigris to deepen the colour, but then the ointment does not keep well. This dangerous fraud may be detected in the manner noticed under *Savine Cerate* (p. 224).

OINTMENT (Elemi). Syn. *Unguentum Elemi,*—Ph. L. & D. *Ung. E. Compositum,*—Ph. L. 1824. *Ung. è Gummi Elemi* or *Linimentum Arcæi,*—Ph. L. 1721. *Balsam of Arcæus, Ointment of do., Balsamum Arcæi,*—Obs. var. *Prep.* 1. (Ph. L.) *Elemi,* 3 oz.; *suet,* 6 oz.; melt them together, remove the vessel from the fire, and stir in of *common turpentine,* 2½ oz.; *olive oil,* ½ fl. oz.; lastly, strain the whole through a linen cloth.

2. (Ph. D.) *Resin of elemi,* 4 *oz.; ointment of white wax,* 1 *lb.*; melt them together, strain through flannel, and stir the mixture constantly until it concretes.

Uses, &c. Stimulant and digestive. It is frequently employed to keep open issues and setons, and as a dressing for old and ill-conditioned sores. The *ung. elemi cum ærugine* of St. George's Hospital is made by adding 1 dr. of *finely powdered verdigris* to every 6 oz. of the ointment.

OINTMENT (Escharotic). Syn. *Unguentum Escharoticum,*— Lat. *Prep.* 1. (Sir B. Brodie.) *Bichloride of mercury,* 1 dr.; *nitric oxide of mercury, sulphate of copper,* and *verdigris,* of each, 2 dr. (all in very fine powder); *lard,* q. s. See *Arsenical Ointment* and *Cerate.*

OINTMENT (Eye). Syn. *Eye Salve, Unguentum Ophthalmicum,*—Lat. *Prep.* 1. (Dr. Collier.) *Burnt alum,* ½ dr.; *powdered opium,* 20 gr.; *olive oil,* 1 fl. dr.; *sperma-*

ceti ointment, 2 dr. In inflammation of the eyelids, purulent ophthalmia, &c.

2. (W. Cooley.) *Chloride of barium*, 6 gr.; *calomel*, 10 gr.; *simple ointment*, 1 oz.; *otto of roses*, 1 or 2 drops. In scrofulous ophthalmia.

3. (Dessault.) *Nitric oxide of mercury*, *carbonate of zinc*, *acetate of lead*, and *dried alum*, of each, 1 dr.; *corrosive sublimate*, 10 gr.; *rose ointment*, 1 oz. In chronic ophthalmia, profuse discharges, &c.; in general diluted.

4. (Dupuytren.) *Red oxide of mercury*, 10 gr.; *sulphate of zinc*, 20 gr.; *lard*, 2 oz. For chronic inflammation of the eyelids, chronic ulcers, &c.

5. (Fricke.) *Nitrate of silver*, 10 gr.; *zinc ointment*, 2 dr.; *balsam of Peru*, ½ dr. In ulceration of the cornea, and in acute, purulent, and chronic ophthalmia, &c., employing great caution in its use.

6. (Guthrie.) *Spermaceti ointment*, 1 dr.; *solution of diacetate of lead*, 15 drops; *nitrate of silver*, 2 to 10 gr. As the last, and in cases wherein a direct caustic action is desired. The stronger ointment often occasions intense pain.

7. (Hufeland.) *Black oxide of mercury*, 2 gr.; *spermaceti cerate* and *walnut oil*, of each, 1 dr. In chronic affections of the eyes or eyelids, particularly in those of a syphilitic character.

8. (Janin.) *Ammonio-chloride of mercury*, 1 dr.; *tutty* and *bole*, of each, 2 dr.; *lard*, 1 oz. In debility of the conjunctiva, in chronic inflammation with excessive secretion, &c.

9. (*Marshall's.*) See *Cerates.*

10. (Parker.) *Iodine*, 1 gr.; *iodide of potassium*, 5 gr.; *simple ointment*, 3 dr. In scrofulous ophthalmia, thickening of the conjunctiva, opacity of the cornea, &c.

11. (Pellier.) *Nitric-oxide of mercury* and *carbonate of zinc*, of each, 1½ dr.; *tutty*, ½ dr.; *red sulphuret of mercury*, 20 gr.; *lard*, 2 oz.; *balsam of Peru*, 15 drops. In specks in the eye arising from small ulcers which have healed up; in excessive defluxions, &c.

12. (Ratier.) *Liquor of diacetate of lead*, ½ dr.; *wine of opium*, 1 dr.; *lard*, 5 dr. In excoriations, and the variety of chronic ophthalmia popularly termed "blear eye."

13. (*Regent's.*) *Acetate of lead* and *red precipitate*, of each, 1 dr.; *camphor*, 6 gr.; *washed fresh-butter*, 2½ oz. As the last, and in chronic ulcerations.

14. (Singleton's *Golden Ointment.*) According to Dr. Paris, this compound consists of *lard* medicated with *orpiment* (native yellow sulphuret of arsenic). There appears, however, to be some mistake in this, as that sold us under the name had nearly the same composition as the *ointment of nitric oxide of mercury* of the pharmacopœia. It did not contain even a trace of either arsenic or sulphur. The action of this nostrum, and the reputation which it has acquired, fully justify this conclusion.

15. (*Smellome's.*) From *verdigris* (levigated), ½ dr.; *olive oil*, 1 fl. dr.; triturate together, add of *yellow basilicon*, 1 oz., and again triturate until it begins to concrete. A popular nostrum, sometimes useful in chronic inflammation and ulcerations of the eyelids, &c., especially in those of a scrofulous character.

16. (Spielmann.) *Acetate of lead*, 20 gr.; *spermaceti cerate*, 5 dr.; *compound tincture of benzoin*, 40 gr. Cooling; desiccative. In inflamed eye-lids, excoriations, &c.

17. (Thomson.) *Levigated oxide of zinc*, 1 dr.; *lard*, 9 dr.; *wine of opium*, 20 drops. In chronic ophthalmia depending on want of tone in the vessels and integuments of the eye.

18. (Velpeau.) *Precipitated sesquioxide of iron* (recent, but dry), ½ dr.; *lard*, 5 dr.; *oil of almonds*, 1 fl. dr.; *balsam of Peru*, 15 drops. As the last, especially in "blear eye."

19. (Ware.) *Wine of opium*, 1 fl. dr.; *simple ointment*, 3 dr. In ophthalmia, after the inflammatory symptoms have subsided, and the vessels remain red and turgid.

20. (St. Yve.) *Fresh butter* (washed), 1 oz.; *white wax*, 1 dr.; *camphor*, 15 gr.; melt by a gentle heat, and when cooled a little, add of *red precipitate* (levigated), ½ dr.; *oxide of zinc*, 20 gr. In chronic inflammation of the coats of the eye, or of the eye-lids, specks on the cornea, &c.

Obs. The ingredients entering into the composition of all the above ointments must be reduced to the state of impalpable powder before mixing them; and the incorporation should be made by long trituration in a Wedgwood-ware mortar, or preferably, for those that contain substances that are very gritty, by levigation on a porphyry slab, with a muller. The most serious consequences, even *blindness*, have resulted from the neglect of these precautions. They should all be employed in exceedingly small quantities at a time, and they should be very carefully applied by means of a camel-hair pencil or a feather; and, in general, not until acute inflammation has subsided. The stronger ones, in most cases, require dilution with an equal weight, to twice their weight of lard or simple ointment, and should only be used of their full strength under proper medical advice. Various other formulæ for *ophthalmic ointments* will be found under the names of their leading ingredients.

OINTMENT (Figwort). See *Ointment* (Scrophularia).

OINTMENT (Foxglove). Syn. *Unguentum Digitalis,*—Lat. *Prep.* 1. From *fresh foxglove,* as *ointment of hemlock,* Ph. L. As an application to chronic ulcers, glandular swellings, &c.

2. (M. Rudemacher.) *Extract of foxglove,* 2 dr.; *lard,* 1 oz. In croup; spread on lint, and applied as a plaster to the throat.

OINTMENT (Fuligokali). See *Fuligokali.*

OINTMENT (Galls). Syn. *Unguentum Gallæ,*—Ph. D. *Ung. Gallarum.*—Ph. D. 1826. *Prep.* (Ph. D.) *Gall-nuts* (in very fine powder), 1 *dr.; ointment of white wax,* 7 *dr.;* rub them together until a uniform mixture is obtained. An excellent application to piles, either alone or mixed with an equal quantity of zinc ointment; also highly useful in ring-worm of the scalp.

OINTMENT (Galls,—Compound). Syn. *Ointment of Galls and Opium; Unguentum Gallæ Opiatum; Ung. Gallæ Compositum,*—Ph. L. *Ung. Gallæ et Opii,*—Ph. E. *Prep.* 1. (Ph. L.) *Gall nuts* (very finely powdered), 6 dr.; *powdered opium,* 1½ dr.; *lard,* 6 oz.; rub them together.

2. (Ph. E.) *Galls,* 2 dr.; *opium,* 1 dr.; *lard,* 1 oz.; as the last.

Uses, &c. A most valuable astringent and anodyne in blind piles, slight cases of prolapsus ani, &c. Some practitioners add 1 dr. of *camphor.* The ointment of the Ph. E. is much the strongest.

OINTMENT (Galls with Morphia). Syn. *Unguentum Gallæ et Morphiæ,*—Lat. *Prep.* (Dr. Paris.) *Morphia,* 2 gr.; *olive oil* (hot), 2 fl. dr.; triturate, add of *zinc ointment* (Ph. L.), 1 oz.; *powdered galls,* 1 dr.; and mix thoroughly. In piles. The quantity of galls should be doubled.

OINTMENT (Garlic). Syn. *Unguentum Allii,*—Lat. *Prep.* 1. *Fresh garlic* (bruised), 2 parts; *lard,* 3 parts; simmer together for ½ an hour, and then strain with expression. Rubbed on the abdomen in chronic diarrhœa and colic, and over the chest and spine in hooping-cough.

2. (Beasley.) *Fresh garlic* and *lard,* equal parts; beaten together. Applied to the feet in hooping-cough.

OINTMENT (Giacomini's). See *Chilblain Ointment.*

OINTMENT (Gold). Syn. *Unguentum Auri,*—Lat. *Pommade d'Or,*—Fr. *Prep.* 1. (Legrand.) *Gold* (in powder), 12 gr.; *lard,* 1 oz. As a dressing for syphilitic ulcers, and as a friction in glandular indurations, &c.; also endermically.

2. (Magendie.) *Amalgam of gold,* 1 dr.; *lard,* 1 oz. For endermic use, chiefly. When the surface becomes dry, the ointment of terchloride of gold is to be substituted as a dressing. In rheumatic pains, neuralgia, &c.

OINTMENT (Golden). See *Eye Ointment, Citrine do., &c.*

OINTMENT (Gondret's). See *Ammoniacal Ointment.*

OINTMENT (Goulard's). Syn. *Unguentum Goulardi, Ung. Lithargyri Acetatis,*—Lat. *Prep.* (Ph. Chirur.) *Goulard's extract,* 1 dr.; *simple ointment,* 2 oz. See *Cerates* (*p.* 222).

OINTMENT (Green). See *Elder Ointment.*

OINTMENT (Hellebore). Syn. *Ointment of White Hellebore; Unguentum Veratri,*—Ph. L. 1836 & Ph. D. 1826. *Ung. Hellebori Albi,*—Ph. L. 1788. *Prep.* (Ph. L. 1836.) *White hellebore* (in very fine powder), 2 oz.; *lard,* 8 oz.; *oil of lemons,* 20 drops. In itch, lepra, ringworm, &c.; and to destroy insects in the hair of children. It should be used with caution, and preferably, diluted with an equal weight of lard.

OINTMENT (Hellebore,—Compound). Syn. *Unguentum Veratri Compositum,*—Lat. *Prep.* 1. (Rayer.) *White hellebore,* 1 oz.; *sal ammoniac,* ½ oz.; *lard,* 8 oz. *Used* as the last.

2. See *Compound Sulphur Ointment,* Ph. L.

OINTMENT (Hemlock). Syn. *Unguentum Conii,*—Ph. L., and Ph. D. 1826. *Prep.* 1. (Ph. L.) *Fresh hemlock leaves* and *lard,* of each, 1 ℔; boil them together (very gently) until the leaves become crisp, then strain through linen, with pressure. See *Medicated Oils* (*p.* 855).

2. *Extract of Hemlock,* 1 dr.; *lard,* 9 dr.; triturate together.

Uses, &c. As a local anodyne in neuralgic and rheumatic pains, glandular enlargements, painful piles, &c.; and as a dressing to painful and irritable ulcers, cancerous sores, &c.

OINTMENT (Henbane). Syn. *Unguentum Hyoscyami,*—Lat. *Prep.* 1. *Fresh henbane leaves,* 1 ℔; *lard,* 2 ℔; boil until nearly crisp.

2. (Taddei.) *Extract of henbane,* 1 dr.; *lard,* 1 oz. Anodyne; in painful piles, sores, &c., as the last.

OINTMENT (Holloway's). See *Patent Medicines.*

OINTMENT (Hops). Syn. *Unguentum Lupuli,*—Lat. *Prep.* (Swediaur.) *Hops* (commercial), 2 oz.; *lard,* 10 oz.; as extract of hemlock, Ph. L. In painful piles and cancerous sores.

OINTMENT (Hydriodate of Ammonia). Syn. *Unguentum Ammoniæ Hydriodatis,*—Lat. *Prep.* From *hydriodate of ammonia,* ½ dr.; *simple ointment,* 1 oz. *Used* chiefly as an application to scrofulous tumours and ulcers, in irritable subjects.

OINTMENT (Hydriodate of Potassa). See *Ointment of Iodide of Potassium.*

OINTMENT (Hydrochloric Acid). Syn. *Unguentum Acidi Hydrochlorici,*—Lat. *Prep.* (Dr. Corrigan.) *Hydrochloric acid,* 1 dr.; *simple ointment,* 1 oz. As a dressing for scald-head, after the scabs have been removed by emollient liniments or poultices.

OINTMENT (Hypochloride of Sulphur). Syn. *Unguentum Sulphuris Hypochloridi,*—Lat. *Prep.* (Dr. Copland.) *Hypochloride of sulphur,* 1 dr.; *simple ointment,* 1 oz. It is generally scented with oil of almonds. *Used* in psoriasis inveterata, and some other skin diseases.

OINTMENT (Hypochlorite of Lime). Syn. *Unguentum Calcis Hypochloritis, Ung. C. Chlorinatæ,*—Lat. *Prep.* 1. From *chlorinated lime* (chloride of lime), 1 dr.; *lard,* 1 oz.; carefully triturated together. In scrofulous swellings, goiture, chilblains, indolent glandular tumours, &c.

2. *Chlorinated lime,* 1 dr.; *powdered foxglove,* 2 dr.; *simple ointment,* 2 oz. As an application to fœtid and malignant ulcers, &c.

OINTMENT (Iodide of Arsenic). Syn. *Unguentum Arsenici Iodidi,*—Lat. *Prep.* (M. Biett.) *Iodide of arsenic,* 2 to 3 gr.; *lard,* 1 oz.; carefully triturated together. In lepra, psoriasis, &c.; and in corroding tubercular diseases. It should be used with caution, and not more than ½ dr. applied at once.

OINTMENT (Iodide of Barium). Syn. *Ointment of Hydriodate of Baryta; Unguentum Barii Iodidi, Ung. Barytæ Hydriodatis,*—Lat. *Prep.* (Magendie.) *Iodide of barium,* 3 to 4 gr.; *lard,* 1 oz. As a friction to scrofulous swellings and indurations. The usual proportions are now 5 gr. to the oz.

OINTMENT (Iodide of Lead). Syn. *Unguentum Plumbi Iodidi,*—Ph. L. & D. *Prep.* 1. (Ph. L.) *Iodide of lead,* 1 oz.; *lard,* 8 oz.; rub them together.

2. (Ph. D.) *Iodide of lead* (in fine powder), 1 *dr.; ointment of white wax,* 7 *dr.* An excellent application to scrofulous tumours and swelled glands, especially when accompanied with pain.

OINTMENT (Iodide of Mercury). Syn. *Ointment of Protiodide of Mercury; Unguentum Hydrargyri Iodidi,*—Ph. L. *Prep.* 1. (Ph. L.) *White wax,* 2 oz.; *lard,* 6 oz.; melt them together, add of *iodide* (protiodide) *of mercury,* 1 oz., and rub them well together.

2. (Magendie.) *Iodide of mercury,* 20 gr.; *lard,* 1½ oz.

Uses, &c. In tubercular skin diseases, as a friction in scrofulous swellings and indolent granular tumours, and as a dressing for ill-conditioned ulcers, especially those of a scrofulous character.

OINTMENT (Biniodide of Mercury). Syn. *Ointment of Red Iodide of Mercury; Unguentum Hydrargyri Biniodidi; Ung. H. Iodidi Rubri,*—Ph. D. *Prep.* 1. (Ph. D.) *Red iodide of mercury,* 1 dr.; *ointment of white wax,* 7 dr.; mix by careful trituration.

2. (Soubeiran.) *Biniodide of Mercury,* 20 gr.; *lard,* 1½ oz.

Uses, &c. Similar to those of the preceding, but it is much more stimulant, and is regarded as better adapted for obstinate syphilitic sores. Largely diluted with lard or almond oil it is applied to the eyes in like cases.

OINTMENT (Iodide of Potassium). Syn. *Ointment of Hydriodate of Potassa; Unguentum Potassii Iodidi,*—Ph. L. & D. *Prep.* 1. (Ph. L.) *Iodide of potassium,* 2 dr.; dissolved in *boiling distilled water,* 2 fl. dr.; *lard* (softened by heat), 2 oz.: triturate together until united.

2. (Ph. D.) *Iodide of potassium,* 1 *dr.; distilled water,* ½ fl. dr.; *ointment of white wax,* 7 *dr.;* as before.

3. (Magendie.) *Iodide of potassium,* 1 dr.; *lard,* 12 dr.

4. (Le Gros.) *Iodide,* ½ dr.; *lard,* 1 oz.

Uses, &c. As a friction in scrofula, bronchocele, glandular enlargements, indurations, &c.; as a dressing to scrofulous ulcers, as an application in scrofulous ophthalmia, and in most of the other applications in which the employment of iodine is indicated. The last formula has been successfully employed by M. Le Gros in itch.

Obs. The strength of this ointment, as prescribed by different parties, varies greatly, the proportions of the iodide ranging from $\frac{1}{32}$ to $\frac{1}{8}$th of the whole, to adapt it to particular cases. When other ingredients are added, the iodide must be used in a perfectly dry state, and in fine powder, instead of being dissolved in water. This is particularly necessary when it is to be mixed with mercurial ointment.

OINTMENT (Iodide of Sulphur). Syn. *Unguentum Sulphuris Iodidi*,—Ph. L. *Prep.* 1. (Ph. L.) *Iodide of sulphur* (in fine powder), ½ dr.; *lard*, 1 oz.; mix by trituration.

2. (Cazenave.) *Iodide of sulphur*, 12 to 15 gr.; *lard*, 1 oz.

Uses, &c. As a local stimulant and alterative, in the chronic forms of lepra, lupus, porrigo, psoriasis, itch, &c. A few drops of oil of cloves or nutmeg are commonly added.

OINTMENT (Iodide of Zinc). Syn. *Ointment of Hydriodate of Zinc; Unguentum Zinci Iodidi, Ung. Z. Hydriodatis*,—Lat. *Prep.* 1. From *iodide of zinc*, 12 gr.; *simple ointment*, 1 oz. In scrofulous excoriations, and in the chronic ophthalmia of scrofulous subjects, arising from a relaxed state of the tissues and vessels.

2. (Dr. Ure.) *Iodide of zinc*, 1 dr.; *lard*, 1 oz. As a friction to glandular tumours and indurations, and as a dressing to flabby and obstinate scrofulous ulcers.

OINTMENT (Iodine). Syn. *Unguentum Iodinii*,—Ph. U. S. and Ph. D. 1826. *Prep.* 1. (Ph. D. 1826.) *Iodine*, 20 gr.; *lard*, 1 oz.

2. (Ph. U. S.) *Iodine*, 20 gr.; *rectified spirit*, 20 drops; rub them together, then add of *lard*, 1 oz. (See *below*.)

OINTMENT (Iodine,—Compound). Syn. *Ointment of Ioduretted Iodide of Potassium; Unguentum Potassii Iodidi Ioduretum; Ung. Iodinii Compositum*,—Ph. L. & D. *Ung. Iodinii*,—Ph. E. *Prep.* 1. (Ph. L.) *Iodide of potassium* (in very fine powder), 1 dr. *lard*, 2 oz.; mix, then add of *iodine*, ½ dr., dissolved in *rectified spirit*, 1 fl. dr., and mix all together.

2. (Ph. E.) *Iodine*, 1 dr.; *iodide of potassium*, 2 dr.; rub them together, then gradually add of *lard*, 4 oz.

3. (Ph. D.) *Pure iodine*, ½ *dr.; iodide of potassium*, 1 *dr.;* rub them well together in a glass or porcelain mortar, then gradually add of *ointment of white wax*, 14½ *dr.*, and continue the trituration until a uniform ointment is obtained.

Uses, &c. An excellent friction in goiture, and in enlarged or indurated glands or tumours, more especially those of a scrofulous character; in the quantity of ½ to 1 dr., night and morning. It may be advantageously combined with extract of belladonna in the incipient bubo of scrofulous subjects, and in the early stages of cancer; and with an equal weight of mercurial ointment as a friction in cases of enlarged liver and spleen, and ovarian dropsy. It is generally regarded as stronger and more efficacious than the simple ointment.

OINTMENT (Iodo-bichloride of Mercury). Syn. *Unguentum Hydrargyri Iodo-bichloridi*,—Lat. *Prep.* From *iodo-bichloride of mercury*, 16 gr.; *simple ointment*, 1 oz. Discutient; probably one of the most powerful known in syphilitic cases complicated with scrofula.

OINTMENT (Iodo-hydrargyrate of Potassa). Syn. *Unguentum Potassæ Iodo-hydrargyratis*,—Lat. *Prep.* 1. (Lamothe.) *Iodohydrargyrate of potassa*, 20 gr.; *lard*, 1 oz.

2. (Puche.) *Biniodide of mercury* and *iodide of potassium*, of each, 8 gr.; *lard*, 1 oz. As a powerful stimulant discutient; in tumours, inflammatory sore throat, &c.

OINTMENT (Iodo-narcotic). Syn. *Unguentum Iodo-narcoticum*,—Lat. *Prep.* (Purvis.) *Iodine*, 20 gr.; *iodide of potassium*, 2 dr.; *oil of tobacco* (by infusion), 1½ dr.; *lard*, 3 dr. To relax rigid muscles.

OINTMENT (Ipecacuanha). Syn. *Unguentum Ipecacuanhæ*,—Lat. *Prep.* (Dr. Turnbull.) *Ipecacuanha* (in fine powder), 2 dr.; *olive oil*, 2 fl. dr.; *lard* or *simple ointment*, 4 dr. Counter-irritant; when frequently employed as a friction it occasions an eruption, but one of a milder character than that from either croton oil or tartar emetic.

OINTMENT (Issue). Syn. *Unguentum ad Fonticulos*,—Lat. *Prep.* (Golding Bird.) *Ointment of cantharides* (Ph. L.), 1½ oz.; *tartar emetic* (in impalpable powder), 8 gr.; *spermaceti ointment*, 2 oz. As a stimulating application to issues, to promote the discharge. See *Elemi Ointment, Cerates, Plasters, &c.*

OINTMENT (Itch.) Syn. *Unguentum Antipsoricum*,—Lat. Several excellent formulæ for itch ointments will be found under the names of their leading ingredients. The following are additional ones, including some nostrums:—

1. (*Bailey's.*) From *alum, nitre*, and *sulphate of zinc*, of each, in very fine powder, 1½ *oz.*; *vermilion*, ½ *oz.*; mix, add gradually of *sweet oil*, ¼ pint; triturate together until perfectly mixed, then further add of *lard* (softened by heat), 1 *lb.*, with *oils of aniseed, lavender*, and *origanum*, q. s. to perfume.

2. (Bateman.) *Carbonate of potassa*, ½ oz.; *rose water*, 1 fl. oz.; *red sulphuret of mercury*, 1 dr.; *oil of bergamot*, ½ fl. dr.; *sublimed sulphur* and *hog's lard*, of each, 11 oz.; mix them. (Bateman, *Cutan. Dis-*

eases.) The nostrum vended under the name is made as follows:—*Carbonate of potash*, 1 oz.; *vermilion*, 3 dr.; *sulphur*, 1 *lb.*; *lard*, 1½ *lb.*; *rose-water*, 3 fl. oz.; *oil of bergamot*, 1½ dr.

3. (French Hosp.) *Chloride of lime*, 1 dr.; *rectified spirit*, 2 fl. dr.; *sweet oil*, ½ fl. oz.; *common salt* and *sulphur*, of each, 1 oz.; *soft soap*, 2 oz.; *oil of lemons*, 20 drops. Cheap, effectual, and inoffensive.

4. (De la Harpe.) *Sulphur*, 2 oz.; *powdered white hellebore*, ½ oz.; *sulphate of zinc*, ¼ do.; *soft soap*, 4 oz.; *lard*, 8 oz.

5. (*Jackson's.*) From *palm oil*, *flowers of sulphur*, and *white hellebore*, of each, 1 part; *lard*, 2 parts.

6. (*Nugent's.*) From *white lead*, 2 *oz.*; *orris root*, 1 *oz.*; *corrosive sublimate*, in very fine powder, ½ *oz.*; *palm oil*, 4 *oz.*; *lard*, 1¼ *lb.*

7. (Ph. E. 1744.) *Elecampane root* and *sharp-pointed dock* (rumex acutus,—Linn.), of each, bruised, 3 oz.; *water*, 1 quart; *vinegar*, ¾ pint; boil to one-half, add of *water-cress*, 10 oz.; *lard*, 4 ℔; boil to dryness, and strain with expression; to the strained liquid add of *bees' wax* and *oil of bays*, of each, 4 oz.; and stir the mixture until nearly cold.

8. (*Ung. A. Comp.*,—Ph. E. 1744.) To each ℔ of the last, add of *strong mercurial ointment*, 2 oz.

9. (Robertson.) *Soft soap*, 1 *oz.*; *rum*, 1 tablespoonful; *chloride of lime* (dry and good), ¼ *oz.*; mix, and add of *lard*, 2 *oz.*

10. (Swediaur.) *Stavesacre* (in powder), 1 oz.; *lard*, 3 oz.; digest with heat for 3 hours, and then strain. The formula of the Ph. Bruns. is nearly similar. Very useful in itch; also to destroy pediculi.

11. (Thomson.) *Chloride of lime* and *common salt*, of each, in fine powder, 1 dr.; *soft soap*, 1 oz.; *rectified spirit*, 2 fl. dr.; mix, add of *lard*, 1 oz.; and *lastly*, of *strong vinegar*, 3 fl. dr. Very cleanly and effective; but should not be made in quantity, as it does not keep well.

12. (Voght.) *Chloride of lime* (dry), 2 dr.; *burnt alum*, 3 dr.; *lard*, 9 dr. To be mixed with an equal quantity of *soft soap* at the time of fusing it.

Obs. The products of the preceding formulæ are used by *well rubbing* them into the part affected, night and morning, as long as necessary; the number of applications required depending greatly on the manner in which this is done.

OINTMENT (Ivy). Syn. *Unguentum Hederæ*,—Lat. *Prep.* From the *leaves* of *common ivy*, by infusion, as ointment of henbane. *Used* as an application to soft corns, in itch, and as a dressing to indolent ulcers and issues.

OINTMENT (Juniper-tar.) *Unguentum Olei Pyroligni Juniperi*, *Ung. Cadinum*,—Lat. *Prep.* (Eras. Wilson.) *Lard* and *suet*, of each, 6 parts; *bees' wax*, 4 parts; liquefy by heat, and add of *pyroligneous oil of juniper* (huile de cade), 16 parts; with a few drops of any *fragrant essential oil*, to conceal the smell. In ringworm, and as a stimulant ointment in some other skin diseases.

OINTMENT (Kirkland's). See *Compound Lead Ointment.*

OINTMENT (Lard). Syn. *Unguentum Adipis*,—Ph. L. 1788. *Ung. Pomatum*,—Ph. L. 1746. *Ung. Simplex*, Ph. E. 1744. *Prep.* (Ph. L. 1788.) *Prepared lard*, 2 ℔; melt, add of *rose-water*, 3 fl. oz.; beat the two well together, then set the vessel aside, and when the whole is cold separate the congealed fat. A simple emollient. See *Elder Ointment.*

OINTMENT (Laurel). Syn. *Laurine Ointment; Unguentum Laurinum, Ung. Lauri Nobilis*,—Lat. *Prep.* 1. (Ph. Lusit.) *Suet* (softened by heat), 8 oz.; *laurel oil* (expressed oil of bay), 1 ℔; *oil of turpentine*, 1½ oz. This is the "*nervine balsam*" and "*nervine ointment*" of the shops in the Peninsula, and in some other parts of Southern Europe. The Ph. Bat., 1805, added ½ oz. of *rectified oil of amber.*

2. (P. Cod.) *Fresh bay leaves* and *berries* (bruised), of each, 1 ℔; *lard*, 2 ℔; as *hemlock ointment*, Ph. L. Highly esteemed on the Continent as a stimulating friction, in bruises, sprains, stiff joints, &c.; and in deafness.

3. (Trade.) From *fresh bay leaves*, 2 *lb.*; *bay berries*, 1 *lb.*; *neat's-foot oil*, 5 pints; boil as last; to the *strained oil* add of *hard suet*, 3 *lb.*; *true oil of bay*, ¼ *lb.*; and allow it to cool very slowly, in order that it may "*grain*" well. Sold for *laurel ointment* and *common oil of bay.*

OINTMENT (Lead). Syn. *Unguentum Plumbi, Ung. Lithargyri, Ung. Nutritum*,—Lat. *Prep.* (P. Cod.) *Litharge*, 3 oz.; *distilled vinegar*, 4 oz.; *olive oil*, 9 oz.; mix with heat, and stir until they combine. See *Acetate of Lead, Carbonate of do.*, and *Goulard Ointments* (and *below*). Camphor, morphia, and opium, are common additions to lead ointment, when an anodyne effect is desirable.

OINTMENT (Lead,—Compound). Syn. *Neutral Ointment, Higgin's do., Kirkland's do.; Unguentum Neutrale; Ung. Plumbi Compositum*,—Ph. L. *Prep.* (Ph. L.) *Lead plaster*, 3 ℔; *olive oil*, 18 fl. oz.; mix by a gentle heat, and add of *prepared chalk*, 6 oz.;

lastly, add of *dilute acetic acid*, 6 fl. oz., and stir well until the mass has cooled. As a dressing in indolent ulcers, "but its utility is doubtful." (Dr. Garrod.)

Obs. It will be observed that the College has slightly modified the old formula of this ointment. The vinegar is now the last ingredient added to the mass. "Gradually add the chalk, separately mixed with the vinegar, the effervescence being finished, and stir," &c. (Ph. L. 1836.)

OINTMENT (Le Mort's). *Carbonate of lead, corrosive sublimate, litharge,* and *Venice turpentine,* of each, 1 *oz.; alum,* ½ *oz.; lard,* ½ *lb.; vermilion,* q. s. to colour.

OINTMENT (Lupuline). Syn. *Unguentum Lupulinæ,*—Lat. *Prep.* (Soubeiran.) *Lupuline,* 1 part; *lard,* 3 parts; digest by the heat of a water-bath for 5 or 6 hours, and strain. As an anodyne dressing to cancerous ulcers, and as a friction to swollen and painful joints.

OINTMENT (Lycopodium). Syn. *Unguentum Lycopodii,* — Lat. *Lycopodium,* 1 dr.; *balsam of Peru,* ½ dr.; *simple ointment,* 1 oz. In chaps and excoriations.

OINTMENT (Mace). Syn. *Unguentum Macidis,*—Lat. *Prep.* From *mace* (beaten to a paste), and *palm oil,* of each, 1 *lb.; purified beef-marrow,* 3 *lb.;* gently melted together, and strained. Emollient and stimulant; chiefly *used* as a *pommade* for the hair. Sold for "*common oil of mace.*"

OINTMENT (Marshmallow). Syn. *Unguentum Althææ, Dialthææ,*—Lat. *Prep.* 1. (Ph. L. 1746.) *Oil of mucilages,* 2 ℔; *bees' wax,* ½ ℔; *yellow resin,* 3 oz.; melt them together, then add of *Venice turpentine,* ½ oz., and stir the mixture until it concretes.

2. (*Wholesale.*) From *palm oil,* ½ *lb.; yellow rosin,* 1¼ *lb.; bees' wax,* 2¼ *lb.; pale linseed oil,* 9 *lb.* (say 1 gall.); melt together, and stir until it is nearly cold.

Uses, &c. Emollient and stimulant; seldom used in regular practice, but in great repute amongst the common people. Linseed oil is now almost universally substituted for the oil of mucilages.

OINTMENT (Master-wort). Syn. *Pommade Anti-cancéreuse de Milius; Unguentum Imperatoriæ,* — Lat. *Prep.* (Mr. Beasley.) *Powdered master-wort* (imperatoria ostruthium,—Linn.), 1½ oz.; *tincture of master-wort,* 1 oz.; *lard,* 2 oz.

OINTMENT (Mercurial). Syn. *Strong Mercurial Ointment, Blue do., Neapolitan do.; Unguentum Hydrargyri,*—Ph. L. E. & D. *Ung. Hyd. Fortius,*—Ph. L. 1836. *Ung. Cæruleum,*—Ph. L. 1721. *U. C. Fortius,*—Ph. L. 1746. *Prep.* (Ph. L. & E.) *Mercury,* 1 ℔; *lard,* 11½ oz.; *suet,* ½ oz.; rub the mercury with the suet and a little of the lard, until globules are no longer visible; then add the remaining lard, and triturate all together.

2. (Ph. D.) *Pure mercury* and *lard,* of each, 1 *lb.;* as before.

Pur., &c. The stronger mercurial ointment of the shops is usually made with a less quantity of mercury than that ordered by the Colleges, and the colour is brought up with finely ground *blue black,* or *wood charcoal.* This fraud may be detected by its inferior sp. gr., and by a portion being left undissolved when a little of the ointment is treated, first with *ether* or *oil of turpentine,* to remove the fat, and then with *dilute nitric acid,* to remove the mercury. When made according to the instructions of the Ph., its sp. gr. is not less than 1·781 at 60° Fahr. It "is not well prepared so long as metallic globules may be seen in it with a magnifier of 4 powers." (Ph. E.) When rubbed on a piece of bright copper or gold, it should *immediately* give it a coating of metallic mercury, and a silvery appearance.

The "*Ung. hyd. fort.*" of the wholesale houses is generally made of *mercury,* 12 *lb.; suet,* 1½ *lb.;* and *lard,* 16½ *lb.* It thus contains only ⅖ instead of ½ of its weight of mercury. That of the same parties labelled "*Ung. hyd., partes æquales,*" is prepared with *mercury,* 12 *lb.; suet,* 1½ *lb.; lard,* 13½ *lb.*

Uses. This ointment is chiefly used to introduce mercury into the system when the stomach is too irritable to bear it; in syphilis, hepatic affections, hydrocephalus, &c. For this purpose ½ to 1 dr. is commonly rubbed into the inside of one of the thighs until every particle of the ointment disappears. This operation is repeated night and morning, until the desired effect is produced, and should be, if possible, performed by the patient himself. During its administration the patient should avoid exposure to cold, and the use of fermented or acidulous liquors, and his diet should consist chiefly of toast, broth, gruel, milk-and-water, and other inoffensive matters. This ointment is now frequently employed to prevent the "*pitting*" in smallpox; and, diluted with 3 or 4 times its weight of lard, in several skin diseases, as a dressing for ulcers, to destroy pediculi, &c. Camphor is often added to this ointment, to increase its activity. With the addition of a little extract of belladonna, or hydrochlorate of ammonia, it forms an excellent anodyne and resolvent friction in painful syphilitic tumours and glandular enlargements.

Obs. The preparation of mercurial ointment according to the common plan is a process of much labour and difficulty, and usually occupies several days. The instructions in the pharmacopœias are very meagre and unsatisfactory, and, so far as details go, are seldom precisely carried out. Employers grumble, and operatives become impatient when they find the most assiduous trituration apparently fails to hasten the extinction of the globules, and the whole affair is voted an "intolerable bore," which all desire to be rid of. To facilitate matters, various tricks are resorted to, and various contraband additions are often clandestinely made. Among the articles referred to, *sulphur* and *turpentine* are those which have been longest known, and, perhaps, most frequently employed for the purpose; but the first spoils the colour, and the other the consistence of the ointment; whilst both impart to it more or less of their peculiar and respective odours. On the Continent *oil of eggs* was formerly very generally used for the purpose, and is even now occasionally so employed. Nearly half a century ago, the father of the writer of this article clearly showed that the difficulty might be satisfactorily overcome by simply triturating the quicksilver with ⅛ to ¼th of its weight of *old mercurial ointment*, before adding the lard; and that the effective power of this substance was in direct proportion to its age, or the length of time it had been exposed to the air. His plan was to employ the "bottoms" and "scrapings" of the store pots for the purpose. At a later period (1814-5) Mr. Higginbottom, of Northampton, repeated this recommendation, and at length the plan has been imported into the pharmacopœia Borussica. About thirteen years since we re-opened an investigation of the subject, which extended over several months, during which we satisfied ourselves of the accuracy of the assertion of M. Roux, that the mercury in mercurial ointment exists entirely, or nearly so, in the metallic state, and not in the form of oxide, as was generally assumed. We succeeded in preparing an excellent sample of mercurial ointment by agitating *washed suet* and *quicksilver* together *in vacuo*. The quantity of oxide present at any time in this ointment is variable and accidental, and is largest in that which has been long prepared; but in no case is it sufficient to materially discolour the fat after the metallic mercury is separated from it. We were led to conclude that the property alluded to, possessed by old ointment, depends solely on the peculiar degree of consistence or viscidity of the fat present in it, and on the loss of much of the thoroughly greasy, "antiattritive" character, possessed by the latter in a recent state. In practically working out this idea, we obtained pure fats (*magnetic adeps; sevum præparatum*) which, without any addition, were capable of reducing, in a *few minutes*, 8, 16, 32, and even 48 times their weight of mercury. We also found that the formula of the pharmacopœia might be adopted, and that a perfect ointment might be readily obtained by skilful management in from ½ an hour to an hour, even without these resources. All that was necessary was to employ a *very gentle* degree of heat, by either performing the operation in a warm apartment, or by allowing the mortar to remain filled with warm water for a short time before using it. *Suet* or *lard*, reduced either by *gentle warmth*, or by the addition of a little *almond oil* to the consistence of a *thick* cream, so that it will hang to the pestle without running from it, will readily extinguish 7 or 8 times its weight of running mercury by simple trituration. The exact temperature must, however, be hit upon, or the operation fails. This fact was afterwards noticed in the *Ann. de Chim.*, and some other journals.

M. Pomonti has proposed a method of preparing *strong mercurial ointment*, which, modified to suit the English operator, is as follows:—*Fresh lard*, 8 parts; *solution of nitre* (see below), 1 part; mix by trituration, add of *mercury*, 32 parts, and again triturate. The globules disappear after a few turns of the pestle, but reappear in a few minutes, and then again disappear to return no more. When this happens, the trituration is to be continued for a few minutes longer, when *lard*, 24 parts, is to be rubbed in, and the ointment at once put into pots. It is said that the globules are so completely extinguished as to escape detection, even when the ointment is examined by a microscope of low power. The SOLUTION.—*Nitre*, 100 gr.; *water*, 1 fl. oz.; dissolve. This quantity is sufficient for a kilogramme of mercury. See *Ointment of Oxide of Mercury.*

OINTMENT (Mercurial,—Milder). Syn. *Milder Blue Ointment*, *Trooper's do.*, *Unction; Unguentum Hydrargyri Mitius,*—Ph. L. 1836, & Ph. D. 1826. *Ung. Cæruleum Mitius,*—Ph. L. 1745. *Prep.* (Ph. L. 1836.) *Stronger mercurial ointment*, 1 ℔; *lard*, 2 ℔.

Uses, &c. In the itch and several other cutaneous diseases, as a dressing to syphilitic ulcers, to destroy pediculi on the body, &c. *Each drachm* contains 10 gr. of *mercury.* That of the shops generally contains considerably less.

OINTMENT (Mercurial,—with Soap). Syn. *Savon Mercuriel; Unguentum Hydrargyri Saponaceum, Ung. H. Alkalizatum,*—Lat. *Prep.* 1. (Draper.) *Mercurial ointment* (softened by a gentle heat), 1 oz.; *hydrate of potassa,* 1 dr., dissolved in *water,* ½ fl. oz.; triturate them together until the mass solidifies.

2. (Swediaur.) *Milder mercurial ointment,* 8 parts; *soft soap,* 2 parts; *camphor,* 1 part. In periostitis, engorgements of the testicles, soft corns, &c.

OINTMENT (Mezereon). Syn. *Unguentum Merzerei,*—Lat. *Prep.* 1. (Hamb. Cod.) *Alcoholic extract of mezereon,* 2 dr.; dissolve in *rectified spirit,* q. s., add it to *white wax,* 1 oz.; *lard,* 8 oz.; and mix by a gentle heat.

2. (P. Cod.) *Mezereon* (dried root-bark), 4 oz.; moisten it with *rectified spirit,* bruise it well, and digest it for 12 hours, at the heat of boiling water, in *lard,* 14½ oz.; then strain with pressure, and allow it to cool slowly; lastly separate it from the dregs, remelt it, and add of *white wax,* 1½ oz. *Used* as a stimulating application to blistered surfaces and indolent ulcers.

OINTMENT (Mustard). Syn. *Unguentum Sinapis,*—Lat. *Prep.* 1. *Flour of mustard,* ¾ oz.; *water,* 1 fl. oz; mix, and add of *resin cerate,* 2 oz.; *oil of turpentine,* ½ oz. Rubefacient and stimulant. As a friction in rheumatism, &c.

2. (Frank.) *Flour of mustard,* 3 oz.; *oil of almonds,* ½ fl. oz.; *lemon juice,* q. s. In sun-burn, freckles, &c.

OINTMENT (Naphthaline). Syn. *Unguentum Naphthalinæ,*—Lat. *Prep.* (Emery.) *Naphthaline,* ½ dr.; *lard,* 7½ dr. In dry tetters, lepra, psoriasis, &c.

OINTMENT (Neapolitan). See *Mercucurial Ointment.*

OINTMENT (Nervine). Syn. *Balsamum Nervinum, Unguentum N.,* — Lat. *Prep.* 1. (*Baume Nerval,*—P. Cod.) *Expressed oil of mace* and *ox-marrow,* of each, 4 oz.; melt by a gentle heat, and add of *oil of rosemary,* 2 dr.; *oil of cloves,* 1 dr.; *camphor,* 1 dr.; *balsam of tolu,* 2 dr.; (the last two dissolved in) *rectified spirit,* 4 dr. In rheumatism, &c.

2. (Ph. E. 1744.) *Fresh leaves* of *male southernwood, marjoram, mint, pennyroyal, rosemary,* and *rue,* of each, 6 oz.; *neat's-foot oil,* 4 pints; *beef suet,* 3 ℔; boil until the herbs are crisp, then strain with pressure, and add of *oil of bays,* 10 oz. Green coloured. Once a popular stimulant application in various local affections.

OINTMENT (Neutral). See *Compound Lead Ointment.*

OINTMENT (Nitrate of Mercury). Syn. *Citrine Ointment, Yellow do., Mercurial Balsam; Unguentum Hydrargyri Nitratis,*—Ph. L. & D. *Ung. H. N.,* or *Ung. Citrinum,*—Ph. E. *Ung. H. Supernitratis,*—Ph. D. 1807. *Prep.* 1. (Ph. L.) *Mercury,* 2 oz.; *nitric acid* (sp. gr. 1·42), 4 fl. oz.; dissolve, and mix the solution, *whilst still hot,* with *lard,* 1 ℔, and *olive oil,* 8 fl. oz., melted together.

2. (Ph. E.) *Mercury,* 4 oz.; *nitric acid,* (sp. gr. 1·500), 8 fl. oz. 6 fl. dr.; dissolve by a gentle heat, add the liquid to *lard,* 15 oz.; *olive oil,* 32 fl. oz.; melted together, and whilst the whole are still hot, and mix them thoroughly. "If the mixture does not froth up, increase the heat a little until this takes place. Keep the ointment in earthenware vessels, or in glass vessels, secluded from the air." This admirable formula is a modification of that originally introduced into pharmacy by the late Dr. Duncan, of Edinburgh.

3. (Ph. D.) *Mercury,* 1 *oz.; nitric acid* (1·500), 1 fl. oz.; (diluted with) *water,* ½ fl. oz.; dissolve by a gentle heat, and add the liquid to *lard,* 4 *oz.; olive oil,* 8 fl. oz.; melted together and still hot; next "let the temperature of the mixture be raised so as to cause effervescence, and then, withdrawing the heat, stir the mixture with a porcelain spoon until it concretes on cooling."

4. (Ph. L. 1836.) *Mercury,* 1 oz.; *nitric acid* (1·500), 11 fl. dr.; *lard,* 6 oz.; *olive oil,* 4 fl. oz.; as No. 1 (above).

5. (P. Cod.) *Mercury,* 3 parts; *nitric acid* (1·321), 6 parts; *lard* and *oil,* of each, 24 parts; as above.

6. (Ph. U. S.) *Mercury,* 1 oz.; *nitric acid* (1·42), 14 fl. oz.; *lard,* 3 oz.; *fresh neat's-foot oil,* 9 fl. oz.; mix the mercurial solution with the melted fat and oil at 200° Fahr.

Uses, &c. Detergent and stimulant. In ringworm, herpes, itch, porrigo, psoriasis, and some other chronic skin diseases; in various chronic affections of the eyes, especially chronic inflammation and ulceration of the eyelids, "blear eye," &c. It "may almost be regarded as specific in psorophthalmia, in the purulent ophthalmia of infants producing ectropium (eversion of the eyelids), and in ulcerations of the tarsi (edges of the eyelids)." (A. T. Thomson.)

As a dressing to old ulcers, more especially those of a syphilitic character, it is superior to all the other ointments containing mercury; in sore legs, assisted by the internal use of the *pill of soap with opium* (pil. saponis cum opio), it often acts like a charm when all other modes of treatment have failed. For most of these purposes it should be diluted with from *twice* to *seven times* its weight of some simple fatty matter. One of the principal reasons why this ointment is in less general use than its merits deserve, is the very inferior quality of that vended in the shops under the name, arising from almost every druggist preparing some "mess" of his own, instead of adhering to the College formulæ.

Obs. Ointment of nitrate of mercury, faithfully prepared according to the instructions in the pharmacopœia, possesses a rich golden-yellow colour, and a buttery consistence, and keeps well. Unfortunately, clumsy and careless operators, who regard the pharmacopœia as a foolish book, which it is quite unnecessary to look into, often fail in their attempts to produce an article of good quality. The difficulty is immediately surmounted by employing *pure ingredients*, in the *proportions ordered*, and *mixing* them at the *proper temperature.* The acid should be of the full strength, or, if somewhat weaker than that directed, an equivalent quantity should be employed. A slight excess of acid is not injurious, rather the contrary; but a deficiency of acid, in all cases, more or less damages the quality of the product. If, on stirring the mercurial solution with the melted lard and oil, the mixture does *not* froth up, the heat should be increased a little, as *without* a *violent frothing* and *reaction* take place, the ointment will not turn out of good quality, and will rapidly harden and lose its colour. The most favorable temperature for the union of the ingredients is from 185° to 200° Fahr., and in no case should it exceed 212°; whilst below 180° Fahr., the reactions are feeble and imperfect. This is the whole mystery of the process; and it is surprising that the preparation of this ointment, which is not at all difficult, and which had been previously satisfactorily explained by both Duncan and Phillips, should have so long engaged the attention of the pharmaceutical periodicals.

Stone-ware or *glass vessels* must *alone* be *employed* in the *preparation* of this ointment, and the stirrers or spatulas should be either of glass or white deal. The best plan is to keep the whole exclusively for the purpose, and when out of use to preserve them from dust and dirt. (See *below.*)

OINTMENT (Nitrate of Mercury,—Milder). Syn. *Milder Citrine Ointment; Unguentum Hydrargyri Nitratis Mitius,*—Ph. L. *Ung. H. N. M.*, or *Ung. Citrinum M.*,—Ph. E. *Prep.* 1. (Ph. L.) *Ointment of nitrate of mercury*, 1 oz.; *lard*, 7 oz.; rub them together. "This ointment is to be used recently prepared."

2. (Ph. E.) As the *stronger ointment*, Ph. E., but using a *triple proportion* of *oil* and *lard.*

Uses, &c. See *above.*

OINTMENT (Nitrate of Silver). Syn. *Unguentum Argenti Nitratis,*—Lat. *Prep.* 1. (M. Jobert.) *Nitrate of silver*, 2, 4, or 6 parts; *lard*, 20 parts. These ointments are respectively numbered 1, 2, and 3, and are used in white-swelling.

2. (Macdonald.) *Nitrate of silver*, 1 part; *lard*, 7 to 8 parts. To smear bougies, in gonorrhœa, &c.

3. (Mackenzie.) *Nitrate of silver*, 5 gr.; *lard*, 1 oz. In purulent and chronic ophthalmia, ulcers on the cornea, &c.

4. (Velpeau.) *Nitrate of silver*, 1 gr.; *lard*, 1 dr. In acute ophthalmia, &c. The above compounds require to be used with caution.

OINTMENT (Nitric Acid). Syn. *Oxygenized Fat; Pommade d'Alyon; Unguentum Oxygenatum; Ung. A. Nitrici,*—Ph. D. 1826. *Ung. A. Nitrosi,*—Ph. E. 1817. *Prep.* 1. (Ph. D. 1826.) *Olive oil*, 1 ℔; *lard*, 4 oz.; melt them together, add, gradually, of *nitric acid* (sp. gr. 1·500), 5½ fl. dr., and stir the mixture constantly with a glass rod until it concretes.

2. (Ph. E. 1817.) *Lard*, 1 ℔; melt, add of *nitrous acid*, 6 dr.; expose it to a medium heat in a water bath, with agitation, for 15 minutes, then remove the vessel from the bath, and stir the mixture with a glass rod until it becomes firm.

Uses, &c. In itch, porrigo, and some other chronic skin-diseases; and as a dressing for syphilitic and herpetic ulcers, old sores, &c. It is frequently employed as a substitute for the ointment of nitrate of mercury, which it somewhat resembles in appearance; but it is less active and useful. The product of the last formula has an agreeable yellow colour, and keeps well. It is occasionally sold for citrine ointment, but the fraud may be detected by its not turning gray when it is kept heated for some time, and by its not imparting a silvery appearance to a piece of bright copper when rubbed on it.

OINTMENT (Nitric Oxide of Mercury).

Syn. *Red Precipitate Ointment; Unguentum Hydrargyri Nitrico-oxydi,*—Ph. L. *Ung. Hyd. Oxydi,*—Ph. E. *Ung. H. O. Rubri,*—Ph. D. *Ung. H. Subnitratis,*—Ph. D. 1807. *Prep.* 1. (Ph. L.) *White wax,* 2 oz.; *lard,* 6 oz.; mix by heat, add of *nitric oxide of mercury,* in very fine powder, 1 oz.; and rub them together.

2. (Ph. E.) *Nitric oxide of mercury,* 1 oz.; *lard,* 8 oz.; mix by trituration.

3. (Ph. D.) *Red oxide of mercury* (nitric oxide), 1 *dr.*; *ointment of white wax,* 7 *dr.*; as the last.

Uses, &c. An excellent stimulant application to indolent and foul sores, ulcers, &c.; and, when diluted, as an eye ointment in chronic inflammation and ulceration of the eyes and eyelids, and especially in psorophthalmia; also in specks on the cornea, and the other affections noticed under *ointment of nitrate of mercury.* It forms the basis of numerous quack medicines.

OINTMENT (Obstetrical). Syn. *Pommade Obstetricale; Unguentum Obstetricum,*—Lat. *Prep.* 1. (Chaussier.) *Extract of belladonna,* 1 dr.; *water,* 2 dr.; *lard,* 1 oz. To promote the dilation of the os uteri.

2. (*Pommade pour le toucher.*) From *yellow wax* and *spermaceti,* of each, 1 oz.; *olive oil,* 16 oz.; melt them together, strain, add of *solution of caustic soda,* 1 fl. oz.; and stir until the whole is nearly cold.

OINTMENT (Opium). Syn. *Unguentum Opiatum; Ung. Opii,*—Ph. L. *Prep.* 1. (Ph. L.) *Powdered opium,* 20 gr.; *lard,* 1 oz.; mix by trituration. As a simple anodyne friction or dressing.

2. (Augustin.) *Opium,* 2 dr.; *ox-gall,* 2 oz.; digest 2 days, strain, and add of *melted lard,* 2 oz.; *oil of bergamot,* 10 drops.

3. (Brera.) *Opium,* 1 dr.; *gastric juice of a calf,* ½ oz.; digest 24 hours, and add of *melted lard,* 1 oz.

OINTMENT (Oxide of Lead). See *Lead Ointment.*

OINTMENT (Oxide of Manganese). Syn. *Unguentum Manganesii Oxydi, Ung. M. Binoxydi,*—Lat. *Prep.* 1. *Black oxide of manganese* (levigated), 1 dr.; *lard,* 1 oz.; mix by patient trituration. As a friction in scrofulous swellings and indurations; and in itch, scald-head, chilblains, &c.

2. (W. Cooley.) *Binoxide of manganese,* 1 dr.; *sulphur,* 2 dr.; *lard,* 9 dr.; *cajeput oil,* 15 drops. As the last; also as a friction in rheumatism, swelled joints, &c., and in porrigo, and some other skin diseases.

OINTMENT (Oxide of Mercury). Syn. *Ointment of Gray Oxide of Mercury; Unguentum Hydrargyri Oxydi; Ung. Hyd. Protoxydi; U. H. O. Cinerei,*—Ph. E. 1817. *Prep.* 1. (Ph. E. 1817.) *Gray oxide of mercury,* 1 oz.; *lard,* 3 oz.; triturate together. Formerly proposed as a substitute for mercurial ointment, but in practice it has been found useless as a friction, owing to the unctuous matter only being absorbed, whilst the oxide is left on the surface. This objection does not apply to the following preparations:—

2. (Donovan.) *Gray oxide of mercury,* 20 gr.; *lard,* 1 oz.; mix, and expose them to the temperature of 320° Fahr. for 2 hours, constantly stirring. Gray coloured. It may also be made from the *nitric* or *red oxide* in the same way, by keeping the ointment heated to about 300° for some hours. Cleaner and stronger than *Ung. Hyd. Fort.,* Ph. L.

3. (Tyson.) *Black oxide of mercury* (prepared by decomposing precipitated calomel with liquors of potassa and ammonia), 2 oz.; *lard,* 1 ℔; triturate together. Inferior in activity to the last. It closely resembles in appearance a fine sample of mercurial ointment.

OINTMENT (Binoxide of Mercury). Syn. *Unguentum Hydrargyri Binoxydi, Ung. H. Oxydi Rubri,*—Lat. *Prep.* 1. (Cazenave.) *Binoxide of mercury,* 30 gr.; *camphor,* 5 gr.; *lard,* 1 oz. Closely resembles *ointment of nitric oxide of mercury,* over which it, perhaps, possesses some advantage from the oxide being in a more minutely divided state.

OINTMENT (Oxide of Silver). *Unguentum Argenti Oxydi,*—Lat. *Prep.* (Serre.) *Oxide of silver,* 16 to 20 gr.; *lard,* 1 oz. As a dressing for scrofulous and syphilitic sores, &c.

OINTMENT (Oxide of Zinc). Syn. *Zinc Ointment; Unguentum Zinci,*—Ph. L. E. & D. *Ung. Oxydi Zinci,*—Ph. E. 1839. *Nihil Album Ointment, Ung. de Nihilo,*—Obs. *Prep.* 1. (Ph. L.) *Oxide of zinc,* 1 oz.; *lard,* 6 oz.; mix them together.

2. (Ph. E.) *Oxide of zinc,* 1 oz.; *simple liniment* (Ph. E.), 6 oz.

3. (Ph. D.) *Ointment of white wax,* 12 *oz.;* melt it by a *gentle* heat, add of *oxide of zinc,* 2 *oz.;* and stir constantly until the mixture concretes.

Uses, &c. Astringent, desiccative, and stimulant; in excoriations, burns, various skin diseases attended by profuse discharges, in chronic inflammation of the eyes depending on relaxation of the vessels, in sore nipples, indolent sores, ringworm of the scalp, &c. It is an excellent and very useful preparation. See *Tutty Ointment.*

OINTMENT (Pepper). Syn. *Unguentum*

Piperis Nigri,—Ph. D., 1826. *Prep.* 1. *Black pepper* (bruised), 1 oz.; *lard,* 2 oz.; *suet,* 1 oz.; digest together in a covered vessel, by the heat of a water bath, for 6 hours, then strain, with pressure, add of *expressed oil of mace,* 2 dr., and stir until the mixture concretes. In piles, itch, as a friction in rheumatism, &c.

2. (Ph. D. 1826.) *Black pepper* (in fine powder), 4 oz.; *lard,* 1 ℔.; mix. In scald-head, &c.

OINTMENT (Phosphoric Acid). Syn. *Unguentum Acidi Phosphorici,*—Lat. *Prep.* (Soubeiran.) *Phosphoric acid,* 1 dr.; *lard* (softened by heat), 1 oz.; triturate carefully together. As a friction in caries, osseous tumours, &c.

OINTMENT (Phosphorus). Syn. *Unguentum Phosphori, Ung. Phosphoratum,*—Lat. *Prep.* (P. Cod.) *Phosphorus,* 1 dr.; *lard,* 6 oz. 3 dr.; melt them together (in a wide-mouthed bottle) by the heat of a water bath, remove the vessel from the heat, and shake it briskly until the ointment concretes. As a friction in gout, chronic rheumatism, and several skin diseases.

OINTMENT (Picrotoxine). Syn. *Unguentum Picrotoxinæ,*—Lat. *Prep.* (Jäger.) *Picrotoxine,* 10 gr.; *lard,* 1 oz. In ringworm of the scalp; and to destroy pediculi. It should be used with care.

OINTMENT (for Piles). Syn. *Unguentum Hæmorrhoidale, Ung. Anti-hæmorrhoidale,*—Lat. *Prep.* 1. *Burnt alum* and *oxide of zinc,* of each, ½ dr.; *lard,* 7 dr.

2. (Bories.) *Acetate of lead,* 15 gr.; *freshly burnt cork,* ½ oz.; *washed fresh butter,* 2 oz.; triturate well together.

3. (W. Cooley.) *Morphia,* 8 gr.; *melted spermaceti ointment,* 1 oz.; triturate together until solution is complete, then add of *galls* (in impalpable powder), 1½ dr.; *essential oil of almonds* (genuine crude), 12 to 15 drops; and stir until the mass concretes. In painful piles, prolapsus, &c. It is not only very effective, but does not soil the linen so much as most other ointments.

4. (Dr. Gedding.) *Carbonate of lead,* 4 dr.; *sulphate of morphia,* 15 gr.; *stramonium ointment,* 1 oz.; *olive oil,* q. s. When there is much pain and inflammation.

5. (Sir H. Halford.) *Ointment of nitrate of mercury* and *oil of almonds,* equal parts, triturated together.

6. (Mazzini.) *Nitrate of morphia,* 15 gr.; *citrine ointment,* 1 dr.; *fresh butter,* 1 oz. As the last.

7. (Vallez.) *Extract of elder leaves,* ½ dr.; *burnt alum,* 16 gr.; *poplar ointment,* 1 oz. For other formulæ see the *respective names* of their leading ingredients.

8. (Mr. Ware.) *Camphor,* 1 dr.; *simple ointment,* 1 oz.; dissolve by heat, add of *powdered galls,* 2 dr.; mix well, further add of *tincture of opium,* 2 fl. dr., and stir until the whole is cold. In flabby mucous, and painful piles.

9. (Zanin.) *Spermaceti ointment,* 1 oz.; *powdered galls,* 1 dr.; *powdered opium,* 18 gr.; *solution of diacetate of lead,* 1 fl. dr. When there is both pain and inflammation.

OINTMENT (Pitch). Syn. *Black Basilicon, Ointment of Black Pitch; Ung. Picis,*—Ph. L. *Ung. Picis Nigræ,*—Ph. L. 1836. *U. Resinæ Nigræ,*—Ph. L. 1809. *U. Picis Aridæ,*—Ph. L., 1788. *U. Basilicum Nigrum* or *U. Tetrapharmacum,*—Ph. L. 1746. *Prep.* (Ph. L.) *Black pitch, resin,* and *bees' wax,* of each, 11 oz.; *olive oil,* 1 pint; melt together, strain through a linen cloth (and stir until the mass concretes).

Uses, &c. Stimulant and detergent; very useful in indolent ulcerations, scald-head, and various foul eruptions. In itch and psoriasis, and other scaly skin diseases, a little sulphur is commonly added to it.

OINTMENT (Platinum). Syn. *Unguentum Platini*—Lat. *Prep.* (Hœfer.) *Bichloride of platinum,* 15 gr.; *extract of belladonna,* ½ dr.; *lard,* 1 oz. As a dressing for painful indolent ulcers.

OINTMENT (Plumbago). Syn. *Unguentum Graphitis, Ung. Plumbaginis,*—Lat. *Prep.* From *pure plumbago* (black lead), 1½ dr.; *lard,* 1 oz. As a dressing to ulcers, and in certain skin diseases.

OINTMENT (Plunket's). *Prep.* (Original formula.) *Crowsfoot,* 1 handful; *dog's fennel,* 3 sprigs; pound well, add of *flowers of sulphur* and *white arsenic,* of each, 3 thimblefuls; beat them well together, form the mass into boluses, and dry them in the sun. For *use,* powder them; and mix the powder with *yelk of egg,* spread a *little* on a small piece of *pig's bladder* (size of half a crown), and apply it to the sore, where it must remain until it falls off by itself. *Poisonous;* in cancer; with great caution.

OINTMENT (Pomatum). See *Lard Ointment.*

OINTMENT (Poplar Buds). Syn. *Unguentum Populeum,*—Lat. *Prep.* 1. *Fresh poplar buds* (bruised), 1 part; *lard,* 4 parts; boil until crisp, and strain. It never gets rancid. Emollient and stimulant.

2. (*Compound,*—P. Cod.) *Poplar buds,* 12 oz.; *fresh leaves* of *belladonna, common nightshade* (solanum nigrum), *henbane,* and *poppies,* of each, 8 oz.; *lard,* 4½ ℔; as the last. Emollient, stimulant, and anodyne.

OINTMENT (Potassio-tartrate of Antimony). Syn. *Antimonial Ointment, Tartar Emetic do.; Unguentum Antimonii Potassio-tartatris,*—Ph. L. *Ung. A. Tartarizati,*—Ph. D. *Ung. Antimoniale,*—Ph. E. *Ung. Tartari Emetici,*—Ph. D. 1826. *Prep.* 1. (Ph. L. & E.) *Potassio-tartrate of antimony,* rubbed to a very fine powder, 1 oz.; *lard,* 4 oz.; mix by trituration.

2. (Ph. D.) *Tartar emetic,* in very fine powder, 1 *dr.*; *ointment of white wax,* 7 *dr.*

Uses, &c. Counter-irritant; in phthisis, chronic rheumatism, certain liver affections, and other deep-seated pains and diseases. A portion, about the size of a nut, is rubbed on the skin night and morning, until a crop of pustules is produced. The part should be well rubbed with a coarse towel, so as to be reddened, before applying the ointment. The product of the Dublin formula is of only half the strength of those of the other colleges.

Obs. Before adding the tartar emetic to the lard it should be reduced to the state of an impalpable powder. The precipitated salt (see *p.* 76) is the best for this purpose. As the pustules formed by this ointment permanently mark the skin, it should only be applied to those parts of the person which are covered by the dress.

OINTMENT (Purgative). See *Ointment of Colocynth, Worm do., &c.*

OINTMENT (Quinine). Syn. *Unguentum Quiniæ, Ung. Quiniæ Sulphatis,*—Lat. *Prep.* 1. *Sulphate of quinine,* 1 dr.; *lard,* 3 dr. In the agues of children.

2. (Beasley *ex* Antonini.) *Sulphate of quinine,* 1 dr.; *alcohol* (rectified *spirit*), 2 dr.; *sulphuric acid,* 10 drops; dissolve, and mix it with *lard,* ½ oz. In malignant intermittents; 2 to 4 dr. at a time, rubbed into the groin or axilla.

OINTMENT (Red Sulphuret of Mercury). Syn. *Unguentum Hydrargyri Bisulphureti, Ung. Hyd. Sulphureti Rubri,*—Lat. *Prep.* 1. (Alibert.) *Red sulphuret of mercury,* 1 dr.; *camphor,* 20 gr.; *simple ointment,* 1 oz. In herpes, applied twice a day.

2. (Collier.) *Bisulphuret of mercury,* 1½ dr.; *sal ammoniac,* ½ dr.; *lard,* 1 oz.; *rose water,* 1 fl. dr. In several skin diseases, to diminish the itching, destroy pediculi, &c.

3. (Radius.) As the last, with 1 oz. more *lard.*

OINTMENT (Resin). Syn. *Yellow Basilicon; Unguentum Resinæ,*—Ph. D. *Ung. R. Albæ,*—Ph. D. 1826. *Ung. Resinosum,*—Ph. E. *Prep.* 1. (P. D.) *Yellow wax,* ¼ *lb.; yellow resin,* in coarse powder, ½ *lb.; prepared lard,* 1 *lb.;* melt them together by a gentle heat, strain the mixture, whilst hot, through flannel, and stir it constantly until it concretes.

2. (Ph. E.) *Bees' wax,* 2 oz.; *resin,* 5 oz.; *lard,* 8 oz.

Obs. A useful stimulant dressing to foul and indolent ulcers. For the corresponding preparation of the Ph. L., see *Resin Cerate.*

OINTMENT (Resolvent). See *Discutient Ointment.*

OINTMENT (Ringworm). *Unguentum contra-tineam,*—Lat. *Prep.* 1. *Carbonate of soda,* 1 part; *fresh-slaked lime,* 4 parts; *lard,* 120 parts.

2. *Ointment of nitrate of mercury,* 1 dr.; *tar ointment* and *lard,* of each, ½ oz.

3. (Henke.) *Hydrochloric acid,* 1 fl. dr.; *juniper-tar ointment,* ½ oz.; *marshmallow do.,* 1 oz.

4. (Pereira.) *Tar,* 3 dr.; *lard,* 1½ oz.; melt them together, and stir in of *acetic acid* (Ph. L.), 2 fl. dr.

5. (Thompson.) *Carbonate of soda* and *sulphuret of potassium,* of each, 1 dr.; *creasote,* ½ dr.; *lard,* 1¼ oz.

Obs. The hair must be cut off close, and the part washed clean before each application. For other forms, see *above.*

OINTMENT (Rose). Syn. *Rose Pommade, Rose Lip-salve; Unguentum Rosæ, Ung. Rosatum,*—Lat. *Prep.* 1. (P. Cod.) *Washed lard* (melted), and *roses* (centif.), of each, 2 ℔; mix, and in 2 days remelt the mass, and press out the fat; to this last add of *fresh roses,* 2 ℔, and repeat the process; lastly, colour it with alkanet root, if required red.

2. (*Ung. Aquæ Rosæ,*—Ph. U. S.) This is *spermaceti ointment* melted and beaten up with about ⅔rds of its weight of *rose water* until they congeal. Both the above are simple emollients. The last is an officinal "cold cream."

OINTMENT (Rust's). *Calcined alum,* 1½ dr.; *camphor,* ½ dr.; *powdered opium,* 20 gr.; *balsam of Peru,* 1 dr.; *lead ointment,* 5 dr.; triturate together. In chilblains, frostbites, frosted limbs, &c.

OINTMENT (Sabadilline). Syn. *Unguentum Sabadillinæ,*—Lat. *Prep.* (Dr. Turnbull.) *Sabadilline,* 15 to 20 gr.; *lard,* 1 oz. Intended as a substitute for *ointment of veratria.*

OINTMENT (Savine). Syn. *Unguentum Sabinæ,*—Ph. L. & D. *Ceratum Sabinæ,*—Ph. L. 1836. *Prep.* 1. (Ph. L.) *White wax,* 3 oz.; *lard,* 1 ℔; melt them together, mix in of *fresh savine* (bruised), ½ ℔, and press through a linen cloth.

2. (Ph. D.) *Savine tops,* dried and in fine powder, 1 *dr.; ointment of white wax,* 7 dr.; mix by trituration. For the formula of the Ph. E., the uses, &c., see *Cerates.*

OINTMENT (Scrophularia). Syn. *Unguentum Scrophulariæ,*—Lat. *Prep.* (Ph. D. 1826.) *Green leaves of knotted rooted fig-wort* and *lard,* of each, 2 ℔; *prepared suet,* 1 ℔; boil till crisp, and strain with pressure. In ringworm, "burnt-holes" (*pemphigus gangrenosus* of children), impetigo, and some other cutaneous diseases; also as an application to piles, painful swellings, &c. In the second it is said to be almost specific.

OINTMENT (Simple). Syn. *Ointment of White Wax; Simple Dressing; Unguentum Simplex,*—Ph. E. *Ung. Ceræ Albæ,* —P. D. *Prep.* 1. (Ph. E.) *Olive oil,* 5½ fl. oz.; *white wax,* 2 oz.; melted together, and stirred whilst cooling.

2. (Ph. D.) *Prepared lard,* 4 *lb.; white wax,* 1 *lb.;* as the last.

Obs. The above are mild emollients, useful in healthy ulcers, excoriations, &c.; but chiefly as forming the basis for other ointments. The corresponding preparation of the Ph. L. is *spermaceti ointment.* See *Lard Ointment,* &c.

OINTMENT (Singleton's). See *Eye Ointments.*

OINTMENT (Smallpox). Syn. *Unguentum Ectroticum,*—Lat. *Prep.* 1. *Mercurial ointment,* 1½ oz.; *bees' wax* and *black pitch,* of each, ½ oz.; *expressed oil of mace,* 2 dr.; mixed together by a very gentle heat.

2. (M. Briquet.) *Mercurial ointment,* 4 parts; *powdered starch,* 1 part.

3. (M. Tourriere.) *Iodide of potassium* (dry and in fine powder), 1 part; *expressed oil of mace,* 2 parts; *black resin,* 4 parts; *mercurial ointment,* 8 parts. *Used* to prevent the "*pitting*" of the pustules. See *Smallpox.*

OINTMENT (Smellome's). See *Eye Ointments.*

OINTMENT (Soap). See *Cerates.*

OINTMENT (Soap, — Camphorated). Syn. *Unguentum Saponis Camphoratum,*—Lat. *Prep.* (Hamb. Cod.) *White soap* (scraped), 1 *lb.; water,* ½ *lb.;* dissolve by heat, add of *olive oil,* 5 *oz.;* and when the mixture has partly cooled, further add of *camphor,* 1 *oz.,* previously dissolved by heat in *olive oil,* 1 *oz.;* lastly, stir until the mass concretes. As an anodyne and stimulating friction in various local affections, as chaps, chilblains, rheumatism, &c.

OINTMENT (Sodio-Chloride of Gold). Syn. *Pommade de Muriate d'Or et de Soude; Unguentum Auri Sodio-chloridi,*—Lat. *Prep.* (Magendie.) *Sodio-chloride of gold,* 10 gr.; *lard,* 4 dr. In scrofulous and syphilitic swellings, indurations, ulcers, &c.

OINTMENT (Spermaceti). Syn. *Emollient Dressing, Simple Ointment, White do.; Unguentum Cetacei,*—Ph. L. & D. *Ung. Spermatis Ceti,*—Ph. L. 1788 & Ph. D. 1807. *Ung. Album, Linimentum A.,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Spermaceti,* 5 oz.; *white wax,* 14 dr.; *olive oil,* 1 pint or q. s.; melt them together by a gentle heat, and stir the mixture until cold.

2. (Ph. D.) *White wax,* ½ *lb.; spermaceti,* 1 *lb.; prepared lard,* 3 *lb.;* as the last.

Uses, &c. As an emollient and healing application or dressing to abrasions, excoriations, blistered surfaces, healthy ulcers, chilblains, chops, &c. In *trade* the Dublin formula, with *double the amount* of *lard,* is commonly employed. See *Lard Ointment, Simple do., &c.*

OINTMENT (Squills). Syn. *Unguentum Scillæ,*—Lat. *Prep.* 1. (Brera.) *Squills* (in very fine powder), 1 dr.; *mercurial ointment,* 2 dr.

2. (Hufeland.) *Squills,* 1 oz.; *liquor of potassa,* 2 fl. oz.; reduce to a mucilage by boiling, then add of *lard,* 2 oz. or q. s. As a resolvent friction to indolent tumours and indurations.

OINTMENT (Stavesacre). Syn. *Unguentum Staphisagriæ,*—Lat. *Prep.* (Swediaur.) *Powdered stavesacre,* 1 oz.; *lard,* 3 oz.; melt together, digest 3 or 4 hours, and strain. A very cleanly remedy for itch, and to destroy pediculi on the person. A similar ointment is much used by farriers.

OINTMENT (Stramonium). Syn. *Unguentum Stramonii,*—Lat. *Prep.* 1. Fresh *thorn-apple leaves,* 1 part; *lard,* 4 parts; as ointment of hemlock.

2. (Pereira.) *Powdered leaves,* 1 oz.; *lard,* 4 oz.; mix by trituration.

3. (Ph. U. S.) *Extract of stramonium,* 1 dr.; *lard,* 1 oz.; as the last.

Uses, &c. To dress irritable ulcers, and as an application to painful piles.

OINTMENT (Strychnine). Syn. *Unguentum Strychniæ,*—Lat. *Prep.* 1. (Bouchardat.) *Strychnia,* 16 gr.; *lard,* 1 oz.; carefully triturated together.

2. (Wendt.) *Nitrate of strychnia,* 6 gr.; *lard,* 1 oz.; as last. Both are *used* as a friction in paralysed parts, &c. From the extremely poisonous character of strychnine it should be used with caution.

OINTMENT (Subacetate of Copper). See *Verdigris Ointment.*

OINTMENT (Subsulphate of Mercury).

Syn. *Unguentum Hydrargyri Subsulphatis,*—Lat. *Prep.* 1. (Alibert.) *Turpeth mineral,* ½ dr.; *lard,* 1 oz.

2. (Biett.) *Turpeth mineral,* 1 dr.; *sulphur,* 2 dr.; *lard,* 2 oz.; *oil of lemons,* 15 drops. In herpes, porrigo, and the scaly skin diseases.

OINTMENT (Sulphate of Iron). Syn. *Unguentum Ferri Sulphatis,*—Lat. *Prep.* (Velpeau.) *Sulphate of iron,* 1½ dr.; *simple ointment,* 1 oz. In erysipelas.

OINTMENT (Sulphate of Manganese). Syn. *Unguentum Manganesii Sulphatis,*—Lat. *Prep.* From *sulphate of manganese,* 1 dr.; *lard* or *simple ointment,* 1 oz. Alterative and discutient; in similar cases to those in which mercurial ointment is employed.

OINTMENT (Sulphate of Zinc). Syn. *Unguentum Zinci Sulphatis,*—Lat. *Prep.* (Scarpa.) *Sulphate of zinc* (in very fine powder), 1 dr.; *lard,* 1 oz. In some chronic skin diseases attended with a lax state of the tissues, and as a dressing to scrofulous tumours after they have separated and the abscess has been discharged.

OINTMENT (Sulphur). Syn. *Unguentum Sulphuris,*—Ph. L. E. & D. *Ung. è Sulphure,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Sulphur,* ½ ℔; *lard,* 1 ℔. In the Ph. L. 1836, *oil of bergamot,* 40 drops, were added.

2. (Ph. E.) *Sulphur,* 1 oz.; *lard,* 4 oz.

3. (Ph. D.) *Sulphur,* 1 *lb.; lard,* 4 *lb.*

Uses, &c. In itch, scald-head, &c., in the first of which it is specific. It should be well rubbed in every night until the disease is cured; "but not more than one fourth part of the body should be covered with it at a time." (A. T. Thomson.)

OINTMENT (Sulphur,—Compound). Syn. *Itch Ointment; Unguentum Sulphuris Compositum,*—Ph. L. *Prep.* (Ph. L.) *Nitrate of potassa* (powdered), 40 gr.; *white hellebore* (powdered), 10 dr.; *sulphur* and *soft soap,* of each, 4 oz.; *lard,* 1 ℔; rub them together.

2. (Ph. L. 1836.) *Sulphur* and *soft soap,* of each, 6 oz.; *white hellebore,* 2 oz.; *nitre,* 1 dr.; *lard,* 1½ ℔; *oil of bergamotte,* 30 drops.

3. (P. Cod.) *Alum* and *sal ammoniac,* of each, ½ oz.; *sulphur,* 8 oz.; *lard,* 16 oz.

Uses, &c. In itch, as the last. They are all more efficacious than the simple ointment, but owing to the presence of white hellebore, that of the Ph. L. is apt to cause irritation in persons with delicate skins. See *Itch Ointment.*

OINTMENT (Sulphuret of Mercury). See *Ointment of Red Sulphuret of Mercury.*

OINTMENT (Sulphuret of Potassium). Syn. *Unguentum Potassii Sulphureti,*—Lat. *Prep.* 1. *Sulphuret of potassium* (dry and in fine powder), 1 dr.; *lard,* 9 dr. Alibert adds 1 dr. of *carbonate of soda.*

2. *Sulphuret of potassium,* 2½ dr.; *lard* and *soft soap,* of each, 1 oz.; *olive oil,* ½ oz. In several chronic skin diseases, as itch, psoriasis, ringworm, lepra, eczema, &c.

OINTMENT (Sulphuret of Sodium). Syn. *Unguentum Sodii Sulphureti,*—Lat. *Prep.* (Swediaur.) *Sulphuret of sodium,* 3 dr.; *lard,* 1½ oz. In itch, for which it is very cleanly and effective. The last two ointments are most powerful when recently prepared.

OINTMENT (Sulphuric Acid). Syn. *Unguentum Acidi Sulphurici,*—Lat. *Prep.* 1. (Dr. Duncan.) *Sulphuric acid,* 1 dr.; *lard,* 2 oz.

2. (Ph. D. 1826.) *Sulphuric acid,* 1 dr.; *lard,* 1 oz.; mix.

Uses, &c. Black, fœtid; in itch. It is now seldom used. With oil of turpentine it has been used as a stimulating liniment in rheumatism. An ointment made of 1½ dr. of *dilute sulphuric acid* to 1 oz. of *lard,* is a good application in prurigo.

OINTMENT (Sultana). *Spermaceti* and *white wax,* of each, ¼ *oz.; oil of almonds* and *butter of cacao,* of each, ¼ *lb.;* melt together, add of *balsam of Peru,* 1 dr., stir constantly for a few minutes, and after it has settled pour off the clear portion; to this add of *orange-flower water,* 2 fl. dr., and stir the mixture constantly until it concretes. A very agreeable species of cold cream.

OINTMENT (Tannate of Lead). Syn. *Unguentum Plumbi Tannatis,*—Lat. *Prep.* 1. *Tannate of lead,* 1½ dr.; *powdered camphor,* 20 gr.; *spermaceti ointment,* 7 dr. In inflamed piles, &c.

2. (Sundelin.) *Decoction of oak bark,* 6 fl. oz.; *solution of diacetate of lead,* 1½ oz.; mix, collect and drain the precipitate, and mix it, whilst still moist, with *lard,* 1 oz.; *camphor,* 10 gr. In bed-sores.

OINTMENT (Tannin). Syn. *Unguentum Tannini, Ung. Acidi Tannici,*—Lat. *Prep.* (Richard.) *Tannin,* 2 dr.; *water,* 2 fl. dr.; triturate them together, then add of *lard,* 1½ oz. Astringent and hæmostatic. In piles, prolapsus, &c. It is a very cleanly and effective application.

OINTMENT (Tar). Syn. *Unguentum Picis Liquidæ,*—Ph. L. E. & D. *Ung. Picis,*—Ph. L. 1788. *Ung. è Pice,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Tar* and *suet,* of each, 1 ℔; melt them together, and press the mixture through a linen cloth.

2. (Ph. E.) *Tar*, 5 oz.; *bees' wax*, 2 oz.; melt together, and stir the mixture briskly until it concretes.

3. (Ph. D.) *Tar*, ½ pint; *yellow wax*, 4 *oz.;* as the last.

Uses, &c. As a detergent application in ringworm, scald-head, scabby eruptions, foul ulcers, &c. It should be, in general, at first diluted with half of its weight of lard or oil.

OINTMENT (Tartar Emetic). See *Ointment of Potassio-tartrate of Antimony.*

OINTMENT (Tobacco). Syn. *Unguentum Tabaci,*—Lat. *Prep.* 1. (Chippendale.) *Extract of tobacco*, 1 dr.; *lard*, 1 oz. As a friction in neuralgia.

2. (Ph. U. S.) *Fresh tobacco leaves*, 1 oz.; *lard*, 12 oz.; as ointment of hemlock. As an anodyne application in irritable ulcers, ringworm, prurigo, and some other skin diseases.

OINTMENT (Tripharmic). Syn. *Ointment of Three Things; Unguentum Tripharmacum,*—Ph. L. 1746. *Prep.* From *lead plaster*, 4 oz.; *olive oil*, 2 fl. oz.; *distilled vinegar*, 1 fl. oz.; melt together, and stir until they combine, and a proper consistence is obtained. Cooling and desiccative; formerly greatly esteemed as a dressing.

OINTMENT (Trooper's). See *Mercurial Ointment.*

OINTMENT (Turpentine). Syn. *Unguentum Terebinthinæ,*—Lat. *Prep.* 1. (Guy's Hosp.) *Camphor*, 1 dr.; *oil of turpentine*, 1 to 2 fl. dr.; dissolve, and add of *resin cerate*, 1 oz. As a stimulant and anodyne friction in nephritic and rheumatic pains, engorgements, &c.

2. (Ph. Austr.) *Turpentine*, 2 ℔; *simple ointment*, 1 ℔; mix by a gentle heat. As a stimulant dressing.

OINTMENT (Tutty). Syn. *Unguentum Zinci Oxydi impuri,*—Ph. E. 1807. *Ung. Tutiæ,*—Ph. D. 1826 & Ph. L. 1788. *Prep.* From *prepared tutty*, 1 part; *simple ointment*, 5 parts; mix by trituration. Formerly in great repute in ophthalmic practice, more particularly in inflammation, &c., of the eyelids. See *Ointment of Oxide of Zinc.*

OINTMENT (Veratrine). Syn. *Pommade de Veratrine; Unguentum Veratriæ,*—Lat. *Prep.* 1. (Magendie.) *Veratrine*, 4 gr.; *lard*, 1 oz.; mixed by *careful* trituration.

2. (Pereira.) *Veratrine*, 30 gr.; *lard*, 1 oz.

3. (Turnbull.) *Veratrine*, 10 to 20 gr.; *olive oil*, 1 dr.; triturate, and add of *spermaceti ointment*, 1 oz.

Uses, &c. As a friction in neuralgia, neuralgic rheumatism, gout, dropsy, &c. A piece, about the size of a hazel nut, is to be rubbed for 10 or 15 minutes over the seat of pain, twice a day. It must not be applied where the skin is unsound, nor to a large surface at a time; and the greatest caution must be used, on account of the extremely poisonous character of veratrine.

OINTMENT (Verdigris). Syn. *Ointment of Subacetate of Copper; Unguentum Æruginis,*—Ph. E. *Ung. Cupri Subacetatis,* —Ph. D. *Prep.* 1. (Ph. E.) *Resinous ointment*, 15 oz.; melt by a gentle heat, sprinkle into it of *verdigris* (in very fine powder), 1 oz., and stir the mixture briskly until it concretes.

2. (Ph. D.) *Prepared subacetate of copper*, ½ *dr.; ointment of white wax*, 7½ *dr.;* mix by trituration.

3. (Ph. D. 1826.) *Verdigris*, ½ oz.; *olive oil*, 1 oz.; triturate them together, and add them to *resin ointment*, 1 ℔ (melted), and stir until the mixture is nearly cold.

Uses, &c. Detergent and escharotic; as an occasional dressing to foul and flabby ulcers, to keep down fungous flesh, and, diluted with oil or lard, in scrofulous ulceration and inflammation of the eyelids.

OINTMENT (Vinegar). Syn. *Acetic Ointment; Unguentum Aceti, Ung. Acidi Acetici,*—Lat. *Prep.* 1. (Dr. Cheston.) *Olive oil*, 1 ℔; *white wax*, 4 oz.; melt them together by a gentle heat, add of *strong vinegar*, 2 fl. oz., and stir until the mixture concretes. As a cooling astringent dressing, and as an application in chronic ophthalmia.

2. (W. Cooley.) *Acetate of morphia*, 6 gr.; *acetic acid* (Ph. L.) and *water*, of each, 1½ fl. dr.; dissolve, add the solution to *simple ointment* (melted), 1½ oz., and stir the mixture briskly until nearly cold. In chronic ophthalmia, painful inflamed piles, &c.; also to remove freckles, and to allay itching and irritation in several skin diseases.

OINTMENT (White). Both *spermaceti ointment* and *ointment of carbonate of lead* were formerly so called, but the name is now obsolete. The *camphorated white ointment* of the Ph. L. 1746 (*Ung. album camphoratum*) was spermaceti ointment to which a little camphor had been added.

OINTMENT (White Hellebore). See *Hellebore Ointment.*

OINTMENT (White Precipitate). See *Ointment of Ammonio-chloride of Mercury.*

OINTMENT (White Wax). See *Simple Ointment.*

OINTMENT (Wolfsbane). See *Ointment of Aconite.*

OINTMENT (for Worms). Syn. *Unguentum Anthelminticum, Ung. Vermifu-*

gum,—Lat. *Prep.* 1. (Boerhaave.) *Aloes* and *ox-gall*, of each, 1 part; *marshmallow ointment*, 8 parts.

2. (Fr. Hosp.) *Aloes* and *oil of tansy*, of each, 1 part; *dried ox-gall*, 2 parts; (both in fine powder;) *lard*, 8 parts.

3. (Ph. Bat.) *Aloes*, 1 dr.; *dried ox-gall* and *petroleum*, of each, 1½ dr.; *lard*, 1½ oz.

4. (Soubeiran.) *Powdered aloes*, 2 dr.; *lard*, 1 oz.

Uses, &c. The above are purgative and vermifuge, applied as frictions to the abdomen. They are chiefly employed for children and delicate females. See *Colocynth Ointment.*

OINTMENT (Yellow Wax). Syn. *Unguentum Ceræ Flavæ*,—Lat. *Prep.* (Ph. D. 1826.) *Bees' wax*, 1 ℔; *lard*, 4 ℔; melt them together. A mild emollient dressing. Some parties regard it as more "healing" than the "ointment of white wax."

OINTMENT (Zinc). See *Ointment of Oxide of Zinc.*

OINTMENT (Zinc,—Compound). Syn. *Unguentum Zinci Compositum*, — Lat. *Prep.* 1. (Hufeland.) *Oxide of zinc* and *lycopodium*, of each, 1 dr.; *simple ointment*, 1 oz. In excoriations and simple ulcerations, especially those of the eyelids, nipples, &c.

2. (Thomson.) *Oxide of zinc*, ½ dr.; *powdered opium*, 5 gr.; *lard*, 1 oz. As the last, when there is much pain.

OINTMENTS (Flower of). Syn. *Flos Unguentorum*,—Lat. *Prep.* From *resin*, *thus*, *wax*, and *suet*, of each, ½ ℔; *olibanum* and *Venice turpentine*, of each, 2½ oz.; *myrrh*, 1 oz.; *wine*, ½ pint; boil them together, and lastly, add of *camphor*, 2 dr. Suppurative; warming.

OLANINE. See *Animal Oil* (p. 839).

OLEFIANT GAS. Syn. *Carburetted Hydrogen; Bicarburetted do., Percarburetted do., Hydroguret of Carbon, Ethylene; Heavy Inflammable Air*,—Obs. var. A substance discovered by some associated Dutch chemists, in 1796, and composed of carbon and hydrogen in equivalent proportions.

Prep. 1. A *mixture* of *alcohol* (rectified spirit), 1 part, and *oil of vitriol*, 6 parts, is heated in a retort until it blackens and sulphurous acid begins to be evolved; the product is then passed first through a wash-bottle containing a solution of *caustic potassa* or *milk of lime*, and next through a bottle containing *concentrated sulphuric acid;* the last being furnished with a tube dipping into the water of the pneumatic trough.

2. The *vapour* of *boiling alcohol* is passed into a *mixture* of *oil of vitriol* diluted with rather less than one half its weight of *water*, and so heated as to be in a state of tranquil ebullition (320° to 330° Fahr.); the gaseous product is chiefly olefiant gas, and the vapour of water, from which it may be separated as above. No sulphurous acid is formed, nor does the acid blacken as in the last process.

Prop., &c. Colourless; neutral; nearly odourless; nearly insoluble in water; alcohol, ether, and the volatile and fixed oils absorb a portion of it; burns with a brilliant white flame; at a full red heat it suffers decomposition, with deposit of carbon and liberation of light carburetted hydrogen gas; mixed with twice its volume of chlorine and inflamed, hydrochloric acid is formed, and the carbon of the gas is precipitated in the form of dense black soot; if the mixture (best in equal volumes), instead of being kindled, be left standing over water, it soon condenses into a heavy oily liquid (*chloride of hydrocarbon, Dutch liquid*). It is the presence of olefiant gas in *coal gas* that principally gives to the latter its illuminative properties. Sp. gr. 0·981; 100 cubic inches weigh 30·57 gr.

OLEFIANT GAS (Bromide of). From *bromine* and *olefiant gas*, as *Dutch liquid.* A colourless liquid with an ethereal odour, boiling at 265°, and solidifying at 0° Fahr. Sp. gr. 2·16.

OLEFIANT GAS (Chloride of). Syn. *Dutch Liquid; Chloride of Ethylene.* This substance, referred to above, may be easily prepared in any quantity by the following process:—*Chlorine* and *olefiant gas* (the latter a little in excess) are conveyed by separate tubes (passing through the same cork) into a glass globe, having a narrow funnel-shaped neck at its lower part, dipping into a small bottle destined to receive the product of their mutual reaction; the newly formed liquid trickles down the sides of the globe into the receiver, and when a sufficient quantity is collected, it is purified by agitating it first with water, and then with sulphuric acid, and lastly, submitting it to distillation.

Prop., &c. Colourless; sweet-tasted; agreeably fragrant, the odour approaching that of oil of caraway; slightly soluble in water; freely so in alcohol and ether; it sinks in water; boils at 180° Fahr.; burns with a smoky greenish flame; is unaffected by oil of vitriol; but decomposed by solution of caustic potassa. It combines with chlorine, forming new compounds. See *Chlorides of Carbon.*

OLEFIANT GAS (Iodide of). From

iodine and *olefiant gas*, as the last. Colourless, crystalline, highly volatile with a penetrating odour; it melts at 174° Fahr.

OLEIC ACID. Syn. *Elaic Acid.* One of the oily acids discovered by Chevreul, and produced by saponifying oils, and then separating the base from the resulting soap by means of a dilute acid. It now forms an important secondary product in the manufacture of stearic acid. Perfectly pure oleic acid may be obtained as follows:—

1. By saponifying *oleine*, as just noticed.

2. Pure *almond* or *olive oil soap* is decomposed by a *dilute acid*, and the resulting *oily acid* is digested in a water bath with half its weight of *litharge* (in very fine powder) for some hours, constantly stirring; the mixture is then agitated with twice its volume of *ether* in a close vessel, and in 24 hours the clear *ethereal solution* is decanted, and decomposed with *dilute hydrochloric acid;* the *oleic acid* separates, and the ether mixed with it is expelled by evaporation. To render it colourless, the acid is again saponified with *caustic soda*, and the soap thus obtained is repeatedly dissolved in a *solution of soda*, and as often separated by adding *common salt;* this soap is, lastly, decomposed by *dilute hydrochloric acid* as before.

Prop., &c. A colourless oily acid, insoluble in water, soluble in alcohol, ether, and oil; with the bases it forms salts called *oleates.* The *crude oleic acid* of commerce is noticed at page 851.

OLEINE. Syn. *Elaine; Huile Absolue.* The liquid portion of the fixed oils and fats. By saponification it yields oleic acid.

Prep. 1. *Olive oil* or *almond oil* is digested for 24 hours with a quantity of *caustic soda lye*, only sufficient to saponify one-half of the oil, and the undecomposed oily portion (*oleine*) is then separated from the alkaline solution and newly formed stearine soap.

2. The *saponified mixture of oil and alkali* (see No. 1) is digested with *proof spirit* until all the soap is dissolved out, and the *oleine* separates and floats on the surface; the latter, after repose, is decanted.

3. *Almond* or *olive oil* is agitated in a stout bottle with 7 or 8 times its weight of *strong alcohol* (sp. gr. 0·798) at nearly the boiling point, until the whole is dissolved; the solution is next allowed to cool, after which the clear upper stratum is decanted from the stearine which has been deposited, and after filtration, the spirit is removed by distillation at a gentle heat; by exposure at a very low temperature it deposits any remaining stearine, and then becomes pure.

Prop., &c. The product of the last two formulæ have only a very slight yellow colour, but may be rendered quite limpid and colourless by digestion for 24 hours with a little pure freshly burnt animal charcoal, and subsequent filtration. In this state it is perfectly neutral to test paper, does not in the slightest degree affect metallic bodies immersed in it, and does not thicken by exposure to the greatest cold. *Oleine* is *used* by watchmakers for their fine work. Some years ago the product of the last formula was sold, by a certain metropolitan house, as "*watchmaker's oil,*" at 1*s.* 6*d.* a drachm. *Commercial oleine* is generally lard oil. The refined oleic acid of the stearine works also commonly passes under the name. *Oleine* burns well in lamps; but *oleic acid* does not do so unless when well refined and when the wick-tube is so formed as to remain cool. Messrs. Humfreys & Wilson have patented an excellent arrangement for this purpose. See *Lard Oil* and *Oleic Acid.*

OLEOMETER. Syn. *Elaïometer, Elæometer, Oil-balance.* A delicate areometer or hydrometer, so weighted and graduated as to adapt itself to the densities of the leading fixed oils. As the differences of the specific gravities of these substances are inconsiderable, to render it more susceptible, the bulb of the instrument is proportionately large, and the tube or stem very narrow. The scale of the elaïometer in general use (M. Gobby's) is divided into 50 degrees, and it floats at 0 or zero in *pure poppy oil*, at 38 or 38½ in *pure almond oil*, and at 50 in *pure olive oil.* The standard temperature of the instruments made in this country are now 60°; those made on the Continent, 54·5° Fahr. The oil must therefore be brought to this normal temperature before testing it, by plunging the glass cylinder containing it into either hot or cold water, as the case may be; or a correction of the observed density must be made. The last is done by *deducting* 2 from the indication of the instrument for *each degree* of the thermometer *above* the normal temperature of the instrument, and adding 2 for every degree below it. Thus; suppose the temperature of the oil at the time of the experiment is 60° Fahr., and the elaïometer indicates 61°; then—

60·0° *Actual temperature.*
54·5 *Normal temperature.*
——
5·5 Difference.
——

Indication of the elaïometer . 61·0
The difference 5·5 × 2 = . . 11·0

Real density . . . . 50·0

Suppose the temperature observed at the time of the experiment is 52°, and the elaïometer indicates 45°; then—

54·5 *Normal temperature.*
52·0 *Actual temperature.*

2·5 Difference.

Indication of the elaïometer . 45·0
The difference 2·5 × 2 = . . 5·0

Real density . . . . 50·0

The oil is, therefore, presumed to be pure. See *Hydrometer*, *Oils* (Fixed), and *Specific Gravity.*

OLEON. A peculiar liquid obtained by the distillation of *oleic acid* and *lime.*

OLEO-PHOSPHORIC ACID. An acid compound found by Fremy in the brain and nervous matter.

OLEO-RESINS. The natural compounds of *resin* and *essential oil* forming the vegetable balsams and turpentines.

OLEO-RICINIC ACID. See *Ricinoleic Acid.*

OLEOSACCHARUM. Syn. *Elæosaccharum.* Sugar aromatized or medicated by being rubbed up with an essential oil. The *oleosacchara* of *aniseed*, *caraway*, *cinnamon*, *peppermint*, *pennyroyal*, and the other like *essential oils*, are made by rubbing 15 to 20 drops of the *respective oils* with *white sugar*, 1 oz.—The Ph. Græca, 1837, prescribes 1 part of *oil* to 20 parts of *sugar.*—The Ph. Austr. 1836 and Ph. Bor. order the same proportions, or 3 drops of *oil* to the dr., and 24 drops to the oz. of *powdered sugar.* When intended for making *extemporaneous distilled waters*, 1 dr. of *magnesia* is a common addition. The *oleosacchara* of *citrons*, *lemons*, *oranges*, *&c.*, are made from the peels, as follows:—After cleaning off any specks in the outer rind of the fruit, rub a large piece of *loaf sugar* on it until the yellow rind is completely removed. Those parts of the sugar which are impregnated with the essence are, from time to time, to be cut away with a knife, and put into an earthen pot. The whole being thus taken off, the sugared essence (*oleasaccharum*) is to be closely pressed down in the pot, tied over with bladder, and preserved in a cool place for use.

OLIBANUM. Syn. *Indian Olibanum; Frankincense.* A gum resin obtained from either *juniperus lycia* or *Boswellia serrata.* It is stimulant, astringent, and diaphoretic. It is burnt as *incense* in the temples of India, and in Roman Catholic churches. *African frankincense* is produced by *Boswellia floribunda.* (Royle.) This substance must not be confounded with the resin noticed at *page* 489.

OLIVE. Syn. *Olea*, *Oliva*,—Lat. The *olea Europæa* (Linn.), a native of the South of Europe. The *unripe fruit* is preserved in brine (*Spanish olives*, *French olives*); the *ripe fruit* furnishes olive oil; the *bark* is bitter, astringent, and febrifuge, and has been used as a substitute for cinchona bark; it yields a gum-like substance which was formerly reputed vulnerary, and contains *olivile.* The olive tree has in all ages been held in peculiar estimation, as the bounteous gift of heaven to man. Some authors have styled it "a mine on earth." It is remarkable for yielding a fixed oil from the pericarp, instead of from the seed. See *Med. Circ.*, i, 350.

OLIVILE. The name given by Pelletier to the substance obtained by evaporating an *alcoholic solution* of the *gum of the olive tree.* It is a white, brilliant, starch-like powder, soluble in hot water and in alcohol.

OLIVINE. Syn. *Olivina*, *Olivinum.* A white, crystalline substance, obtained by Landerer from the leaves of the olive tree.

Prep. The *recent leaves* (bruised) are digested in *water* acidulated with *hydrochloric acid*, the infusion is concentrated by a gentle heat, and precipitated by *ammonia;* the precipitate is washed with a little *cold water*, redissolved in *dilute acid*, and decoloured by *animal charcoal;* the filtered solution is, lastly, reprecipitated with *ammonia*, as before.

Prop., *&c.* White; crystalline; bitter; soluble in dilute acids, and in alcohol. It is feebly basic.

OLLIVIER'S BISCUITS. See *Patent Medicines.*

OMELET. Syn. *Omelette*, — Fr. A variety of pancake or fritter made of eggs, and other ingredients. *Omelets* may contain *bacon*, *ham*, *herbs*, *fish*, *shell-fish*, *cold meat*, *cold game*, *fruit*, or anything else at hand at the pleasure of the cook. "*Spirit omelets*" are made by pouring a little *brandy*, *rum*, or *whisky* over them on serving them up, and setting it on fire for a *moment* just before placing the dish on the table. "Where is the man or woman cook but says they know how to make an omelette, and that to perfection? But this is rarely the case. It is related of Sarah, the Duchess of Marlborough, that no one could cook a '*fraise*,' as it was then called, for the great duke but herself. The great point is, if in an iron pan, it should be very clean and free from damp, which sometimes comes out of the iron when placed on the fire. The best plan is to put it on the fire, with a little fat, and let it get quite hot, or until the fat burns; remove it, and wipe it clean with a dry cloth, and then you will be able to make the omelette to perfection." (Soyer.)

The following formula for a *plain omelet* is by the above august authority:—Break *four eggs* into a basin, add ½ *tea-spoonful* of *salt*, and ¼ *do.* of *pepper*, and beat them up well with a fork; put into the frying-pan 1½ *oz.* of *butter*, *lard*, or *oil*, place it on the fire, and when *hot*, pour in the *eggs*, and keep on mixing them quickly with a spoon until they are delicately set; then let them slip to the edge of the pan, laying hold by the handle, and raising it slantways, which will give an elongated form to the omelette; turn in the edges, let it rest a moment, to set, turn it over on to a dish, and serve." "It ought to be of a rich-yellow colour, done to a nicety, and as light and delicate as possible." "2 *table-spoonfuls* of *milk* and 1 *oz.* of the *crum of bread* cut into thin slices, may be added."

Mixed and *fancy omelettes* are made by simply dropping the ingredients, cut into dice or fragments, into the above. *Anchovy*, *oyster*, and *shrimp omelettes* are generally prepared by placing a few spoonfuls of the respective sauces in the centre of each, when nearly dressed.

ONGUENT (de la mère). A stimulant and digestive ointment very popular in French pharmacy.

Prep. (P. Cod.) *Black pitch*, 1 part; *butter*, *lard*, *litharge*, *suet*, and *yellow wax*, 4 parts; *olive oil*, 8 parts.

OMYCHILE. A brown, resinous substance, obtained by Scharling from *inspissated urine*.

ONION. Syn. *Cepa*,—Lat. The *bulb* of *allium cepa* (Linn.) The onion is diuretic, expectorant, rubefacient, and stimulant. The *juice*, made into a syrup with sugar (*syrupus cepæ*), has been given in chronic catarrh, diarrhœa, croup, dropsy, and calculus. Roasted and split open, onions have been applied as poultices to suppurating tumours; and applied to the pubes to relieve suppression of urine in children. According to Dr. Cullen, "onions are acrid and stimulating, and possess little nutrient power. In *bilious constitutions* they generally produce flatulence, thirst, headache, and febrile symptoms; but where the *temperament* is *phlegmatic*, they are of infinite service, by stimulating the system, and promoting the excretions, particularly expectoration and urine." They also possess antiscorbutic and soporific properties.

ONONINE. A sweet crystallizable substance contained in the *root* of *ononis spinosa* or *rest-harrow*.

ONYX. A sub-species of quartz often wrought into small ornamental articles. Among jewellers, any stone exhibiting layers of two or more colours, strongly contrasted, is called an *onyx*. A regularly and richly banded agate of this class is much prized for cameos. See *Gems*.

OPAL. See *Gems* and *Pastes*.

OPHTHALMIA. Syn. *Ophthalmitis*. Inflammation of the eye. In ordinary cases this disease is confined to the external membrane of the globe of the eye, or to the eyelids; but it occasionally attacks the sclerotica, cornea, choroid coat, and retina.

The *common causes* of ordinary or *conjunctival ophthalmia*, are the sudden exposure of the organ to a cold easterly wind, to dust, gritty particles, or to any external irritation or injury.

The *symptoms* are, in part, those common to local inflammation. The eye or eyelids become more or less bloodshot, swollen, and tender, and a sensation resembling that induced by the presence of particles of sand or some gritty substance, accompanied by much heat and a pricking pain, is almost constantly experienced. The secretion becomes yellowish and glutinous, and during the night frequently glues, as it were, the lids together. Sometimes only one eye is attacked, but after 2 or 3 days the disease extends to the other.

The *treatment* of *mild cases* of conjunctival ophthalmia is extremely simple. In general it may be relieved by fomentations of warm water, or decoction of poppy-heads, and the use of aperient medicines; to which leeches and cupping may often be added with advantage. In *severer cases*, general depletion and blisters to the nape of the neck must be had recourse to. When the *inflammation has subsided*, mild astringent and cooling eye-waters and ointments will be found useful; but all applications of this kind should be used with caution. The *purulent ophthalmia* of new-born infants, and that which often follows the smallpox, measles, and fevers, generally yields to the use of mild astringent eye-waters and ointments, and to the application, at bedtime, of a drop of *wine of opium* diluted with 5 or 6 drops of water. A *very weak* solution of *sulphate of zinc*, or the *ointment of nitric oxide of mercury*, will be found a good application in the latter cases. In every variety the eye should be kept clean by careful ablution with warm milk-and-water. A solution of *chloride of barium* (3 to 5 gr. to distilled water 1 fl. oz.) is an excellent application in chronic ophthalmia arising from scrofula or syphilis.

When the disease is symptomatic of other affections, as gout, rheumatism, hysteria, &c., the treatment should have reference to the primary disease. Intense pain (*ophthalmodynia*), having this origin, is sometimes felt in the eye when there is no inflammation.

Occasionally ophthalmia assumes a malignant form, producing the most intense suffering, ending in destruction of the eyeball, and total blindness. In this state, it is highly contagious. Of this description was the disease which fell with such severity on the French and English armies in their expeditions to Egypt.

OPIAMMON. A nearly white insoluble powder formed by evaporating the *ammonia salt of opianic acid* to dryness. The stronger acids reconvert it into opianic acid and ammonia.

OPIANE. Narcotine.

OPIANIC ACID. A crystalline substance, resulting from the oxidation of narcotine, discovered by Wöhler and Liebig.

Prep. Narcotine is dissolved in *dilute sulphuric acid,* in considerable excess; *binoxide of manganese,* in very fine powder, is next added, also in excess, and the mixture is boiled until carbonic acid ceases to be evolved; the liquid is then filtered, and on cooling forms a crystalline mass of *opianic acid;* this is drained on a filter, pressed, washed with *cold water,* and frequently recrystallized from a saturated solution in *boiling water.*

Prop., &c. Colourless, prismatic, reticulated crystals; very sparingly soluble in cold water; freely soluble in hot water, and in alcohol; soluble in alkaline lyes, but insoluble in them after fusion, unless when concentrated. It forms crystallizable salts called *opianates,* including an ether (*opianic ether*).

OPIANINE. A substance of little importance occasionally found in opium.

OPIATES. Syn. *Opiata,*—Lat. Preparations containing opium. The word is often applied in a general sense to anodynes and soporifics. In French pharmacy the name is commonly used synonymously with confections.

Anti-dysenteric Opiate,—Quarin. *Purified opium,* 4 gr.; *ipecacuanha,* ½ dr.; *tormentilla,* 1 dr.; *syrup of whortleberries* and *conserve of red roses,* of each, 6 dr. *Dose.* A tea-spoonful every hour.

Anti-hysterical Opiate, — Trousseau & Reveil. *Powdered indigo,* 1 oz.; *white honey,* 3 oz. *Dose.* 1 table-spoonful daily, gradually increased until the whole is taken in a day. In hysteria, epilepsy, and nervous affections of an epileptic character.

Anti-tubercular Opiate; Lepecq de la Cloture. From *spermaceti, crab's eyes,* and *sulphur,* of each, 2 dr.; *conserve of roses,* 4 dr.; *pepper mushroom,* 3 dr.; *honey,* q. s. to make an electuary. In pulmonary consumption. *Dose.* 1 to 2 tea-spoonfuls, 3 or 4 times a day.

Balsamic Opiate,—Trousseau & Reveil. *Oleo-resin* (balsam) *of copaiba,* 1 oz.; *cubebs* (in powder), 3 oz.; *potassio-tartrate of iron,* 2½ dr.; *syrup of quince,* q. s. In gleet. *Dose.* 3 boluses the size of a nut, thrice daily.

Charcoal Opiate,—Ratier. *Willow charcoal* (recent), 1 oz.; *prepared chalk,* 1 dr.; *powdered white sugar,* 2 oz.; *rose water,* q. s. to form an electuary. In diarrhœa and incipient cholera, in dysentery with fetid stools, and in gastralgia, flatulence, &c. By substituting calcined magnesia for chalk it becomes an excellent remedy for habitual constipation.

Cubeb Opiate, — Deyeaux. *Powdered cubebs,* 4 dr.; *powdered camphor,* 1 dr.; mix, and divide it into 18 powders. *Dose.* One, 3 or 4 times daily, in gleet, painful and scalding micturition, &c.

OPIATE (en Poudre). *Prep.* From *Bath brick,* 8 *oz.; china ware,* 4 *oz.; red coral,* 1 *oz.; cinnamon* and *cloves,* of each, 1 dr.; reduced to very fine powder, and passed through gauze or muslin. *Used* as a dentifrice; rapidly whitens the teeth, but should not be employed too freely.

OPIUM. Syn. *Opium,*—Ph. L. E. & D. "Turkey opium (*opium Turcicum*);" "the juice emitted from the incised unripe fruit (*capsules*) of *papaver somniferum,* Linn.," or *white poppy,* "indurated by exposure to the air."

Var.—1. *Egyptian;* in roundish flattened lumps; inferior to Turkey opium. — 2. *English;* often equal to the best Smyrna.— 3. *French;* resembles the last.—4. *German;* similar to English opium. — 5. *Indian;* —*a.* Benares opium, in large balls; — *b.* Malwa opium, in roundish flattened cakes, of 9 or 10 *oz.* in weight each;—*c.* Patna opium, in balls or square cakes. Inferior to Turkey opium.—6. *Levant;* same as Smyrna opium.—7. *Persian;* in rolls or sticks, 6 × ½ inch; inferior; resembles hepatic aloes in appearance.—8. *Smyrna;* in irregular, rounded, flattened pieces, varying in weight from 2 or 3 *lb.* to only as many *oz.* It forms the best variety of Turkey opium, and is particularly rich in morphia. It is the only one adapted for the manufacture of the *salts of morphia,* as it contains on the average from 7 to 9$\frac{0}{0}$ of that alkaloid, and usually yields about 12 to 12·5$\frac{0}{0}$ of *hydrochlorate of morphia,* which is more than can be obtained from any other variety of opium.—9. *Turkey;* of which two varieties are known in commerce; viz., Constantinople opium, and Levant or Smyrna opium. The *first* is generally in small flattened, roundish cakes, 2 to 2½ inches in diameter, and covered with poppy leaves. It is more mucilaginous and less esteemed than Smyrna opium, from which it may be distinguished by this last being always covered with the reddish capsules of a species of rumex.

Pur. The opium of commerce is not unfrequently adulterated with *extract of poppies, extract of lettuce, lactucarium, mucilage of gum tragacanth, dried leaves, starch, water, clay, sand, gravel,* and other substances, in order to increase its weight. This fraud is readily detected by inspection, by chemical analysis, and the microscope; and indirectly, with the greatest certainty, by a simple assay of the sample for its morphia ("*morphiometry*"). This may be effected by one or other of the following methods:—

1. (Couerbe.) *Opium,* 4 parts; and *quicklime,* 1 part, made into a milk with *water,* q. s.; are boiled together, and the solution filtered whilst hot; *dilute hydrochloric acid* is then added, to saturation, and the *morphia* precipitated by the addition of *liquor of ammonia,* any excess of the latter being expelled by heat; the precipitate is then collected, dried, and weighed. If 100 gr. have been operated on, the given weight will represent the per centage richness of the sample in morphia (nearly).

2. (M. Guilliermond.) 100 gr. of *opium* are triturated for some time in a mortar along with 4 times its weight of *rectified spirit,* and the tincture strained through linen, with expression, into a wide-mouthed bottle; the marc is triturated a second time with about 3 times its weight of alcohol, and the tincture strained into the bottle as before; to the *mixed tinctures* is added 1 fl. dr. of *liquor of ammonia,* and the whole is agitated for a short time. In about 12 hours the *morphia* spontaneously separates, accompanied with some *narcotine* and *meconate of ammonia;* the morphia covering the interior of the vessel with large, coloured, and gritty crystals, feeling like sand, and the narcotine crystallizing in very light, small, white, and pearly needles. These crystals are washed with *water,* either through a paper filter or linen, to free them from the *meconate of ammonia* which they contain; after which the *narcotine* is separated from the morphia by decantation in water, which removes the narcotine, which is the lighter of the two. According to M. Mialhe, however, the morphia is more effectually removed by washing the crystals with 1 to 1½ fl. dr. of *ether,* by triturating the two together; when the morphia is left in an insoluble state, and may then be dried and weighed.

3. (Ph. E.) Macerate 100 gr. of *opium* for 24 hours in 2 fl. oz. of *water,* filter, and strongly squeeze the residue; then precipitate the infusion with *carbonate of soda,* ½ oz., dissolved in *cold water,* 2 fl. oz.; gently heat the precipitate until it shrinks and fuses, then cool and weigh it. It should weigh at least 10 gr.; and when powdered, be entirely soluble in a *solution of oxalic acid.*

Tests. These depend chiefly on the chemical and physical characters of morphia and meconic acid, the tests for which have been already noticed. In operating upon the *contents of the stomach,* or upon *solid organs,* in cases of suspected poisoning, the best method of proceeding is that already described under "*Alkaloid.*"—*Another method* is to boil the substances in *water slightly acidulated with acetic acid,* next to evaporate the solution to the consistence of a thick syrup, and then to treat it *twice* with *boiling rectified spirit;* the tincture thus obtained is to be filtered when cold, and again evaporated to the consistence of syrup; it is now redissolved in *distilled water,* the filtrate treated with solution of *diacetate of lead,* and the precipitate of *meconate of lead,* separated by filtration, and carefully preserved. A current of *sulphuretted hydrogen* is then passed through the solution, to precipitate excess of lead, and after again filtering it, the liquid is evaporated, at *first,* in a water bath, and afterwards, under the receiver of an air-pump. The shapeless mass of crystals thus obtained, present all the characters of morphia, if the substance examined contained opium. In the mean time the *precipitate* of *meconate of lead* is to be boiled with *water acidulated with sulphuric acid,* and the insoluble sulphate of lead separated by filtration; the filtered liquid, by evaporation, furnishes meconic acid, either under the form of crystals or an amorphous powder, the solution of which precipitates the *sesquisalts of iron* of a deep blood-red.

The following are additional tests to those already noticed:—

1. From the peculiar odour of opium, often perceptible when the drug has been taken only in very small quantities.

2. A solution containing crude opium is turned of a deep-red colour, or if coloured, it is turned of a reddish-brown, and is darkened, by tincture of sesquichloride of iron.

3. (M. Hare.) A portion of the *suspected liquid* is poured into a beakerglass, and a few drops of *solution of acetate of lead* are added to it; the whole is stirred frequently for 10 or 12 hours, and then allowed to settle, after which the supernatant liquid is decanted; 20 or 30 drops each of *dilute sulphuric acid* and *solution of sesquisulphate of iron*, are next poured on the precipitate (*meconate of lead*), when a deep and beautiful red colour will be developed, if the original liquid contained opium. This test is said to be so delicate as to detect "10 drops (? *laudanum*) in half a gallon of water."

4. (Dr. Rieget.) The *suspected substance* is mixed with some *potassa*, and is then agitated with *ether;* a strip of *white unsized paper* is next several times moistened with the solution, and when dry it is remoistened with *hydrochloric acid*, and exposed to the *steam of hot water*. The paper assumes a red colour, more or less deep, if opium is present.

Uses, &c. Opium is one of the most valuable substances employed in medicine. In small doses it acts as a powerful and diffusible stimulant; in somewhat larger ones it is narcotic; and in excessive doses, it proves an active narcotic poison. It is also anodyne, antispasmodic, diaphoretic, soporific, and sedative, its peculiar action being greatly modified by the dose and the condition of the patient. Its action as a stimulant is followed by sedative effects, which are, in general, much more marked than could be expected from the degree of previous excitement it induces. It is employed to fulfil a variety of indications,—to procure sleep, to lull pain, allay irritation, check morbid discharges, alleviate cough and spasm, &c., &c. It also, when judiciously administered, renders the body less susceptible of external impressions, as those of cold, contagion, &c.; but it is injurious when the pulse is high, the heat of the body above the natural standard, and the skin dry, or when there is a disposition to local inflammation or congestion. When applied externally, in the form of frictions, liniments, ointments, &c., it is absorbed, and produces similar effects to those produced by swallowing it, but in this way it requires to be used in larger quantities. *Dose.* As a stimulant, $\frac{1}{4}$ gr., every 2 or 3 hours; as an anodyne and antispasmodic, $\frac{1}{2}$ to 1 gr.; as a soporific, $\frac{1}{2}$ to 2 gr.; in violent spasms, neuralgia, acute rheumatism, &c., 2 to 4 gr., increased in delirium tremens, hydrophobia, mania, tetanus, &c., to several times that quantity, according to circumstances.

The *use* of *opium* as a *stimulant* and *intoxicant* is common among the nations of the East. The Turks chew it, and the Chinese smoke a watery extract of it, under the name of *Chundoo.* Of late years "*opium-eating*" and "*laudanum-taking*" have, unfortunately, been greatly on the increase in this country, and the employment of this drug as a soporific for infants and young children, has become so general amongst the poor and dissipated, as to call for the interference of the legislature. The *first effect* of *opium*, as a stimulant, is to excite the mental powers and to elevate those faculties proper to man; but its *habitual use* impairs the digestive organs, induces constipation, and gradually lessens the energy of both the mind and body. In excessive quantities it destroys the memory, induces fatuity, and a state of wretchedness and misery, which after a few years is cut short by a premature death. In this respect the effects of the excessive use of opium closely resemble those of fermented liquors. According to the testimony of Christison and Johnson, the one neither injures the health nor shortens life more than the other. Nor does the practice of *smoking opium* affect the health of the inhabitant of China, more than the practice of *smoking tobacco* does that of the phlegmatic Englishman. Mr. Smith states that "the health of the opulent Chinese, many of whom, within my own observation, have attained the age of 60, 70, or more, and are well known as habitual opium-smokers for more than 30 years, is little affected by it. The practice is most destructive to those who live in poverty, and who carry it to excess." (*China*, 1838.)

Pois.—*Symptoms.* Headache; drowsiness; stupor; frightful reveries; vertigo; contracted pupil (generally); scanty urine; pruritus or dry itching of the skin, often accompanied by a papular eruption; thirst; dryness of mouth and throat; weak and low pulse; vomiting; respiration, generally, natural. Sometimes the drowsiness or sleep is calm and peaceful. The *lesions* are trifling.—*Ant., &c.* Vomiting must be induced as soon as possible, by means of a strong emetic, and tickling the fauces. If this does not succeed the stomach-pump should be applied. The emetic may consist of ½ dr. of *sulphate of zinc* dissolved in ½ pint of *warm water*, of which one third should be taken at once, and the remainder at the rate of a wine-glassful, every 5 or 10 minutes, until vomiting commences. When there is much drowsiness or stupor, 1 or 2 fl. dr. of *tincture of capsicum* will be found a useful addition; or one of the formulæ for *emetic draughts* given at *page* 337 (especially No. 7) may be taken instead. *Infusion of galls*, *cinchona*, or *oak-bark*, should be freely administered before the emetic, and water soured with *vinegar* and *lemon juice*, *after* the stomach has been well-cleared out. To rouse the system, *spirit-and-water*, or *strong coffee*, may be given. To keep the sufferer awake rough friction should be applied to the skin, an upright posture preserved, and walking exercise enforced, if necessary. When this is ineffectual, cold water may be dashed over the chest, head, and spine, or mild shocks of electricity may be had recourse to. To allow the sufferer to sleep is to abandon him to destruction. Bleeding may be subsequently necessary in plethoric habits, or in threatened congestion. The costiveness that accompanies convalescence may be best met by aromatic aperients; and the general tone of the habit restored by stimulating tonics and the shower bath. The *smallest fatal dose* of *opium* in the case of an *adult*, within our recollection, was 4½ gr. Children are much more susceptible of the action of opium than of other medicines; and hence, the dose of it for them must be diminished considerably below that indicated by the common method of calculation depending on the age. See *Doses*, *&c.*

Concluding Remarks. Opium is a very complicated substance, and contains a number of alkaloids and other proximate vegetable principles, besides a certain portion of saline matter. The substances already detected in it, are *caoutchouc*, *codeia*, *fatty matter*, *lignine*, *meconic acid*, *meconine*, *morphia*, *narceine*, *narcotine*, *odorous matter*, *opianine*, *papaverine*, *porphyroxine*, *pseudomorphine*, *resin*, *saline matter*, *sulphuric acid*, *thebaine* or *paramorphine*, &c. It is doubtful, however, whether some of these substances are not generated from other principles existing in opium, during the processes adopted to obtain them. By contact with oxidizing agents, *narcotine* yields *cotarnine*, *hemipinic acid*, *opiammon*, *opianic acid*, &c., which are noticed in their alphabetical places.

According to Mulder, 100 parts of ordinary Smyrna opium contain:—

Morphia	10·842
Codeia	·678
Narcotine	6·808
Narceine	6·662
Meconine	·804
Meconic acid	5·154
Resin	3·582
Gummy matter	26·242
Mucus	19·086
Fatty matter	2·166
Caoutchouc	6·012
Water	9·846
Matter undetermined and loss	2·118
	100·

The sp. gr. of *Smyrna opium* is 1·336.

OPIUM (Accarie's Purified). *Infusion of opium*, digested with *powdered charcoal* for some days, then clarified with *white of egg*, and evaporated to an extract.

OPIUM (Baumé's Purified). Similar to *Homberg's opium.*

OPIUM (Cornette's Purified). Similar to the aqueous extract, Ph. L.

OPIUM (Cumin). From *hypecoum procumbens* (Linn.) or *horned wild cumin.* Narcotic.

OPIUM (Glasier's Prepared). *Infusion of opium* made with *may-dew*, filtered and evaporated.

OPIUM (Glauber's Prepared). *Opium*, 4 oz.; *spirit of salt*, 1½ oz.; (diluted with) *water*, 3 oz.; *cream of tartar*, 1 oz.; mix, and digest in *rectified spirit*, 1 quart; lastly, filter, and evaporate the tincture.

OPIUM (Homberg's Purified). *Opium* exhausted by repeated coction in 10 or 12 times its weight of *water*, and the mixed liquors evaporated to one third, and kept boiling for 2 or 3 days, adding *water* from time to time, then straining and evaporating to a pilular consistence.

OPIUM (Josse's Purified). Resembles *extract of opium*, Ph. L.

OPIUM (Launcelotte's Prepared). *Opium*, 1 ℔; *quince juice*, 1 gall.; *pure potassa*, 1 oz.; *sugar*, 4 oz.; ferment for some time, evaporate to a syrup, digest in *rectified spirit*, filter, and evaporate the tincture.

OPIUM (Lettuce). Lactucarium.

OPIUM (Neumann's). *Infusion of opium*, strained, mixed with a little *sugar*, and fermented for some months in a warm place; and, lastly, strained and evaporated to an extract, or preserved in the liquid form.

OPIUM (Powell's Purified). *Opium*, exhausted by coction with *water*, the residuum treated with *spirit of wine*, and the mixed *tincture* and *decoction* evaporated to an extract.

OPIUM (Purified). Syn. *Opium Purificatum*,—Lat. The purified opium of old pharmacy is now represented by the aqueous extract of the pharmacopœias. Formerly, *picked opium* beaten to a pilular consistence, with the addition of a little *water* or *proof spirit*, was called "*soft purified opium*" (*opium purificatum molle*); and *picked opium* dried in a water-bath until brittle enough for powdering, was called "*hard purified opium*" (*o. p. durum*).

OPIUM (Quercetan's). *Vinegar of opium* evaporated to an extract.

OPIUM (Strained). Syn. *Extractum Thebaicum, Opium Colatum, Opium Purificatum, Laudanum Opiatum*,—Obs. Lat. *Opium* dissolved or softened in an equal weight of *water*, pressed through canvass, and evaporated to the consistence of an extract. It is now superseded by the aqueous extract.

OPIUM (Torrefied). Syn. *Roasted Opium; Opium Torrefactum*,—Lat. *Opium*, dried, cut into thin slices, and roasted on an iron plate, at a low heat, as long as it emits vapours, care being taken not to burn it.

Obs. Most of the above preparations are now obsolete in this country. Those that are made with *cold water*, or by fermentation, are considered milder than crude opium, and, in this respect, to closely resemble "*black drop*."

OPODELDOC. See *Soap Liniment.*

OPODELDOC (Steer's). This differs from common opodeldoc chiefly in containing more soap.

Prep. 1. *White Castile soap* (cut very small), 2 *lb.; camphor*, 5 *oz.; oil of rosemary*, 1 *oz.: oil of origanum*, 2 *oz.; rectified spirit*, 1 gall.; mix, and digest in a *strong bottle* (closely corked), by the heat of a water-bath, until solution is complete; when the liquid has considerably cooled, add of *liquor of ammonia*, 11 *oz.;* and immediately put it into wide-mouthed bottles (Steer's), cork them close, and tie them over with bladder. Very fine, solid and transparent when cold.

2. *Soap*, 4 *oz.; camphor*, 1 *oz.; oils of rosemary* and *origanum*, of each, 1 *dr.; rectified spirit*, 1 pint; *liquor of ammonia*, 1½ *fl. oz.;* mix.

3. (Phil. Col. of Pharm.) *White soap*, 20 oz.; *camphor*, 8 oz.; *rectified spirit*, 6½ pints; dissolve, suffer the impurities to subside, add of *liquor of ammonia*, 4 fl. oz.; *oils of rosemary* and *horsemint* (monarda), of each, 1 fl. oz.; and pour it into phials, as before.

ORANGE. Syn. *Aurantium*,—Lat. The common *China* or *sweet orange* is the fruit of *citrus aurantium* (Risso). The *Seville* or *bitter orange* is produced by *citrus vulgaris* or *bigaradia* (Risso).

Oranges are probably about the most wholesome and useful of all the subacid fruits. Their *juice* differs from that of lemons chiefly in containing less citric acid and more sugar. In their general properties the two are nearly similar.

Factitious Orange-juice is made by dissolving *citric acid*, 1 *oz.*, and *carbonate of potassa*, 1 dr., in *water*, 1 quart, and digesting the solution on the *peel of half an orange*, until sufficiently flavoured; *Narbonne honey* or *white sugar* is then added to impart the necessary sweetness. Instead of orange peel, 5 or 6 drops of *oil* of *orange peel*, with ½ fl. oz. of *tincture of orange peel*, may be used.

Orange peel (*cortex aurantii*) is an agreeable stomachic, bitter tonic, especially useful as an adjunct to more active medicines. That ordered to be used in medicine is the exterior (yellow) "rind" of the "*citrus bigaradia*" or bitter orange, "dried in the months of February, March, or April." (Ph. L.) See *Candies, Infusions, Issue Peas, Oils* (Volatile), *&c.*

ORANGEADE. Syn. *Orange Sherbet.* From *oranges*, or *orange flavour*, in the same way as *lemonade* from lemons, &c.

ORANGE CHROME. *Prep.* 1. From a *solution* of *chromate of potash* and *diacetate of lead*, as chrome yellow.

2. From *chrome yellow* or *chromate of lead*, by acting on it with a *weak alkaline lye* until sufficiently darkened. *Used* as a pigment.

ORANGE DYES. These are produced from mixtures of red and yellow dyes in various proportions; or by passing the cloth, previously dyed yellow, through a weak red bath. A very good *fugitive orange* may be given with *annotta*, by passing the goods through a solution made with equal parts of *annotta* and *pearlash;* or still better, through a bath made of 1 part of *annotta*, dissolved in a *lye* of 1 part each of *lime* and *pearlash*, and 2 parts of *soda*. The shade may be REDDENED by passing the dyed goods through water acidulated with *vinegar, lemon-juice*, or *citric acid;* or through a *solution of alum*. The goods are sometimes passed through a weak *alum mordant* before immersion in the dye-bath. See *Annotta, Dyeing, &c.*

ORANGE RED. Syn. *Sandix.* From *white lead*, by calcination, in a nearly similar manner to that by which red lead is prepared from the protoxide. Brighter than red lead; *used* wholly as a pigment.

ORANGERY. The gallery, building, or enclosure in a garden, in which orange trees are preserved or cultivated, to shield them from the effects of the external winter, or to assist their growth by artificial heat.

ORCHARD. See *Cider.*

ORCEINE. Syn. *Lichen Lake, Orceic Acid.* A brownish-red powder, obtained by dissolving *orcine* in *liquor of ammonia*, exposing the solution to the air, and then precipitating with *dilute acetic acid.* It is nearly insoluble in water, but dissolves freely in solutions of ammonia and the fixed alkalies, with the production of a rich purple or violet colour. It probably constitutes the leading tinctorial ingredient in archil, cudbear, and litmus. (See *below.*)

ORCHIL. See *Archil.*

ORCINE. The colouring principle of *lichen dealbatus*, and of other tinctorial lichens, and the general product of the decomposition of the acids obtained from them under the influence of heat or the alkaline earths.

Prep. 1. The *powdered lichen* is treated with *boiling alcohol*, the tincture filtered whilst hot, and again after it has become cold; the alcohol is then removed by distillation, and the remainder evaporated to the consistence of a syrup; this is redissolved in *water*, and the solution is again filtered and evaporated to a syrup; it is then set aside some days, in a *cool place*, and the crystals of *orcine* which form are collected, and dried by pressure in bibulous paper. Impure.

2. *Lecanoric* or *orsellinic acid* (impure will do) is boiled in *baryta water*, and the excess of baryta is precipitated by *carbonic acid;* the filtered liquid is then evaporated to a small bulk, and set aside to crystallize, as before.

Prop., &c. Large, square, prismatic crystals; slightly yellowish; intensely sweet; very soluble in both water and alcohol; melt to a syrupy liquid, and then distil unchanged. Alkalies decompose it; when exposed to the air it gradually reddens. (See *above.*)

ORELLINE. The colouring matter of annotta. (See *p.* 68.)

ORES. The mineral bodies from which metals are obtained. The processes adopted for this purpose constitute *operative metallurgy;* those by which their value is determined, *mineral assaying.* The last only will be noticed here.

Assay. Three general methods are adopted for this purpose:—

1. (*Mechanical.*) This consists in *pulverizing* the *ore* by any convenient method, and expertly *washing* a *given weight* of it (say 1000 gr.) in a wooden bowl or capsule with *water*, so as to remove the *earthy gangues* from the denser and valuable metallic matter in such a way that none of the latter may be lost. This is the common plan adopted with *auriferous sands*, the *ores of tin* after they have passed the stamping mill, *galena, gray antimony, &c.*, and may either be employed as an independent process, or merely as preparatory to more exact investigations. When *galena* is thus tested, the product is a nearly pure sulphuret of lead, of which every grain is equivalent to 0·8666 of METALLIC LEAD, the rest being SULPHUR. The results with *gray antimony ore* are still more direct, since the product is only melted into pigs before being sent to market. In this state it contains 73% (nearly) of METALLIC ANTIMONY.

2. (*Humid.*) Assays in the humid way are true chemical analyses, and are described under the head "*Estim.*" attached to most of the more important minerals noticed in this work. This plan offers greater facilities and gives more accurate results than either of the other methods.

3. (*Dry.*) Of the methods of *assay* in the "*dry way,*" the following are the most accurate, generally useful, and easily applied:—

a. (Dr. Abiche.) The *mineral* is reduced to powder, and mixed with 5 or 6 times its weight of *carbonate of baryta*, also in powder; this mixture is fused at a white heat in a platinum crucible, and the resulting slag, after being powdered, is exhausted with *hydrochloric acid.* This process answers well with both stony and metallic minerals, the most refractory of which give way under this treatment.

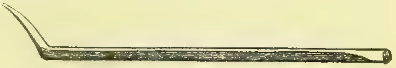
b. (Liebig.) Into a crucible containing *commercial cyanide of potassium*, a *weighed quantity* of the *ore*, in the state of fine powder, is sprinkled, when the *metallic oxides* and *sulphurets* which it contains are almost immediately reduced to the metallic state, and may be separated from the scoria by edulcoration with water. With the *oxides* and *sulphurets of antimony* and *tin*, this reduction occurs at a dull red heat; with the compounds of *copper* it occurs with the disengagement of light and heat; but an *ore of iron* requires to be mixed with a little *carbonate of potassa* or of *soda* before throwing it into the fused cyanide, and to be then submitted to a full-red heat for a short time, before it is reduced to the reguline state. In this case, any *manganese* present in the ore of iron is left under the form of protoxide. A mixture of about equal parts of *dry carbonate of soda* and *cyanide of potassium* answers better for the crucible than the cyanide alone. See *Alloys*, *Metallurgy*, *Testing*, *&c.*

ORGANIC BASES. See *Alkaloid.*

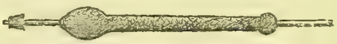
ORGANIC BASES (Artificial). These are numerous, and when of practical interest are noticed under their respective names. See *Amylamine*, *Aniline*, *Ethylamine*, *Methylamine*, *&c.*

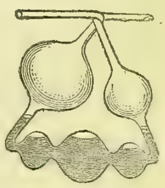
ORGANIC SUBSTANCES. We have reserved a notice of the methods of *estimating* the quantity of *carbon*, *hydrogen*, *oxygen*, and *nitrogen*, in organic compounds until now, in order to present them to the reader in a more useful and connected form. The operation essentially consists, in respect of the first three, in causing the complete combustion of a known quantity of the substance under examination, in such a manner, that the *carbonic acid* and *water* thus produced, shall be collected and their quantity determined. From these the proportions of their elements are easily calculated. The *estimation* of the *quantity* of *nitrogen*, (as is also the case with *chlorine*, phosphorus, sulphur, &c.,) requires a separate operation. The two great classes of organic bodies (*azotized* and *non-azotized*) are readily *distinguished* from *each other* by heating a small portion with some solid *hydrate of potassa*, in a test tube. If nitrogen is present, it is converted into ammonia, which may be recognized by its characteristic odour, and its alkaline reaction.

1. *Estimation* of the *carbon*, *hydrogen*, and *oxygen*.—*a*. The method of Prof. Liebig, now almost exclusively adopted for this purpose, is as follows:—The *substance under examination*, reduced to powder, is rendered as *dry* as possible either by the heat of a *water bath*, or by exposure over *concentrated sulphuric acid*, *in vacuo*; 5 or 6 gr. of it are then weighed in a narrow open test tube, 2 or 3 inches long, and to ensure accuracy, this tube and any little adhering matter is again weighed after its contents have been removed—the *difference* between the *two weights* being regarded as the *true quantity* of the substance employed in the experiment. A "*combustion tube*" of hard white Bohemian glass (0·4 to 0·5 inch *diam.*; 14 to 18 inches *long*) is next taken, and about 2-3ds filled with *protoxide of copper*, prepared by the ignition of the nitrate, and which has been just reheated to expel hygrometric moisture. Nearly the whole of this oxide, whilst still warm, is then gradually poured from the tube and triturated with the *organic sample* in a *dry* and *warm mortar*, after which it is transferred to the combustion tube, and the mortar being rinsed out with a little *fresh protoxide*, which is added to the rest, the tube is, lastly, nearly filled with some *warm protoxide* fresh from the crucible. The contents of the tube are next arranged in a proper position by a few *gentle* blows, so as to leave a small passage for the evolved gases from the one end of the tube to the other. (See *Engr.*)

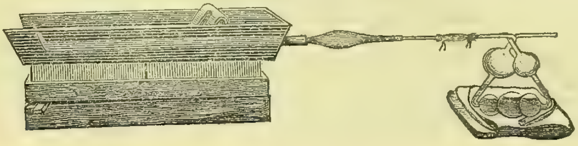


The "*combustion tube*" with its "charge" is next placed in a *furnace* or *chauffer* of thin sheet iron, similar to that figured at *page* 549. Its *open end* is then connected with *another tube* filled with *fragments* of *fused chloride of calcium*, and carefully weighed.





This tube is, in its turn connected with a small glass *bulb apparatus*, containing *solution* of *pure potassa* of the sp. gr. 1·27, also carefully weighed. The junction with the *first* is made by means of a perforated cork; that with the *second*, by means of a small tube of Indian rubber tied with silk, the whole being being made *quite air-tight.* The apparatus is then tested by sucking a few bubbles through the liquid with the *dry* lips, when if the level of the solution of potassa in the two legs continues *unequal* for some minutes, the joints are regarded as perfect. The whole arrangement being complete (See *engr.*), *burning charcoal* is now



placed in the furnace, around the *front* part of the combustion tube, and when this has become red-hot, the screen is slowly moved back, and more burning charcoal is added, until the furthest extremity of the tube has been exposed to its action. The *firing* is so regulated that the gas enters the potassa apparatus in bubbles easily counted, without any violence or inconvenience; and it is kept up as long as gas is extricated. As soon as the operation is complete, and the *slightest* retrograde action is observed, the charcoal is removed from the combustion tube, and the extreme point of this last is broken off. A *little air* is then sucked through the apparatus in order to seize on any remaining carbonic acid gas and moisture. The *potash apparatus* and the *chloride of calcium tube*, are, lastly, detached, and again *accurately weighed.* The *increase* in the *weight* of the *first* gives the *weight* of the CARBONIC ACID formed during the combustion; that of the *second*, the *weight* of the WATER.

			Gr.		Gr.	
1 gr. of	*Carbonic acid*	=	0·27273	of *Carbon*	+ 0·72727	of *Oxygen.*
1 „	*Water*	=	0·11112	„ *Hydrogen*	+ 0·88888	„
2	. . less . . .		0·38385	. . equal to	1·61615	„

The numbers equivalent to any given number of grains, found as above, are converted into the proportions *per cent.* by simply *dividing* them by the weight of the organic substance which has been employed in the experiment, and moving the decimal point of the result two figures to the right.

b. In applying the preceding method to *volatile liquids* it is necessary to enclose them in a *small bulb* with a narrow neck, instead of mixing them directly with the protoxide of copper. The bulb with its contents is introduced into the combustion tube, and after some 6 or 8 inches of the protoxide is heated to redness, a hot coal is applied near where the bulb is situated, so that the liquid which it contains may be slowly volatilized and passed through the heated mass in the state of vapour, and be thus completely burned.

2. *Estimation* of the *Nitrogen.*—*a.* Several methods are employed for this purpose, but the only one of general application, and adapted to the non-scientific operator, is that of MM. Varrentrap and Will, described under "*Guano*" (*p.* 548-9). To ensure correct results the *caustic soda* must be pure, and the *lime* of good quality and well-burnt. The last, having been properly slaked with a *little water* holding the former in solution, the mixture is thoroughly dried in an iron vessel, and then heated to full redness in an earthen crucible. The ignited mass is rubbed to powder in a warm dry mortar, and either used at once, or carefully preserved from the air. The best quantity of the organic substance to operate on, is, in this case, about 10 gr., which must be dried, and accurately weighed with the usual precautions. Bodies *very rich* in either *nitrogen* or *hydrogen* are best mixed with about an equal weight of *pure sugar* before triturating them with the *soda-lime.* MM. Varrentrap and Will weigh the nitrogen under the form of *ammonio-chloride of platinum*, dried at 212° Fahr. This salt contains 6·272% of NITROGEN.

b. M. Péligot has modified the preceding plan by conducting the gaseous matter extricated during the operation into a three-bulb tube charged with a standard *solution of sulphuric acid.* This he subsequently pours into a beaker glass, and after *tinging* it with a *single* drop of *tincture of litmus*, he tests it with either a standard *aqueous solution of soda*, or one of *lime in sweetened water*, after the common method of *alkalimetry.* The *difference* between the *saturating power* of the *acid* in its *normal* condition, and after its *exposure in the condenser*, indicates the amount of ammonia formed. (See *p.* 548.) Each grain of *ammonia* contains 0·82353 gr. of NITROGEN.

Concluding Remarks. The successful application of the above processes requires considerable care and some aptitude in manipulating, as well as the employment of a very delicate balance for determining the weights. A greater error in the weighings than the $\frac{1}{250}$ gr. cannot be tolerated when exact results are desired. The method of MM. Varrentrap and Will for the determination of nitrogen answers admirably for all organic compounds containing it, except those in which it exists under the form of hyponitrous, nitrous, and nitric acids; for which, however, it is not required. When extreme accuracy is aimed at, the atmospheric air in the apparatus, and that absorbed during the preliminary operations by the substances employed, must be expelled before the application of heat to the combustion tube.

ORGEAT. See *Syrups* and *Pastes.*

ORIENTAL RUSMA. See *Hair Dyes.*

OR-MOLU. This name is given to gold-coloured brass or bronze, so finished off as to have the appearance of gold, or of being gilt; but it is often applied in a more general sense. The French more particularly excel in working in or-molu, and the products of this branch of their industry hold an important position in the art manufactures of France.

To give *or-molu* its richest appearance "it is not unfrequently *brightened* up after '*dipping*' (that is cleaning in acid) by means of a *scratch-brush* (a brush made of very fine brass-wire,) the action of which helps to produce a very brilliant gold-like surface. It is protected from tarnish by the application of lacquer." (*Dict. Arts, Man. and Mines.*)

ORMSKIRK MEDICINE. So named after the residence of its inventor, Mr. Hill, of Ormskirk. It is said to have consisted of the ingredients named below, but nothing certain is known on the subject, as the inventor died without revealing his secret:—*Chalk*, ½ oz.; *Armenian bole*, 3 dr.; *elecampane root*, 1 dr.; *alum*, 10 gr.; *oil of aniseed*, 5 or 6 drops; all in fine powder. For a *dose*, to be taken for 6 successive mornings, in a glass of weak *milk-and-water*.

ORPIMENT. Native yellow sulphuret of arsenic. The finest samples used by artists (*golden orpiment*) come from Persia. See *Tersulphuret of Arsenic*.

ORRIS. Syn. *Orris Root*, *Florentine do.*; *Radix Iridis*,—Lat. The *dried rhizoma* of *iris Florentina* (Linn.) Sialogogue, irritant, subacrid, and errhine. Chiefly employed to impart a violet odour to oils, tooth powder, snuffs, spirits, &c.; and when cut into *peas*, to keep open issues.

ORSEDEW. Dutch leaf-gold.

ORSELLIC ACID. Two compounds pass under this name,—*Alphaorsellic acid* (see *p.* 50), and *betaorsellic acid*. They closely resemble each other, and are obtained in a similar manner; the *first* from the South American variety of *roccella tinctoria*; the *last* from that grown at the Cape.

ORSELLINIC ACID. Syn. *Lecanoric Acid*, *Lecanorine*. A compound formed along with *picro-erythrine*, by boiling *erythric acid* for some time with *water*. It is also formed by boiling *alphaorsellic acid* with *water*. In both cases, if the ebullition is too long continued, the new acid is wholly or in part converted into *orcine*.

Prop., *&c.* Crystallizable; bitter-tasted; soluble in water; its aqueous solution by exposure to the air assumes a beautiful purple colour.

ORTHOPÆDIA. See *Surgery* (Popular and Orthopædic).

OSMAMIC ACID. See *Osmic Acid*.

OSMAZOME. The substance on which the peculiar odour and flavour of boiled meat and broth was formerly supposed to depend.

Prep. From *lean meat*, minced, and digested in *cold water*, with occasional pressure; the filtered infusion is gently evaporated nearly to dryness, and then treated with *alcohol*; the alcoholic tincture is, lastly, evaporated. The *product* has a brownish-yellow colour, is soluble in water, and its aqueous solution is precipitated by infusion of galls and the mineral astringent salts.

OSMIC ACID. Syn. *Peroxide of Osmium*. This is obtained from *osmium*, in small fragments, heated in a current of *pure oxygen*. It condenses in the cooler portion of the tube, under the form of colourless, transparent crystals.

Prop., *&c.* Odour and vapour offensive and highly acrid; slightly soluble in water; melts at 165°, and boils below 212° Fahr.; nearly all the metals precipitate it from its solutions, as metallic osmium; its salts are called *osmates*; ammonia converts it into *osmamic* or *osman-osmic acid*.

OSMIOUS ACID. Syn. *Teroxide of Osmium*. Formed by adding *alcohol* to a *solution of osmate of potassa*, when a rose-coloured precipitate of *osmite of potassa* subsides. The acid has never been isolated.

OSMIUM. A rare metal found associated with the ores of platinum by M. Tennant, in 1803.

Prep. See *Iridium*.

Prop., *&c.* Bluish white; somewhat brittle; easily powdered; neither fusible nor volatile; heated to full redness in the air it inflames, with the production of *osmic acid*, which volatilizes; its powder, when digested in nitric acid, is slowly oxidized; fused with nitre, *osmate of potassa* is obtained. Sp. gr. (greatest), 10.

Osmium forms 5 *compounds* with oxygen. —*Protoxide of osmium*, a dark-green powder which falls, along with a little alkali, when *liquor of potassa* is added to a solution of the double protochloride of osmium and potassium.—*Sesquioxide of osmium*, a black powder formed by the deoxidation of osmate of ammonia by heating its solution along with potassa. It always contains ammonia and fulminates when heated. Both the above are feebly soluble in acids.—*Binoxide of osmium*, a black, insoluble powder, obtained by heating a mixture of carbonate of soda and the double bichloride of osmium and potassium.—*Teroxide of osmium*, see *Osmious acid*.—*Peroxide of osmium*, see *Osmic acid*.

The *principal compounds* of *osmium* with *chlorine* are—*Protochloride of osmium*, a dark green, imperfectly crystalline substance, formed by gently heating osmium in chlorine gas. It is soluble; but a large quantity of water decomposes it.—*Sesquichloride of osmium*, formed when the sesquioxide is dissolved in hypochloride acid. It has not been obtained in the solid state.—*Bichloride of osmium* (*bichloride of osmium and potassium*), red octahedral crystals, obtained by strongly heating a mixture of chloride of potassium, sesquichloride of osmium, and metallic osmium, in chlorine gas.

Osmium combines with *phosphorus* and *sulphur*, forming *phosphurets* and *sulphurets*, but these compounds possess little interest.

OSTEOCOLLA. A rough sort of glue or gelatine obtained from bones by digestion in *dilute hydrochloric acid*, to remove their earthy matter, and afterwards acting on the residuum with *water* at a high temperature, until it is wholly dissolved.

OSTEODENTINE. The substance found in the central portion of the *tooth* of the *cachalot* and of some other cetaceans. It partakes of the properties of both bone and dentine.

OTALGIA. See *Ear-ache*.

OTTO OF ROSES. See *Oils* (Volatile).

OURARI. See *Woorari*.

OVALBUMEN. White of egg; to distinguish it from *seralbumen*, or the albumen of the serum of the blood.

OVENS. A very ingenious and useful improvement in the apparatus for baking has been recently made by Mr. Sclater, of Carlisle. It consists in causing the articles to be baked, to *traverse* a *heated earthenware tube*. This tube forms the oven. It is of considerable length, and the biscuits or other articles are slowly traversed through it, from end to end, at such a rate as will allow of the baking being completed during the passage. The *biscuits* are carried on trays, set on travelling chains; or the trays are made into an endless web or chain. The oven is thus entirely self-acting, and the articles demand no attention whatever from the attendants, whilst the system combines superior economy with the best results. A *pyrometer*, or heat indicator, is attached externally, so that the attendant can regulate the heat with great facility. The object of these improvements is to *reduce* the *cost of baking*, and to *improve* the *appearance* of the baked articles. The apparatus is applicable as well to the baking of articles of *clay* or *earthenware*, as to *bread* or *biscuits*.

Of the ovens now in common use by the bakers, that known as the "*Hot-water Oven*" is undoubtedly the best; not merely in reference to economy, but also with reference to its superior cleanliness, and the ease with which the articles operated on may be turned out of that delicate yellowish-brown tint for which the bread of the Viennese and Parisian bakers is so celebrated. See *Baking*, *Bread*, *Roasting*, *&c.*

OX. The *bos taurus* (Linn.), one of the ruminantia. In its more limited sense the word is restricted to the emasculated animal. The *flesh*, *milk*, *skin*, *horns*, *bones*, and *blood* of this animal are all serviceable to man. *Goldbeater's skin* is prepared from the peritoneal membrane of its cæcum. Its blood, fat, horns, and excrement were among the simples of the Ph. L. 1618. See *Beef*, *Milk*, *&c.*

OXALAMIDE. See *Oxamide*.

OXALATE. Syn. *Oxalas*, — Lat. A salt of oxalic acid. The *soluble oxalates* are easily formed by directly neutralizing a solution of *oxalic acid* with the *hydrate*, *carbonate*, or *oxide* of the base; and the *insoluble oxalates*, by double decomposition. See *Oxalic Acid* and the *respective bases*.

OXALHYDRIC ACID. See *Saccharic Acid*.

OXALIC ACID. Syn. *Acidum Oxalicum*, — Lat. *Saccharine Acid*, *Acid of Sugar*, — Obs. This substance was discovered by Bergman, in 1776. It occurs both in the mineral and organic kingdoms, and is produced artificially by the action of nitric acid on sugar, starch, woody fibre, &c. It abounds in wood-sorrel, in which it exists in combination with a little potassa. With the exception of gum and sugar of milk, all starchy and saccharine substances yield oxalic acid when treated with nitric acid at a somewhat elevated temperature.

Prep. 1. *Nitric acid* (sp. gr. 1·42), 5 parts, diluted with *water*, 10 parts, is poured on *sugar*, or, preferably, *potato starch*, 1 part, and the mixture is digested at a gentle heat, as long as gaseous products are evolved; the liquid is then concentrated by evaporation until it deposits crystals on cooling; the crystals, after being drained and freed from superfluous moisture, are redissolved in the smallest possible quantity of *boiling water*, and the solution is set aside to crystallize. The *residuary mother-water*, which consists principally of malic acid (?) with some oxalic and nitric acid, is treated with a little fresh *nitric acid* (say 1½ part) at a gentle heat, after which it is evaporated, as before, for a second crop of crystals. This process is repeated until the solution is exhausted. The brownish-coloured crystals thus obtained, are allowed to effloresce by exposure to *dry air*, and are then redissolved and recrystallized. By repeating this treatment they yield pure colourless *oxalic acid* at the third crystallization. The above method has received the sanction of Liebig, and is probably the best that can be devised.

2. (Schlesinger.) *Sugar* (dried at 257° Fahr.), 4 parts, and *nitric acid* (sp. gr. 1·38), 33 parts, are digested together, as before, and as soon as the evolution of gas ceases, the liquid is boiled down to *one sixth* of its original volume, and set aside to crystallize. The whole process may be completed in about 2 hours, and in 1 vessel, and yields of beautifully crystallized oxalic acid, at the first crystallization, a quantity equal to 56 to 60$\frac{0}{0}$ of the weight of the sugar employed.

3. (Ure.) *Nitric acid* (sp.gr. 1·4), 4 parts, and *sugar*, 1 part, are digested together by the heat of a water bath, and as soon as gas ceases to be extricated, the vessel is removed from the heat, and set aside to cool and crystallize. "The use of a little *sulphuric acid* along with the nitric acid contributes to increase the product."

4. (From *Formic acid*,—Jullion.) The *formic acid* is first exactly neutralized with *liquor of potassa* (or of *soda*), after which a second quantity of *liquor of potassa*, equal to *one half* of that already used, is added; the liquid is then evaporated to dryness, and the solid residuum of the evaporation is heated to 560° Fahr.; the calcined matter (*oxalate of potassa* or *soda*) is next treated with *sulphuret of barium*, *hydrate of baryta*, or any *soluble salt* of *baryta*, so as to convert it into *oxalate of baryta*, which falls as a precipitate; from the last salt pure oxalic acid is obtained by the action of *dilute sulphuric acid* in equivalent proportions. (Vide *Specification.*)

5. (From *Potato* or *dextrine sugar*,—Nyren.) From the washed *pulp of potatoes*, boiled for some hours with *water*, q. s., in a *leaden vessel* with about 2$\frac{0}{0}$ of *oil of vitriol*, until the fecula of the pulp is converted into saccharine matter, shown by the liquid being no longer turned blue by iodine: the whole is then filtered through horse-hair bags or strainers, and the filtrate is evaporated until its density is such that a gallon of it weighs 14 to 14½ *lb.;* in this state it is converted into *oxalic acid*, by treatment with *nitric acid* in the way already described. A similar process has been patented by Messrs. Davy, Macmurdo, and Co.

6. (From *Uric acid*,—Dr. Wilton Turner.) *Uric acid* (from guano) is placed in an open cylindrical iron vessel capable of holding fully three times the quantity, and heated by steam; strong but clear *lime water* is then poured in, and as soon as it boils briskly, *peroxide of lead* is added in successive portions as long as it is whitened by the boiling liquid; the supernatant liquor is next drawn off from the white heavy sediment (*oxalate of lead*), which, after being washed with *water*, is decomposed by boiling it in a mixture of *hydrochloric acid* and *water*, equal parts; the resulting liquid contains the *oxalic acid*, which is obtained by evaporation; the sediment is *chloride of lead.* The liquor decanted from the oxalate of lead contains *allantoine.* By boiling it with *caustic alkali*, this substance is converted into *oxalic acid*, which remains in the liquor, and into ammonia, which escapes during the ebullition. 10 parts of peroxide of lead are required for the conversion of 7 parts of uric acid. An equivalent of *binoxide of manganese* may be substituted for the oxide of lead. *Patent.*

Prop., *&c.* Colourless, transparent, prismatic crystals, possessing a powerfully sour taste and acid reaction; these effloresce in warm dry air, with loss of 28$\frac{0}{0}$ (2 eq.) of water, and then form a white powder, which may be sublimed, in part, without decomposition; the crystals are soluble in 8 parts of water (9 parts, "and form a solution of sp. gr. 1·045,"—Ure) at 60° Fahr., in their own weight or less of boiling water, and in about 4 parts of alcohol; with the acids it forms salts called *oxalates.*

Tests.—1. Solution of chloride of barium occasions a white precipitate in neutral solutions of oxalic acid (oxalates), which is soluble in both nitric and hydrochloric acid.—2. Solution of nitrate of silver, under like circumstances, gives a white precipitate which is soluble in nitric acid, and in ammonia, and which, when heated to redness, yields pure silver.—3. Lime water and solutions of all the soluble salts of lime produce white precipitates, even in highly dilute solutions of oxalic acid or of the oxalates, which is freely soluble in both nitric and hydrochloric acid, but is nearly insoluble in either acetic or oxalic acid, and is converted into carbonate of lime upon ignition.—4. Oxalic acid (or an oxalate) when heated, in the dry state, with oil of vitriol in excess, is converted into carbonic acid and carbonic oxide, which escape, and when kindled, burn with a faint blue flame, whilst the residual sulphuric acid continues colourless, if the substance operated on is free from organic matter. Of the above tests, solution of sulphate of lime (vide No. 3) is the most delicate and characteristic.—5. It is *distinguished* from *Epsom salt* by its acid reaction, its solubility in rectified spirit, its complete dissipation by heat, and by emitting a slight crackling noise during its solution in water. See *Magnesia* (Sulphate).

Uses, &c. Oxalic acid is chiefly used in the arts of calico printing and bleaching; to remove ink-spots and iron-moulds from linen, and to clean boot-tops. It is extremely *poisonous.* The *treatment* in cases of its having been swallowed, is to promote *vomiting*, and to administer *chalk*, *whiting*, or *magnesia*, mixed up with water, in considerable quantities. The use of the alkalies or their carbonates must be avoided, as the compounds which these form with oxalic acid are nearly as poisonous as the acid itself. The remaining treatment is noticed under *Acids.* In poisoning by oxalic acid, the nervous system is almost always affected, and the patients experience numbness, formication of the extremities, and sometimes convulsions, so that the symptoms somewhat approach those produced by strychnine, from which it is distinguished by its corrosive action on the tissues, and its effect upon the heart and circulatory system.

Concluding Remarks. The manufacture of oxalic acid is an important one. On the *large scale*, the first part of the process is either conducted in salt-glazed stoneware pipkins of the capacity of 3 to 5 quarts each, (which are about two thirds filled and set in a water bath), or in wooden troughs lined with lead, and heated by means of a coil of steam pipe. On the *small scale*, a glass retort or capsule is commonly employed. The most appropriate temperature appears to be about 125° Fahr., and the best evidence of the satisfactory progress of the decomposition, is the free but not violent evolution of gas, without the appearance of dense red fumes, or, at all events, any marked quantity of them. When these are disengaged with violence and rapidity, a greater quantity of the newly formed acid suffers decomposition, and flies off in a gaseous form. The sp. gr. of the nitric acid commonly used on the large scale, ranges from 1·22 to 1·27, equivalent quantities being taken. The evaporation is preferably conducted by the heat of steam. The evolved nitrous vapours (*nitric oxide*) are usually allowed to escape, but this loss may be in part avoided by conveying them into a chamber filled with *cold damp air*, and containing a *little water*, when they will absorb oxygen, and be recondensed into fuming nitric acid. Various modifications of this plan have been patented. That of Messrs. McDougall and Rawson, which is one of the simplest and best, consists in passing the mixed nitrous fumes, through a series of vessels containing water, and connected together by tubes, so that the fumes which collect at the top of one vessel are conveyed to nearly the bottom of the next one, and then bubbling up through the water, mix with the air, a supply of which is provided for the purpose. The nitrous fumes are thus brought alternately into contact with air and water, and by the time they reach the last vessel, are re-converted into nitric acid. *Another plan* is to pass the mixed nitrous vapours through a vessel stuffed with some porous substance, as pumice-stone or pounded glass, conjointly with a supply of steam from a boiler, and a supply of oxygen by a blowing machine.

The *products* obtained by skilful manipulation are—from *good dry sugar*, 128%; from *good treacle*, 107%.—"*One cwt.* of *good treacle* will yield about 116 *lb.* of marketable oxalic acid, and the *same weight* of *good brown sugar* may be calculated to produce about 140 *lb.* of acid." "As a general rule, 5 *cwt.* of *saltpetre*, or an equivalent of nitrate of soda, with 2½ *cwt.* of *sulphuric acid*, will generate sufficient nitric acid to decompose 1 *cwt.* of *good sugar*, and yield, as above, 140 *lb.* of fair marketable *oxalic acid*, free from superfluous moisture." (Ure.) On the *small scale*, 5 parts of *sugar* yield nearly 6 parts of *crystallized acid.*

Chemically pure oxalic acid is best prepared by precipitating a *solution* of *binoxalate of potassa* with a *solution* of *acetate of lead*, washing the precipitate with water, decomposing it, whilst still moist, with *dilute sulphuric acid* or *sulphuretted hydrogen*, and gently evaporating the *filtrate* so that crystals may form as it cools.

OXALME. The old name of a mixture of *salt* and *vinegar*, formerly employed in medicine.

OXALOVINIC ACID. *Prep.* An *alcoholic solution of caustic potassa* is added to a solution of *oxalic ether* in *anhydrous alcohol* in quantity sufficient to neutralize *one half* only of the oxalic acid present; the crystalline scales (*oxalovinate of potassa*) which precipitate, are dissolved in *very dilute alcohol*, and decomposed by *hydro-*

fluosilicic acid. It is a sour liquid, possessing little stability.

OXALURIC ACID. A new acid discovered by Wöhler and Liebig. It is obtained by heating a *solution of parabanic acid* with *ammonia,* decomposing a hot saturated solution of the resulting *oxalurate of ammonia* with *dilute sulphuric acid,* and rapidly cooling the liquid, when *oxaluric acid* falls as a white crystalline powder. It possesses an acid taste and reaction, and forms salts (*oxalurates*) with the *bases;* its solution is resolved by ebullition into free oxalic acid and oxalate of urea.

OXALYLE. The hypothetical radical of oxalic acid.

OXAMETHANE. Syn. *Etheroxamide, Oxalate of Ether and Oxamide.* A colourless crystalline substance, prepared by dissolving *oxalic ether* in *alcohol,* and gradually adding *alcohol saturated with dry ammoniacal gas,* until a white powder begins to fall, when after some hours the solution is filtered, evaporated, and crystallized. Soluble in water, fusible, and volatile.

OXAMETHYLANE. Syn. *Oxamate of Methyle.* A white, solid substance formed when *oxalate of oxide of methyle* (methylo-oxalic ether) is treated with *dry ammoniacal gas.* It may be obtained in pearly cubic crystals from its alcoholic solution.

OXAMIC ACID. A substance obtained, along with other products, when *binoxalate of ammonia* is heated by means of an oil bath to about 450° Fahr. It forms salts (*oxamates*) with the bases; those with lime and baryta are soluble; when heated in contact with alkalies and oil of vitriol it suffers decomposition.

OXAMIDE. Syn. *Oxalamide.* A snow-white, tasteless, crystalline powder, obtained during the destructive distillation of *oxalate of ammonia.* It is insoluble in either water or alcohol, and is chiefly interesting as forming the type of a large class of bodies of a precisely similar constitution, containing the elements of an ammoniacal salt, less those of water.

OXANILIDE and *Oxanilic Acid.* Names occasionally applied to the neutral and acid oxalates of ammonia.

OX-GALL. Syn. *Ox-bile; Fel Bovinum, F. Bovis, F. Tauri,*—Lat. Crude ox-gall is noticed at *page* 502. *Refined ox-gall* (fel bovinum purification) is prepared as under:—

1. *Fresh ox-gall* is allowed to repose for 12 or 15 hours, after which the clear portion is decanted, and evaporated to the consistence of a thick syrup by the heat of a water bath; it is then spread *thinly* on a dish, and exposed in a warm situation near the fire, or to a current of dry air, until nearly dry; it is, lastly, put into wide-mouthed bottles or pots, and carefully tied over with bladder. In this state it will keep for years in a cool situation. *For use,* a little is dissolved in water.

2. *Fresh gall,* 1 pint; boil, skim, add *powdered alum,* 1 *oz.;* boil again, until the alum is dissolved, and when sufficiently cool, pour it into a bottle, and loosely cork it down. In a similar manner boil and skim *another pint* of *gall,* add to it 1 *oz.* of *common salt,* and again boil, cool, and bottle it, as above. In *three months* decant the *clear* from both bottles, and mix them in equal quantities; the clear portion must then be separated from the coagulum by subsidence or filtration.

Uses, &c. Both the above are employed by artists to fix chalk and pencil drawings before tinting them, and to remove the greasiness from ivory, tracing paper, &c. The *first* is also used in medicine.

OXIDATION. Syn. *Oxydation.* The combination of bodies with oxygen forming oxides; the operation or process adopted to induce or facilitate such conversion. See the *respective oxides, Oxygenation, &c.*

OXIDE. Syn. *Oxyde; Oxydum,*—Lat. A compound formed by the direct union of oxygen with another body, and which does not exhibit acid qualities. The leading characteristic of the oxides (*oxyda*) is their basic property, or power of forming salts with the acids. Some, however, are almost neutral, and exhibit little disposition to enter into such combinations. *Potassa, soda, lime, litharge,* and *rust of iron,* which are respectively direct compounds of the metals *potassium, sodium, calcium, lead,* and *iron* with *oxygen,* may be taken as examples of the BASIC OXIDES; and *black oxide of manganese,* as an example of the NEUTRAL or *indifferent ones.* Formerly, the term *oxide* was for the most part restricted to the compounds of oxygen with the metals; but at the present time it is extended to other bodies possessing a similar constitution and behaviour. Thus, we have *oxide of ethyle* (ether), *oxide of amyle* (amyl-ether), &c. In a *general sense,* or for theoretical purposes, all direct compounds of oxygen are occasionally termed oxides. Thus, *benzoic acid* is said to be an oxide of benzoyle, and *hypochloric acid* a peroxide of chlorine.

The *nomenclature* of the *oxides* resembles that adapted for other compound bodies.

The terms *oxide* or *protoxide*, *sesquioxide*, *binoxide*, *teroxide*, &c., denote that the *oxygen* is in the ratio to the metal of 1 to 1,—1½ to 1 or 3 to 2,—2 to 1,—3 to 1, &c. The Greek numerals *dis*, *tris*, *tetrahis*, &c., are prefixed in a similar way, to denote oxides formed of 1 equivalent of *oxygen* with 2, 3, or more equivalents of metal. *More complex ratios* are denoted by a fraction, the numerator of which represents the eq. of oxygen, and the denominator the eq. of metal. The terminations *-ous* and *-ic* are occasionally employed in a similar manner to that noticed under "*acids*," the former being applied to the lower, and the latter to the higher state of oxidizement; as *cuprous oxide*, *cupric do.*, *ferrous oxide*, *ferric do.*, applied to the respective oxides of copper and iron. Oxides containing less than 1 eq. of *oxygen* to 1 eq. of *metal* are commonly called *suboxides*. See *Nomenclature, &c.*

OXIODIC ACID. See *Iodic Acid.*

OXIODINE. See *Iodic Acid.*

OXYCHLORIDE. Syn. *Oxichloride; Oxychloridum*,—Lat. A term often loosely applied to compounds of an oxide and chloride, whether in definite or variable proportions. They are also frequently called *subchlorides* or *submuriates*. See *Oxychlorides of Antimony, Lead, &c.*

OXYCRATE. Syn. *Oxycratum*,—Lat. The old name of a mixture of *vinegar* and *water*, dulcified with *honey*.

OXYCROCEUM. See *Plasters.*

OXYFLUORIDES. Double compounds of fluorides and oxides. They possess no practical importance.

OXYGEN. Syn. *Oxygen Gas; Oxygenium*,—Lat. *Dephlogisticated Air*, *Empyreal do.*, *Vital do.*,—Obs. var. An important elementary body discovered by Scheele and Priestley, in 1774. It is remarkable, that although this substance forms a large proportion of our atmosphere, and confers upon it the power of supporting respiration and combustion, and also constitutes the principal portion of the water of our rivers and seas, and enters largely into the composition of the majority of the various mineral bodies that form the bulk of our globe, its existence should have remained unsuspected, or at least undetermined, until a recent date. Even now, our utmost skill fails to obtain it in an absolutely isolated form distinctly perceptible to the human senses. Nature never presents it solitary; and even in combination, whether gaseous, liquid, or solid, we know it only by its effects. The *oxygen gas* of the chemist is merely a compound of this archæal element with light, caloric, and electricity.

Prep. 1. From *red oxide* of *mercury*, heated over a spirit lamp or a few pieces of ignited charcoal. The operation is usually performed in a small green-glass retort, or in a short tube of hard Bohemian glass, closed with a perforated cork furnished with a piece of bent glass tube of small bore, to convey the liberated gas to the vessel arranged to receive it. Pure. 1 *oz.* yields about 100 cubic inches.

2. From *chlorate of potassa*, as the last. Pure. 100 gr. yield nearly 100 cubic inches (Brand; 115,—Ure). This is the plan adopted in the P. Cod. The decomposition occurs with both the above substances at a heat below that of redness.

3. From a *mixture* of *chlorate of potassa* (in coarse powder), 3 parts; powdered *binoxide of manganese*, 1 part; both by volume. Pure. 100 gr. of the mixture yield about 110 cubic inches of oxygen. This method, which has received the approval of Faraday, is exceedingly convenient. The gas is evolved with a rapidity which is entirely at the command of the operator, by simply increasing or lessening the heat. The residuum in the retort may be kept for another operation, if not exhausted; or it may be at once washed out with a little warm water, and the manganese, which is uninjured by the process, reserved for future use. *Red lead*, *black oxide of copper*, and several other substances, answer *nearly* as well as binoxide of manganese.

4. From a *mixture* of *bichromate of potassa*, 3 parts; *oil of vitriol*, 4 parts; gently heated as before. Yields pure oxygen very freely, and with a rapidity entirely at the will of the operator. (Balmain.)

5. From *binoxide of manganese* and *oil of vitriol*, equal parts; as the last. 44 gr. of pure binoxide of manganese yield 8 gr., or 24 cubic inches of oxygen; 1 oz. yields 88 gr., or 256 cubic inches. (Liebig.)

6. (On the *large scale.*)—*a.* From *nitre* exposed to a dull-red heat in an iron retort or gun-barrel. 1 *lb.* yields about 1200 cubic inches of gas, slightly contaminated with nitrogen. (Ure.)

b. From *binoxide of manganese*, as the last. 1 oz. of the *pure binoxide* yields 44 gr., or 128 cubic inches of oxygen (Liebig); 1 *lb.* of good *commercial do.*, yields from 1500 to 1600 cubic inches, or from 5 to 6 gall.

c. M. Boussingault has lately reinvestigated a process, long known although not usefully applied, by which *pure oxygen gas* may be obtained from the *atmosphere* at a trifling cost, so as to enable it to be collected in unlimited quantities and preserved in gasometers, like coal-gas, for application in the arts, manufactures, and sanitation. This process depends upon a peculiar property possessed by the *earth baryta*, of absorbing atmospheric oxygen at one temperature and evolving it at another; or rather, the ready conversion of *hydrate of baryta* into *peroxide of barium* by a current of *atmospheric air* at a dull-red heat, and the decomposition of this peroxide, by *steam*, at a lower temperature, even at 212° Fahr., with reproduction of *hydrate of baryta*, the process being in reality a continuous one. The *baryta* is mixed with a portion of *hydrate of lime* or of *magnesia*, to prevent its fusion. The mixture is placed in an appropriate *earthen tube* heated to dull redness, and is oxidized by passing a *current* of *dry atmospheric air* over it. As soon as the oxidation is *complete*, the tube is connected with the gas-holder, and a *jet of steam* allowed to act upon it: this *reconverts* the *peroxide of barium* into *hydrate of baryta*, the excess of oxygen being given off and collected in the gas-holder. The baryta is then *again* oxidized by a fresh current of air, and deoxidized by steam, and the whole process is repeated as frequently as required. *One ton* of *baryta*, thus treated, is capable of yielding 2500 cubic feet of *pure oxygen* every 24 hours; and this, as it does not waste or lose its properties, at the mere cost of the fuel and labour required in the process. It is not improbable that this product might be easily *doubled*.

d. From *perferrate of potassa*, prepared on the large scale. When exposed to moisture or thrown into water, *pure oxygen* is evolved. This method has been successfully adopted to maintain the air of diving-bells, and of other confined spaces in a state fit for respiration. It was tried in a small apartment in which were three patients in the collapse stage of cholera; two of whom rapidly recovered, and the symptoms in the third case were ameliorated for a time, although the patient died a few hours afterwards of the disease.

Prop. Oxygen gas is colourless, tasteless, odourless, and incombustible; the sp. gr. is 1·057 (Dumas; 1·1026,—Berzelius & Dulong; 1·111,—Thomson); 100 cubic inches at 60° Fahr., and 30 inches of the barometer, weigh 34·29 gr. (Dumas; 34·109 gr.,—Berz.; 34·6 gr.,—Brande; 33·85 gr.,—Ure). Its density to that of atmospheric air is therefore as about 11 to 10. It is a powerful supporter of combustion, and its presence is essential to the existence of both animal and vegetable life. It forms 21% (20·81%) by *volume*, and 23% by weight, of the atmosphere. (M. Dumas.) Water dissolves about 5% by volume of oxygen, and by pressure a much larger quantity, forming *oxygenated water* (aqua oxygenii).

Tests. 1. It is distinguished from other gases by yielding nothing but pure water when mixed with twice its volume of hydrogen and exploded, or when a jet of hydrogen is burnt in it.—2. A recently extinguished taper, with the wick still red-hot, instantly inflames when plunged into this gas.—3. A small spiral piece of iron wire ignited at the point, and suddenly plunged into a jar of oxygen, burns with great brilliancy and rapidity. Charcoal does the same.

Estim. The estimation of the quantity of oxygen in an *organic compound* is described at *p.* 915-6. For determining the quantity present in atmospheric air, and other like gaseous mixtures, Dobereiner has proposed the use of pyrogallic acid. The *air under examination* (freed from moisture) is measured into an accurately graduated tube over mercury, capable of holding about 30 cubic centimetres, and which it should ⅔ds fill. A *solution* formed of 1 part of dry *hydrate of potassa* and 2 parts of *water*, and in volume about $\frac{1}{35}$th that of the air, is next introduced by means of a pipette with a curved point, and is gently agitated therewith in the gas for a short time; the decrease of volume gives the proportion of CARBONIC ACID present. A solution of *pyrogallic acid* (1 gramme, in 5 or 6 centimétres of water), equal in volume to *one-half* that of the solution of potassa already used, is then introduced by means of another pipette, and the mixed liquids are cautiously shaken together over the inner surface of the tube. When absorption ceases (which it does in a few minutes) the quantity of residual air (NITROGEN) is read off from the graduations; the *difference* in volume before and after the introduction of the pyrogallic acid, indicates the proportion of OXYGEN. This is a mere modification of Prof. Liebig's method. 1 gramme of *pyrogallic acid* in combination with *hydrate of potassa*, is capable of absorbing about 189 cubic centimétres of oxygen. (Dobereiner.) *Other methods* employed for the analysis of air, depending on the *increase* or *loss of weight* when the air is passed over finely divided copper heated to redness, the *loss of volume* when the air is exploded in a eudiometer with half its bulk of hydrogen, or when a stick of phosphorus is left in it for some hours, are well known, and described at length in every elementary work on chemical analysis. The *last method*, although less accurate than the others, has the advantage of extreme simplicity.

Uses. Hitherto the trouble and expense of preparing oxygen has precluded its direct use on the large scale. It has been employed to increase the illuminative and heating power of lamps, and to render vitiated air respirable, &c.; and when largely diluted with atmospheric air, or condensed in water, as a remedial agent in asphyxia arising from the inhalation of carbonic acid and carbonic oxide.

Concluding Remarks. Oxygen gas may be collected in the usual way, either over water, mercury, or in bags; or, on the *large scale*, in gasometers. The *purity* of the products of the several processes given above, depends on the substances from which the gas is obtained being themselves pure. For nice experiments, the first portion of gas should be allowed to escape, or be received apart, as with this, as with the other gases, it is contaminated with the atmospheric air of the apparatus. The *gas* procured from *manganese* or *nitre* may be purified by passing it through milk of lime, or a solution of caustic potassa; it will still, however, retain some traces of nitrogen. See *Organic Substances, Ozone, &c.*

OXYGENATION. Syn. *Oxygenizement.* The act or process of combining with oxygen. It is of more general application than the word *oxydation*, which is frequently confounded with it; but which is only correctly applied when an *oxide* is formed.

OXYGENIZED LARD. Syn. *Oxygenated Axunge; Axungia Oxygenata*,—Ph. Bat., 1805. *Prep.* From *prepared lard*, 16 parts, melted over a slow fire, and then mixed with *nitric acid*, 1 part; the combination being promoted by constant stirring with a glass rod, until it *ceases* to affect *litmus paper*. It should be extremely white, and should be kept in the dark. See *Ointment of Nitric Acid.*

OXYIODES. The iodates were so called by Sir H. Davy.

OXYIODINE. See *Oxiodine.*

OXYMEL. Syn. *Oxymel*,—Lat. An acidulous syrup made of honey and vinegar. There are now only two oxymels in the Ph. L. The ingredients in an oxymel should be of such a character, and in such proportions, as to produce a mixture of the proper consistence without evaporation.

OXYMEL (Colchicum). Syn. *Oxymel Colchici Cormi; Oxymel Colchici*,—Ph. D. 1826. *Prep.* (Ph. D. 1826.) *Fresh corms* (roots) *of meadow saffron*, 1 oz.; *distilled vinegar*, 1 pint (wine measure); macerate for 2 days, press out the liquor, filter, add of *clarified honey*, 2 ℔; and boil down the mixture to the consistence of a syrup, frequently stirring. *Dose.* 1 to 3 dr., twice or thrice a day; in gout, rheumatism, dropsy, &c.

OXYMEL (Garlic). Syn. *Oxymel Alii*, —Lat. *Prep.* (Ph. L. 1746.) *Sliced garlic*, 1½ oz.; *caraway seed* and *sweet fennel seed*, of each, 2 dr.; *boiling vinegar*, 8 fl. oz.; infuse, strain, and add of *clarified honey*, 10 oz. In hooping-cough, chronic diarrhœa, rheumatism, &c.

OXYMEL (Pectoral). Syn. *Oxymel Pectorale, O. Inulæ Compositum*,—Lat. *Prep.* (Ph. Br.) *elecampane*, 1 oz.; *orris root*, ½ oz.; *water*, 1½ pint; boil to ½ pint, strain, add of *honey*, 16 oz.; *ammoniacum*, 1 oz.; (dissolved in) *vinegar*, 8 fl. oz.; lastly, boil to an oxymel. *Dose.* 1 spoonful, occasionally; in coughs, humid asthma, &c.

OXYMEL (Simple). Syn. *Vinegar Syrup, Acetated Honey; Oxymel*,—Ph. L. & D. *Oxymel Simplex*,—Ph. L. 1824. *Mel Acetatum*,—Ph. L. 1788. *Prep.* 1. (Ph. L.) *Acetic acid* (sp. gr. 1·048), 7 fl. oz.; *distilled water*, 8 fl. oz.; mix, and add them to *honey*, 5 ℔, previously made hot. This contains only one-half the acid ordered in the Ph. L. 1836.

2. (Ph. D.) *Clarified honey*, 1 *lb.; acetic acid* (sp. gr. 1·044), 3 *oz.*; as before. Stronger than the last.

3. (Ph. L. 1836.) *Honey*, 10 ℔; *acetic acid* (1·048), 1½ pint; as before. This contains too much vinegar. (See No. 1.)

4. (*Wholesale.*) From *honey* (thick and good), 12 *lb.;* melt it by a gentle heat, add of *distilled vinegar* (of fully 5%), 2 quarts, and strain the mixture through flannel. No evaporation is required.

Uses, &c. Demulcent and refrigerant. *Dose.* 1 to 4 fl. dr., either gradually sucked from the spoon, or diffused through some simple liquid. Dissolved in water it forms a useful and pleasant cooling drink or gargle in fevers, sore-throats, hoarseness, &c.; but in some individuals it occasions griping. It is commonly used as an adjunct, in mixtures &c.

OXYMEL (Squills). Syn. *Honey of Squills; Mel Scillæ; Oxymel Scillæ*,—Ph. L., & Ph. D. 1826. *O. Scilliticum*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Vinegar of squills*, 2½ pints; gently evaporate it to 12 fl. oz., and add of *honey* (previously made hot), 5 ℔.

2. (Ph. L. 1836.) *Strained honey*, 3 ℔; *vinegar of squills*, 1½ pint; boil to a proper

consistence. The formula of the Ph. D. 1826 was similar.

Uses, &c. Expectorant, and in large doses, nauseant. *Dose.* $\frac{1}{2}$ to 2 fl. dr.; in chronic coughs, hoarseness, humoral asthma, &c.

OXYMEL (Verdigris). See *Liniments.*

OXYMURIATE. See *below.*

OXYMURIATIC ACID. The old name of chlorine, given to it owing to a mistake as to its constitution. Some of the hypochlorites and chlorides were, in like manner, called "*oxymuriates.*" The "*hyperoxymuriates*" are the chlorates of modern chemistry.

OXYPRUSSIC ACID. The old name of the gaseous chloride or protochloride of cyanogen.

OXYRRHODINE. Syn. *Oxyrrhodinon.* An old compound formed of 1 part of *vinegar of roses,* and 2 parts of *oil of roses.*

OXYSACCHARUM. A syrup acidulated with vinegar. See *Syrups.*

OXYSAL (diaphoreticum Angeli Salæ). The liquid formed by allowing *acetate of potassa* to deliquesce in a moist atmosphere; so called after the celebrated alchemist Angelo Sala.

OXYSULPHURET. Syn. *Oxysulphuretum,*—Lat. A name given to certain compounds under the supposition of their being direct combinations of sulphur with an oxide. In general, they are mere mixtures of the sulphuret and oxide or hydrate of the base, in indefinite and accidental proportions. See *Oxysulphuret of Antimony, &c.*

OYSTER. Syn. *Ostrea,*—Lat. This well-known shell-fish is the *ostrea edulis* (Linn.), the most valuable and important of the numerous species of *ostracean acephala* (Cuvier).

Oysters are nutritious, and easy of digestion, when fresh, but are apt to prove laxative to those unaccustomed to their use. They are in season in each month of the year, the name of which contains the letter R. The *best* British oysters are found at Purfleet; the *worst* near Liverpool. Colchester, and other places in *Essex,* are the great nurseries or feeding grounds for supplying the metropolis, and, indeed, the whole of England with the most esteemed variety (*natives*) of this shell-fish. The *shells* (*testæ preparatæ, t. ostreariæ*) were formerly used in medicine as an absorbent. See *Shell-fish, Sauces, &c.*

OZENA. Syn. *Ozæna.* A malignant ulcer in the nose, attended with a copious discharge of fœtid purulent matter, and, not unfrequently, with caries and exfoliation of the bones. It often has a scrofulous or syphilitic origin, and then requires corresponding treatment. Its character, in all cases, is such as to require prompt and skilful medical treatment.

OZONE. A peculiar substance found in the atmosphere, and probably always existing in it in elevated and healthy situations. Originally, it was supposed to be a new elementary principle analogous to chlorine, but is now shown to be oxygen in a second or allotropic state (*ozonized*), in which it exhibits increased activity and new properties. This probably arises from an altered electrical condition.

Ozone was discovered by Schönbein, and it has since been elaborately studied by Baumert, Becquerel, Berzelius, De la Rive, Erdmann, Frémy, Marchand, Marignac, Rhumkorff, Schönbein, and others; but more particularly by its discoverer.

The *ozonization* of *oxygen* may be effected—

1. (*Chemically.*)—*a.* From *phosphorus* about half-covered with *water,* and immersed in *oxygen,* under only $\frac{1}{4}$ or $\frac{1}{5}$th the usual pressure of the atmosphere, or under the ordinary pressure (preferably the former) at 75° to 97° Fahr. The gas is soon found in a highly *ozonized* condition.

b. By passing *perfectly dry oxygen* over *dry phosphorus* contained in a tube. The effect is rapid, but the operation soon ceases. (Marchand.)

c. A stick of *phosphorus,* about 2 inches in length, and about one half covered with *water,* is placed in a flask, of the capacity of 130 litres, filled with atmospheric air; the mouth is then loosely closed with a cork or stopper, and the whole allowed to repose at 61° to 70° Fahr. Phosphorous vapours are soon developed, and ozonization commences. After some hours the air of the flask manifests the peculiar odour and effects of ozone in a powerful degree.

2. (*Electrically.*)—*a.* By passing a succession of *electrical discharges* through *pure* and *perfectly dry oxygen,* contained in a stoppered bottle or tube (1 by several inches long) furnished with two platinum points passing through, and fused into opposite parts, so that they are 4 or $5'''$ apart; the one being connected with a powerful electrical machine, and the other with the earth. The ozonization proceeds rapidly up to a certain point, but then retrogrades, so that the whole of the gas can never be ozonized. Atmospheric air is also ozonized when treated in a similar manner.

b. A series of *electrical sparks* are passed along the surface of a sealed glass tube containing *pure dry oxygen.* The gas is ozonized by induction. The same occurs with atmospheric air. In the grand laboratory of nature air is thus ozonized by a flash of lightning at the distance of several hundred yards.

3. (*Voltaically.*)—*a.* By passing a powerful *galvanic current* through a mixture of 1 part of *pure sulphuric acid,* and 12 parts of *water* (both absolutely free from organic substances), at as low a temperature as possible. The gas evolved at the + electrode is powerfully ozonized.

b. As the last, but employing a *mixed solution* of *chromic* and *sulphuric acid.* The evolved gas is now so highly ozonized that even vulcanized Indian-rubber tubes are perforated by it in a few minutes. (Baumert.)

Prop., &c. Ozone or ozonized oxygen has never been isolated, and is only recognized by its extraordinary effects. Its odour resembles that often perceived after a flash of lightning, and in the neighbourhood of an electrical machine in a state of extreme activity. According to Dr. Baumert, however, *pure ozone* is odourless until it comes into contact with moisture or water. It exerts the most powerful bleaching and oxidizing action on the substances it comes into contact with. It peroxidizes many of the metals at ordinary temperatures, decolorizes indigo, converts phosphorus into phosphoric acid, separates iodine from iodide of potassium, transforms most of the protosalts into persalts, the yellow into the red prussiate of potash, sulphuret of lead into sulphate, &c. It instantly destroys the organic combinations forming the matter of contagion, &c., and is probably the agent employed by nature for this purpose, since no ozone can be found in the atmosphere of infected districts. Our own belief is that the action of chlorine, both as a bleacher and disinfectant, depends on its power of inducing this allotropic condition of oxygen by contact with organic compounds.

OZONIZED ETHER. M. Schönbein has found that *ether,* and the *oils* of *lemons* and *turpentine* act like phosphorus on oxygen, but less rapidly. On introducing a small amount of *pure ether* into a flask filled with *oxygen gas,* or *atmospheric air,* and shaking them from time to time, the *ether,* after the lapse of four months, was found to have acquired new properties. Although it did not change the colour of litmus, it exhibited most of the other properties of ozonized air. (*Journ. de Chim. Méd.*)

OZONOMETER. This name has been given to paper prepared with a *mixed solution* of *starch* and *iodide of potassium.* It is white, but is turned *blue* by ozonized air, when exposed to it in a slightly moistened state. This test is sufficiently delicate to detect the presence of ozone in atmospheric air.

PACKFONG. Syn. *Pakfong; Chinese White Copper.* An alloy formed by fusing together, in a covered crucible, *arsenic,* 2 parts, and *copper clippings,* 4½ to 5 parts, arranged in alternate layers, and covered with a capping of *common salt.* The product contains about 10% of arsenic.

Prop., &c. White, slightly ductile, and permanent at ordinary temperatures; at a temperature below that of redness it suffers decomposition, with the extrication of fumes of arsenious acid. Formerly much *used* for the scales of thermometers and other instruments, dial plates, candlesticks, &c. It is now almost superseded by the alloy of nickel and copper called *German silver,* to which the name is also applied by some recent writers.

PACKING. As there is considerable art in packing brittle hollow-ware, as *glass, china, &c.,* in such a way that it will stand exposure to the jolting, blows, and agitation of land carriage, it is better, when it is of much value, or in quantity, to employ a person qualified for the job. A man, accustomed to packing such articles, may be readily procured at any glass-works, or china warehouse, for a trifling consideration. When this cannot be done, it must be recollected that the great secret of safe packing consists in the articles being carefully preserved from undue pressure or contact with each other, yet so firmly arranged, and so surrounded with some material, as *hay, straw, sawdust, &c.,* that they cannot be shaken into such a condition by the ordinary contingencies of transport. Loose packing must always be avoided.

PACKWAX. The ligamental matter of the neck of ruminants. It differs from common ligament in being insoluble in boiling water.

PADDING. Amongst *calico printers* this term is applied to the operation of impregnating the pores of their cloth with a mordant. It is now almost exclusively performed by means of a simple piece of machinery (*padding machine*), which essentially consists of—a *large reel* around which the unprepared cloth is wound,—a *guide-roller* over which it passes to smooth and adjust it before entering the liquor,—a *copper cylinder* (dip-roller) nearly at the bottom of the *mordant trough* under which it is carried from the guide-roller,—a half-round polished *stretcher-bar*, to give it equal tension—a pair of *padded cylinders*, to remove superfluous moisture, and lastly, —a *reel* to receive the mordanted (*padded*) cloth. The *degree of tension* is regulated by a weight suspended on a lever, and motion is given to the whole by an endless band from the driving shaft. This machine is also applicable to many of the operations of *dyeing*, *bleaching*, and *starching* textile fabrics.

PAINTER'S CREAM. *Prep.* Take of *pale nut oil*, 6 *oz.; mastic*, 1 *oz.;* dissolve, add of *sugar of lead*, ¼ *oz.*, previously ground in the least possible quantity of *oil;* then further add of *water*, q .s. gradually, until it acquires the consistence of cream, working it well all the time. *Used* by painters to cover their work when they are obliged to leave it for some time. It may be washed off with a sponge and water.

PAINTING. The art or employment of laying on colour. In the *fine arts*, the production of a picture or a resemblance in colours on a flat surface. The artistical and mechanical consideration of this subject does not come within the province of our little volume; but a notice of the leading materials employed by both artists and house painters is given under the respective names. See *Crayons*, *Oils*, *Pigments*, *&c.*

PAINTING (Elydoric). A method of painting invented by M. Vincent, of Montpelier, having for its object to combine the fresh appearance and finish of water colours, with the mellowness of oil painting. The liquid employed as a vehicle for the pigments is an *emulsion* formed of *oil* and *water* by the intervention of a certain portion of *gum* or *mucilage.*

PAINTING (Enamel). In this variety of painting *vitrifiable colours* are laid on thin plates of metal, and fused into it. The *outline* is first burnt in, after which the parts are filled up gradually, with repeated fusions at an enameller's lamp to the most minute finishing touches. "The enamel painter has to work, not with actual colours, but with mixtures which he only knows from experience will produce certain colours after the operation of the fire." (Aikin.)

PAINTING (Encaustic). This method is very ancient, but is now seldom practised. According to Pliny, the colours were made up into *crayons* with *wax*, and the subject being traced on the ground with a metal point, they were melted on the picture as they were used. A coating of *melted wax* was then evenly spread over all, and when it had become quite cold, was finally polished.

The art of encaustic painting, after lying dormant for about 15 centuries, was revived by Count Caylus, in 1753. In its new form, the wood or canvass to be painted on is first well-rubbed over with *wax*, and then held before the fire, so that the wax may penetrate and fill up all the interstices, and form a perfectly even surface. The *coloured pigments* are next mixed with the *powder* noticed below, which is then rubbed smooth with some thick *gum water*, and applied with brushes in the same manner as ordinary water colours. When the painting is finished, and *quite dry*, it is brushed over with *pure white wax* in a melted state, the surface being equalized by the skilful application of heat; it is, lastly, polished off, as before.

The *powder.*—To *white wax*, melted in an earthen pipkin, add in small portions at a time, an equal weight of *powdered mastic*, stirring continuously until the whole is incorporated; then pour it into *cold water*, and afterwards reduce it to powder in a wedgwood-ware mortar. A small quantity only of this powder is used with *light colours;* but more is required with the darker ones, until, on approaching black, the two may be mixed in almost equal proportions.

PAINTING (Fresco). This method of painting was known to the ancient Egyptians, and was commonly practised by the Greeks and Romans. It is confined to the decoration of the walls of buildings, and is executed by incorporating the *colours* with the *still moist plaster.* The pigments employed are entirely mineral or vitreous. As it is extremely difficult to alter the work after the colours are once absorbed, or after the ground has hardened, the whole must be carefully designed before commencing the picture, and no more commenced at once than can be executed during the day.

Of all the varieties of painting, fresco is "undoubtedly the most virile, most sure, most resolute, and most durable," (Vasari,) and the one most adapted for the purposes of historical painting in its grandest and most exalted forms. In comparison with it, it has been said that even oil painting is "employment fit only for women and children." (Michael Angelo.)

PAINTING (Glass). See *Stained Glass.*

PAINTING (Oil). This well-known and much practised method of painting, takes its name from the vehicle employed for the colours. The last may be any of those of a permanent character, and whose natural tint is not altered by admixture with oil. Linseed, nut, and poppy oil, are those which are principally employed. The first requires the addition of "driers," and hence is generally used under the form of "boiled oil." Spirit (*oil*) of turpentine is commonly used to thin down the prepared colours, and the finished picture is frequently covered with a coat of varnish.

PAINTING (Porcelain). See *Porcelain, Stained Glass, &c.*

PAINTING (Velvet). Any of the ordinary *non-corrosive pigments* or *liquid colours*, thickened with a little *gum*, may be employed in this art; preference being, however, given to those that possess the greatest brilliancy, and which dry without spreading. See *Pigments, Stains, &c.*

PAINTINGS. Many valuable paintings suffer premature decay from the attacks of a microscopic insect, a species of acarus or mite. This is especially the case with "*Christ's Passion*," by Northcote, in the Hanover chapel, Regent-street,—the "*Raising of Lazarus*," in the National Gallery, and several pictures in the Louvre, and other national treasuries of art. The *best method* of *preventing* this variety of decay, is to add a little *creasote* (dissolved in brandy or vinegar), or a few grains each of *bichloride of mercury* and *sal ammoniac* (dissolved in a little water) to the *paste* and *glue* used to "line" the picture, as well as to add a few drops of *pure creasote* or of an *alcoholic* or *ethereal solution of bichloride of mercury* to the varnish, when any is to be applied. If the destruction alluded to has already commenced, the painting should be at once carefully cleaned and "re-lined," observing to employ one or other of the remedies just mentioned.

The most *appropriate* and *only safe situation* in which to keep paintings, is where there is a *pure*, and *moderately dry atmosphere.* Impure air abounds in carbonic acid and sulphuretted hydrogen. It is the presence of the last in the air that *blackens* the "*lights*," and causes most of the *middle tints* and *shades* to fade; and it is exposure to damp that produces *mouldiness* and *decay of the canvass.* For this reason valuable paintings should *not be kept in churches*, nor *suspended against heavy walls of masonry*, especially in badly-ventilated buildings. *Excess of light*, particularly the direct rays of the sun, also acts injuriously on paintings, since it bleaches some colours and darkens others.

The *blackened lights* of *old pictures* may be *instantly restored* to their *original hue* by touching them with *deutoxide of hydrogen*, diluted with 6 or 8 times its weight of *pure water.* The part must be afterwards washed with a clean *sponge and water.* We have produced the most astonishing results in this way, but have recently discovered a cheaper and more convenient method of effecting the same object.

PAINTS. In *trade* this term is commonly applied to pigments ground with oil to a thick paste, ready to be "thinned down" with oil or turpentine to a consistence adapted for application with a brush.

Paints are *prepared* on the *small scale* by grinding the *dry pigments* with the *oil* by means of a *stone-and-muller;* on the *large scale* they are ground in a *colour mill.* There are several pigments, as *king's yellow, Scheele's green, verdigris, white lead, &c.*, which from their *poisonous* character cannot be safely ground by hand, except in very small quantities at a time, and then only by the exercise of extreme caution.

In *mixing* or *thinning down paints* for use, it may be useful to mention that—for "*out-door work*" *boiled oil* is principally or wholly employed, unless it be for the decorative parts of houses, when a portion of turpentine and pale linseed oil is often added.—For "*in-door work*," *linseed oil, turpentine*, and a little *driers*, are generally used in the same way. The smaller the proportion of oil employed for the purpose, the less will be the gloss, and the greater the ultimate hardness of the coating. For "*flatted white*," &c., the colour being ground in oil, requires scarcely any further addition of that article, as the object is to have it "dead" or dull. The best "*driers*" are, ground litharge, and ground sugar of lead; the first for *dark* and *middle tints*, and the last for *light ones.*

To *preserve mixed paints* in pots from "*skinning over*" or *drying up*, they should be kept constantly covered with *water;* or, what is better, with a *thin film* of *linseed oil.*

Brushes, when out of use, may be *preserved* in a similar manner to mixed paints. When *dirty*, or required for a paint of another colour, they may be *cleaned* with a little oil of turpentine, which may be either preserved for the same purpose another time, or may be allowed to deposit its colour, and then used to thin down paints as usual. In no case, however, should it be thrown back into the cistern or can with the pure "turps."

PAINTS (Fish Oil). *Prep.*—*a.* (The

Oil.) Dissolve *white vitriol* and *litharge*, of each, 14 *lb.*, in *vinegar*, 32 *gall.;* add of *whale, seal,* or *cod oil,* 1 ton, boil the mixture to dryness, and continue the heat for an hour or two afterwards, with constant agitation the whole time; the next day decant the clear portion, add of *boiled linseed oil*, 12 gall.; *oil of turpentine*, 3 gall.; and mix them well together; in a week decant the clear portion for use.

The *sediment* left after both the decantations, is to be well agitated with about half its volume of *lime water.* It is then used for some inferior paints, under the name of "*prepared residue oil.*"

b. (The *Paints.*)—1. (*Pale green.*) Take of *lime water,* 6 galls.; *whiting* and *road dust,* of each, 1 cwt.; *blue black,* 30 *lb.; yellow ochre,* 28 *lb.; wet blue* (previously ground in *prepared residue oil*), 20 *lb.;* grind them well together. For *use,* thin with equal parts of *prepared residue oil* and *linseed oil.*

2. (*Bright green.*) Take of *yellow ochre* and *wet blue,* of each, 1 cwt.; *road dust,* 1½ cwt.; *blue black,* 10 *lb.; lime water,* 6 gall.; *prepared fish oil,* 4 gall.; *prepared residue* and *linseed oils,* of each, 7½ gall.

3. (*Lead colour.*) From *whiting,* 1 cwt.; *blue black,* 7 *lb.; white lead* (ground in oil), 28 *lb.; road dust,* 56 *lb.; lime water,* 5 gall.; *prepared residue oil,* 2½ gall.

4. (*Reddish brown.*) From *lime water,* 8 gall.; *Spanish brown,* 1 cwt.; *road dust,* 2 cwt.; *prepared fish, prepared residue,* and *linseed oils,* of each, 4 gall.

5. (*Yellow.*) Substitute *yellow ochre* for *Spanish brown* in the last receipt.

6. (*Black.*) Substitute *lamp black* or *blue black* for *Spanish brown* in No. 4.

7. (*Stone colour.*) From *lime water,* 4 gall.; *whiting,* 1 cwt.; *white lead* (ground in oil), 28 *lb.; road dust,* 56 *lb.; prepared fish, linseed,* and *prepared residue oil,* of each, 3 gall.

8. (*Chocolate colour.*) No. 4 and No. 6 mixed together so as to form a chocolate colour.

Obs. At the time when the price of linseed oil was a serious objection to its use in coarse paints, various plans were devised to produce a substitute for it. The preceding was one of them, and was, we believe, made the subject of a patent now long expired. The diminished price of linseed oil of late years has materially lessened, if not wholly divested the subject of present interest.

All the above paints require the addition of some "*driers.*" They are well fitted by their cheapness, hardness, and durability, for common out-door work.

PAINTS (Flexible). *Prep.* Take of good *yellow soap* (cut into slices), 2½ *lb.; boiling water,* 1½ gall.; dissolve, and grind the solution whilst hot with good *oil paint,* 1¼ cwt. *Used* to paint canvass.

PAINTS (Vitrifiable). See *Enamels, Glazes, Stained Glass, &c.*

PALAMOUD. *Prep.* 1. From *rice flour* and *British arrow-root,* of each, 1 *lb.; roasted chocolate-nuts* (ground), ¼ *lb.; red beet* (sliced, dried by a gentle heat, and powdered), 1 oz.; mix them well together, and pass the powder through a sieve.

2. *Sago flour,* 2 *lb.; soluble cocoa powder,* 6 *oz.; red beet* (dried and powdered), 1 *oz.*

PALLADIUM. A rare metal discovered by Dr. Wollaston in the ore of platinum, in 1803.

Prep. 1. A *solution of the ore of platinum in aqua regia,* from which most of the metal has been precipitated by *sal ammoniac,* is neutralized by *carbonate of soda,* and then treated with a *solution of bicyanide of mercury;* the white insoluble precipitate (*cyanide of palladium*) is next washed, dried, and heated to redness; the residuum of the ignition (*spongy palladium*) is then submitted to a gradually increased pressure, and welding at a white heat, so as to form a button, in a similar manner to that adopted with platinum. *Prod.* Columbian ore of platinum, 1%; Uralian do., 0·25 to 0·75%.

2. The *native alloy of gold and palladium* (from the Brazils) is submitted to the operations of *quartation* and *parting* (see *p.* 98), the *nitric acid* employed being of the density of 1·3; the *silver* is next precipitated from the solution by means of a *solution of common salt* or *dilute hydrochloric acid,* and the decanted supernatant liquid, after evaporation to one half, is neutralized with *ammonia,* and concentrated so that crystals may form; these (*ammonio-chloride of palladium*) are cautiously washed in a little *very cold water,* dried, mixed with *borax,* and exposed in a crucible to the strongest heat of a powerful blast furnace, when a solid button of pure palladium is formed.

Prop., &c. Palladium closely resembles platinum in appearance, fusibility, malleability, and ductility; but it is less dense, and has a rather more silvery colour than that metal; it is freely soluble in aqua regia, and is slowly attacked by nitric acid, but the other acids exert little or no action on it; heated to redness in the air a very superficial blue or purple film of oxide forms on the surface, which is again reduced at a white heat. It melts at 156° Wedgewood. Sp. gr. 11·3 to 12·1 (11·8,—Wollaston; 12·14,—Vauquelin.) It readily unites with copper, silver, and some other metals, by fusion.

Tests. 1. The neutral solutions of palladium are precipitated in the metallic state by *sulphate of iron,* dark brown by *sulphuretted hydrogen,* olive by *ferrocyanide of potassium,* and yellowish white by *cyanide of mercury.*—2. A drop of *tincture of iodine* placed on the surface of metallic palladium and then evaporated by the heat of a spirit lamp, leaves a black spot. By the last two tests palladium is readily distinguished from platinum.

Uses. It has been employed to form the scales of mathematical and astronomical instruments. Its alloy with silver is a very valuable white metal.

PALLADIUM (Chlorides of). Of these there are two:—

1. (*Chloride* or *Protochloride.*) From a *solution of the metal* in *aqua regia,* evaporated to dryness.

Prop., &c. A dark-brown, semi-crystalline mass, soluble in water; at a temperature above 212° it loses its combined water, and becomes black; with the chlorides of potassium and ammonium it forms double salts (*ammonio-chloride of palladium, potassio-chloride of do.*), which have a brownish-yellow colour, and are more soluble than the corresponding salts of platinum.

2. (*Bichloride* or *Perchloride.*) By digesting the *protochloride* in *aqua regia.*

Prop., &c. It cannot be obtained in a separate form, as it suffers decomposition during the evaporation; the solution has an intense brown colour; by adding an equivalent proportion of chloride of potassium or sal ammoniac, a red crystalline precipitate (*potassio-bichloride* or *ammonio-bichloride of palladium*) is formed, which is very sparingly soluble in water.

PALLADIUM (Oxides of). Two oxides of palladium are noticed by chemical writers:—

1. (*Oxide* or *Protoxide.*) This is precipitated as a brown *hydrate* by adding an *alkaline carbonate,* in excess, to a *solution of any of the salts of palladium.* This precipitate, when heated to redness, is converted into the *anhydrous black protoxide.* It forms salts with the acids.

2. (*Binoxide* or *Peroxide.*) Obtained by treating solid *bichloride of palladium and potassium* with a *solution of potassa,* in excess, and heating the mixture to 212°

Prop., &c. Yellowish-brown, before being heated; black afterwards. It usually contains a little alkali and water in combination. Both the above oxides form red or reddish-yellow salts with the acids.

PALLADIUM (Sulphuret of). *Sulphide of Palladium.* This is prepared by either fusing together 4 parts of *sulphur* with 13 parts of *palladium;* or by passing a stream of *sulphuretted hydrogen* through a *solution of the protochloride.*

PALMIC ACID. *Prep.* Decompose a *solution* of *soap prepared from palmine and potassa,* by adding to it a *solution* of *tartaric acid,* dissolve the *fatty acid* that separates in *cold alcohol,* and evaporate the filtered solution at a gentle heat.

Prop., &c. Crystallizable; soluble in alcohol, and in ether; melts at 122° Fahr. It may also be procured from the solid mass obtained by passing *sulphurous acid* through *castor oil.*

PALMINE. A new fatty substance obtained by treating *castor oil* with *nitrous acid.* It melts at 143° Fahr., and when saponified yields *palmic acid* and *oxide of glyceryle.*

PALMITIC ACID. *Prepared* from *palm oil* in a similar way to that by which palmic acid is obtained from palmine. It is purified by pressure between the folds of porous paper, washing with *hot alcohol,* and crystallization from *hot ether.* It forms pearly scales, and melts at 140° Fahr., like margaric acid, which it closely resembles.

PALMITINE. The *stearine* or *solid portion* of *palm oil,* purified by crystallization from hot ether. White; soluble in ether and slightly so in hot alcohol; melts at 118° Fahr.; by saponification, it is converted into *palmitic acid.* (See *above.*)

PALM OIL. The melting point of this oil is 80° to 87½° Fahr., and not 117½°, as misprinted at *p.* 854. The statement made by several writers that *lard,* coloured with *annotta,* and scented with *orris root,* is often sold for palm oil, is absurd. As remarked by Dr. Normandy, "it is hardly possible that such a fraud can be practised, seeing that hog's lard is double the price of genuine palm oil." See *Palm Tallow.*

PALPITATION. Syn. *Palpus, Palpitatio Cordis,*—Lat. A violent and irregular beating or action of the heart, either temporary or occasional. When it does not arise from sudden or violent agitation or distress of mind, it may be regarded as a symptom of a disturbance of the nervous functions by disease; in which case attention should be directed to the removal of the primary affection.

PALSY. See *Paralysis.*

PANACEA. A term formerly applied

to those remedies which were supposed to be capable of curing all diseases. Unfortunately for mankind the supposition is opposed to experience. The name is still applied to some quack medicines. Among the preparations to which this name was applied were—*Panacea Anglica*, magnesia; *p. antimonii* (see *p.* 76); *p. dulcis Holsatiæ*, sulphate of potassa; *p. duplicata*, do.; *p. Glauberi*, do.; *p. Holsatica*, do.; *p. lapsorum*, arnica montana; *p. mercurialis*, calomel which has been sublimed 9 times; *p. solutiva*, magnesia; *p. vegetabilis*, saffron.

PANADA. See *Bread Jelly.*

PANARY FERMENTATION. The vinous fermentation as developed in the dough of bread.

PANCAKES. These are essentially fried batter, variously enriched and flavoured, according to the taste of the cook. When they contain *fruit*, *fish*, *meat*, or *poultry*, or are highly seasoned or ornamented, they are commonly called *fritters.*

Prep. (M. Soyer.) Break 2 to 4 *eggs* into a basin, add 4 small table-spoonfuls of *flour*, 2 tea-spoonfuls of *sugar*, and a little *salt;* beat the whole well together, adding, by degrees, ½ pint of *milk*, or a little more or less, depending on the size of the eggs and the quality of the flour, so as to form a rather thick batter; next add a little *ginger*, *cinnamon*, or any other flavour at will; lastly, put them into the pan, and when set, and one side *brownish*, lay hold of the frying-pan at the extremity of the handle, give it a sudden but slight jerk upwards, and the cake will turn over on the other side; when this is brown, dish up with *sifted sugar*, and serve with *lemon.* See *Fritters.*

PANIFICATION. The changes which occur in flour-dough under the influence of the fermentative process and heat, by which it is converted into bread. (See *p.* 159, &c.)

PAPAVERINE. Syn. *Papaverina.* An alkaloid recently discovered by Merck in opium. It crystallizes in needles; is insoluble in water; is slightly soluble in cold alcohol, and in ether; and forms crystallizable salts with the acids which possess little solubility. The *hydrochlorate*, one of the most characteristic of these compounds, crystallizes in beautiful colourless prisms, which possess a high refractive power, and are only very slightly soluble in dilute hydrochloric acid.

PAPER. Syn. *Charta*, *Papyrus*,—Lat. *Papier*,—Fr. The limits of this work preclude the introduction of a description of the manufacture of this well-known and most useful article, which is now almost exclusively made by machinery of an elaborate and most ingenious description. We must, therefore, content ourselves with a short notice of a few of the preparations of the manufactured article. (See *below.*)

Good white paper should be perfectly devoid of odour, and when burnt it should leave a mere nominal amount of ash; digested in hot water, the liquid should be neutral to test paper, and not affected by sulphuretted hydrogen or the alkaline sulphurets, or by tincture of iodine. *Coloured papers* should not contain any deleterious matter.

PAPER (Blistering). See *Vesicants.*

PAPER (Calotype). See *Sun Painting.*

PAPER (Cloth.) This is prepared by covering gauze, calico, canvass, &c., with a surface of *paper pulp* in a Foudrinier machine, and then finishing the compound sheet in a nearly similar manner to that adopted for ordinary paper.

PAPER (Coloured). For those which are merely coloured on *one* side, the *pigments*, ground up with *gum-water* or *size*, or the *stains* thickened with a little of the same, are applied with a brush; after which the sheets are suspended on a line to dry.

For *paper coloured throughout its substance*, the *tinctorial matter* is usually mixed with the *pulp* in the process of manufacture; or the manufactured paper is dipped into a bath of the colouring substance, and then hung up to dry. See *Maps, &c.*

PAPER (Copying). *Prep.* Make a stiff ointment with *butter* or *lard* and *black lead* or *lamp-black*, and smear it thinly and evenly over soft writing paper, by means of a piece of flannel; the next day wipe off the superfluous portion with a piece of soft rag.

Use, &c. Placed on white paper and written on with a style or solid pen, a copy of the writing is left on the former. By repeating the arrangement, 2, 3, or more copies of a letter may be obtained at once. This paper, set up in a case, forms the ordinary "*Manifold writer*" of the stationers. The *copying* or *transfer paper* used for obtaining fac-similes of letters written with "copying ink," is merely a superior quality of *bank-post paper.*

PAPER (Glass). *Prep.* From *powdered glass*, as emery paper. *Used* to polish wood, &c. (See *p.* 366.)

PAPER (Gout). Syn. *Papier Fayard; Charta Anti-arthritica*,—Lat. *Prep.* 1. *Euphorbium*, 1 part; *cantharides*, 2 parts; (both in powder;) *rectified spirit*, 8 parts;

ether, 3 parts; digest in a stoppered bottle, with frequent agitation, for a week; to the strained tincture add of *Venice turpentine*, 1 part; lastly, dip *thin white paper* into it, and dry the sheets in the air.

2. (Mohr.) *Euphorbium*, 1 dr.; *cantharides*, 4 dr.; *rectified spirit* (strongest), 5 oz.; make a tincture, to which add of *Venice turpentine*, 1½ oz., previously liquefied with *resin*, 2 oz.; and spread the mixture, whilst warm, very thinly on paper. *Used* as a counter-irritant in gout, rheumatism, &c.

PAPER (Hydrographic). An absurd name given to paper which may be written on with water, or with some colourless liquid having the appearance of that fluid.

Prep. 1. A mixture of *nut-galls*, 4 parts, and *calcined sulphate of iron*, 1 part (both perfectly dry and reduced to very fine powder), is rubbed over the surface of the paper, and is then forced into its pores by powerful pressure, after which the loose portion is brushed off. Writes *black* with a pen dipped in water.

2. From *sesquisulphate of iron* and *ferrocyanide of potassium*, as the last. Writes *blue*.

3. As the last, but using *sulphate of copper* instead of sulphate of iron. Writes *reddish-brown*.

4. The *paper* is wetted with a *colourless solution* of *ferrocyanide of potassium*, and after being dried is written on with a *colourless solution* of *sesquisulphate of iron*. Writes *blue*.

Obs. The above applications, we need scarcely say, are more amusing than useful. Though long known, we believe that they first acquired a trading importance in the hands of a gentleman of Stamford Street, well known for his skill in both science and business. See *Sympathetic Inks*.

PAPER (Incombustible.) See *Incombustible Cloth*.

PAPER (Iridescent). *Prep.* (Mr. Beasley.) *Sal ammoniac* and *sulphate of indigo*, of each, 1 part; *sulphate of iron*, 5 parts; *nut-galls*, 8 parts; *gum arabic*, ⅛ part; boil them in water, and expose the paper washed with the liquid to (the fumes of) *ammonia*.

PAPER (Issue). Syn. *Charta ad Fonticulos*,—Lat. *Prep.* (Soubeiran.) *Elemi*, *spermaceti*, and *Venice turpentine*, of each, 1 part; *white wax*, 2 parts; melt them together by a gentle heat, and spread the mixture on paper. *Used* to keep issues open.

PAPER (Lithographic). *Prep.* 1. *Starch*, 6 *oz.; gum arabic*, 2 *oz.; alum*, 1 *oz.;* make a strong solution of each separately, in *hot water*, mix, strain through gauze, and apply it whilst still warm to one side of leaves of paper, with a clean painting-brush or sponge; a second and a third coat must be given as the preceding one becomes dry; the paper must be, lastly, pressed, to make it smooth.

2. Give the paper 3 coats of *thin size*, 1 coat of *good white starch*, and 1 coat of a *solution of gamboge in water;* the whole to be applied cold, with a sponge, and each coat to be allowed to dry before the other is applied. The solutions should be freshly made.

Use, &c. Lithographic paper is written on with lithographic ink. The writing is transferred by simply moistening the back of the paper, placing it evenly on the stone, and then applying pressure. A reversed copy is obtained, which, when printed from, yields corrected copies, resembling the original writing or drawing. In this way the necessity of executing the writing or drawing in a reversed direction is obviated. See *Lithography*, *Inks*, *&c.*

PAPER (Oiled). *Prep.* Brush *sheets of paper* over with "*boiled oil*," and suspend them on a line till dry. Waterproof. Extensively employed as a cheap substitute for bladder and gut skin, to tie over pots and jars, and to wrap up paste blacking, ground white lead, &c.

PAPER (Razor). Smooth *unsized paper*, one of the surfaces of which, whilst in a slightly damp state, has been rubbed over with a *mixture* of *calcined sesquioxide of iron* and *emery*, both in *impalpable* powder. It is cut up into pieces (about 5 × 3 inches) and sold in packets. *Used* to wipe the razor on, which thus does not require stropping.

PAPER (Razor-strop). From *emery* and *quartz* (both in impalpable powder), and *paper pulp* (estimated in the dry state), equal parts, made into sheets of the thickness of drawing paper, by the ordinary process. For *use*, a piece is pasted on the strop and moistened with a little oil.

PAPER (Resin), Syn. *Poor-man's Plaster; Charta Resinosa*,—Lat. *Prep.* 1. *Bees' wax*, 1 *oz.; tar* and *resin*, of each, 3 *oz.;* melted together and spread on paper.

2. (Ph. Bor.) *Paper*, thinly spread over with *black pitch*. Calefacient, stimulant, and counter-irritant; in rheumatism, chest affections, &c.

PAPER (Rheumatism). See *Gout* and *Resin Papers*.

PAPER (Safety). Syn. *Papier de Sureté*,—Fr. *White paper pulp* mixed with an equal quantity of *pulp tinged with any* *stain easily affected by chlorine, acids, alkalies, &c.*, and made into sheets as usual.

PAPER (Test). Syn. *Charta Exploratoria*,—Lat. Under this head may be conveniently included all the varieties of prepared paper employed in testing. For this purpose, *sheets* of *unsized paper* or of *good ordinary writing paper* (preferably the first), are uniformly wetted with a *solution of the salt*, or with a *cold infusion* or *decoction of the tinctorial substance* in *distilled water*, and are then hung up to dry in a current of pure air; they are, lastly, cut into pieces of a convenient size, and preserved in closed bottles or jars. For *use*, a small strip of the *prepared paper* is either dipped into or moistened with the *liquid under examination*, or it is moistened with *distilled water*, and then exposed to the *fumes*. A single drop, or even less, of any liquid may be thus tested.

The following are the principal test papers and their applications:—

Brazil-wood Paper. From the *decoction.* Alkalies turn it purple or violet; strong acids, red.

Buckthorn Paper. From the *juice of the berries.* Reddened by acids.

Cherry-juice Paper. As the last.

Dahlia Paper, *Georgina do.* From an *infusion* of the *petals* of the *violet dahlia* (georgina purpurea). Alkalies turn it green; acids, red; strong caustic alkalies turn it yellow. Very delicate.

Elderberry Paper. From the *juice of the berries.* As the last.

Indigo Paper. From a *solution of indigo.* Decoloured by chlorine.

Iodide of Potassium Paper.—a. From the *solution* in *distilled water.* Turned blue by an acidulated solution of starch.

b. From a *mixture* of *a solution of iodide af potassium* and *starch paste.* Turned blue by chlorine, ozone, and the mineral acids, and by air containing them.

Lead Paper. From a *solution* of either *acetate* or *diacetate of lead.* Sulphuretted hydrogen and hydrosulphuret of ammonia turn it black.

Litmus Paper. In general, this is prepared from *infusion of litmus*, without any precaution, but the following plan may be adopted when a superior test paper is desired:—

a. (Blue.) Triturate *commercial litmus*, 1 *oz.*, in a wedgewood-ware mortar with *boiling water*, 3 or 4 fl. oz.; put the mixture into a flask, and add more *boiling water* until the liquid measures fully ½ pint; agitate the mixture frequently until it is cold, then filter it, and divide the filtrate into two equal portions; stir one of these with a glass rod previously dipped into *very dilute sulphuric acid*, and repeat the operation until the litmus infusion begins to look *very slightly* red, then add the other half of the filtrate, and the two being mixed together, dip strips of *unsized paper* into the liquid, in the usual manner, and dry them. Acids turn it red; alkalies, green. The neutral salts of most of the heavy metallic oxides also redden this, as well as the other blue test papers that are affected by acids.

b. (Red.) The treatment of the *whole quantity of the infusion* (see *above*) with the *rod dipped in dilute sulphuric acid*, is repeated until the fluid begins to look distinctly red, when the paper is dipped into it, as before. The alkalies and alkaline earths, and their sulphurets, restore its blue colour; the alkaline carbonates and the soluble borates also possess the same property. Very sensitive. An *extemporaneous red litmus paper* may be prepared by holding a strip of the *blue variety* over a pot or jar into which 2 or 3 drops of hydrochloric acid have been thrown.

Mallow Paper. From an *infusion* of the *purple flowers* of the *common mallow.*

Manganese Paper. From a *solution of sulphate of manganese.* Ozonized air blackens it.

Rhubarb Paper. From a *strong infusion* of the *powdered root.* Alkalies turn it brown; but boracic acid and its salts do not affect it. Very sensitive.

Rose Paper. From the *petals of the red rose*, as the last. Alkalies turn it bright green. Mr. A. S. Taylor recommends the infusion to be *very slightly* acidulated with an acid, before dipping the paper into it. More sensitive than turmeric paper.

Starch Paper. From a *cold decoction of starch.* Free iodine turns it blue.

Sulphate of Iron Paper. From a solution of the *protosulphate.* As a test for hydrocyanic acid and the soluble cyanides.

Turmeric Paper. From *decoction of turmeric* (2 *oz.* to the pint). It is turned brown by alkalies, and by boracic acid and the soluble borates. It is not quite so susceptible as some other tests, but the change of colour is very marked and characteristic.

PAPER (Tracing). *Prep.* 1. Open a quire of *smooth unsized white paper*, and place it flat upon a table, then apply, with a clean "*sash tool*," to the upper surface of the first sheet, a coat of *varnish* made of equal parts of *Canada balsam* and *oil of turpentine*, and hang the prepared sheet across a line to dry; repeat the operation on fresh sheets until the proper quantity is finished. If not sufficiently transparent, a second coat of varnish may be applied as soon as the first has become quite dry.

2. Rub the paper with a *mixture* of equal parts of *nut oil* and *oil of turpentine*, and dry it immediately by rubbing it with *wheaten flour;* then hang it on a line for 24 hours to dry.

Obs. Both the above are used to copy drawings, writing, &c. If washed over with ox-gall and dried, they may be written on with ink or water colours. The *first* is the whitest and clearest, but the *second* is the toughest and most flexible. The *paper* prepared from the *refuse of the flax-mills*, and of which bank-notes are made, is also called "*tracing paper*," and sometimes "*vegetable paper*." This requires no preparation; but though very flexible it has little strength.

PAPER (Varnished). Before proceeding to varnish *paper, card-work, pasteboard, &c.*, it is necessary of give it 2 or 3 coats of "size," to prevent the absorption of the varnish, and any injury to the colour or design. The "*size*" may be made by dissolving a little *isinglass* in *boiling water*, or by boiling some clean *parchment cuttings* until they form a clear solution. This, after being strained through a piece of *clean muslin*, or, for very nice purposes, clarified with a little *white of egg*, is applied by means of a small clean brush, called by painters a sash tool. A light, delicate touch must be adopted, especially for the first coat, lest the ink or colours be started, or smothered. When the prepared surface is perfectly dry, it may be varnished in the usual manner. See *Maps, Varnishes, &c.*

PAPER (Wafer). See *Wafers.*

PAPER (Waxed). *Prep.* Place *cartridge paper*, or strong *writing paper*, on a hot iron plate, and rub it well with a lump of *bees' wax. Used* to form extemporaneous steam or gas pipes, to cover the joints of vessels, and to tie over pots, &c.

PAPER HANGINGS. The ornamental paper used to cover the walls of rooms, &c. Under the *old system*, the paper, after being *sized* and *prepared with a ground colour*, had the pattern produced on it by the common process of *stencilling*, a separate plate being employed for each colour that formed the pattern. To this succeeded the use of *wooden blocks*, the surface of which bearing the design in relief, and being covered with *colour*, was applied by simple hand-pressure on the paper, in a precisely similar manner to that adopted in the block-printing of calicoes. The cylinder calico-printing machine has now been successfully applied to the manufacture of paper hangings.

The *colours* employed for *paper hangings* are—

Blacks. Frankfort, ivory, and blue black.

Blues. Prussian blue, verditter, and factitious ultramarine.

Browns. Umber (raw and burnt), and mixtures.

Grays. Prussian blue and blue black, with Spanish white.

Greens. Brunswick green, Scheele's do., and green verditter; also mixtures of blues and yellows.

Reds. Decoctions of Brazil wood (chiefly), brightened with alum or solution of tin; the red ochres; and, sometimes, red lake.

Violets. Decoction of logwood and alum; also blues tempered with bright red.

Yellows. Chrome yellow, decoction of French berries or of weld, terra di sienna, and the ochres.

Whites. White lead, sulphate of baryta, plaster of Paris, and whiting, and mixtures of them.

The *vehicle* employed to give *adhesiveness* and *body to the colours*, is a solution of gelatine or glue, sufficiently strong to gelatinize on cooling.

The *satiny lustre* observable in some paper hangings is produced by dusting finely powdered *French chalk* over the surface, and rubbing it strongly with a brush or burnisher. The ground for this purpose is prepared with plaster of Paris.

Flock and *velvet papers* are produced by covering the surface of the pattern with a mordant formed with *boiled oil thickened with white lead* or *ochre*, and then sprinkling powdered *woollen flocks* on it. These are previously dyed, and ground to the required fineness in a mill. See *Walls, &c.*

PAPIER-MACHE. Pulped paper moulded into forms. It possesses great strength and lightness. It may be rendered partially *waterproof* by the addition of *sulphate of iron, quicklime*, and *glue* or *white of egg*, to the pulp; and incombustible, by the addition of *borax* and *phosphate of soda*. The *papier-maché tea-trays, waiters, snuff-boxes, &c.*, are prepared by pasting or glueing *sheets of paper together*, and then submitting them to powerful pressure, by which the composition acquires the hardness of board when dry. Such articles are afterwards *japanned*, and are then perfectly waterproof.

The *refuse of the cotton* and *flax mills*, and numerous other substances of a like character, are now worked up as papier-maché, and the manufactured articles formed of them are indistinguishable from those prepared directly from paper.

PAPYRINE. An absurd name given to *white unsized paper* which has been immersed for about half a minute in *concentrated sulphuric acid,* and afterwards washed in water *slightly alkalized* with *ammonia,* by which it assumes a toughness and appearance somewhat like parchment. It is simply a modified form of vegetable fibre, between that of lignine and dextrine.

PARABANIC ACID. A new acid, obtained by Wöhler and Liebig by treating *uric acid* or *alloxan,* 1 part, with *strong nitric acid,* 8 parts, at a gentle heat, and when the reaction has nearly ceased, evaporating the liquid to the consistence of a syrup; the crystals which form in the liquid after standing for some time, are purified by re-solution and crystallization.

Prop., &c. Beautiful, colourless, transparent prisms, freely soluble in water, with an acid taste and reaction. Its salts (*parabanates*) give a white precipitate with nitrate of silver.

PARACHUTE. In *aerostation,* an instrument or apparatus having for its object to retard the descent of heavy bodies through the air. The only *form* of parachute which has been hitherto adopted with success, is that of the common umbrella when extended. The *materials* of which the apparatus is made, are *canvass* and *cord,* both light but strong, and carefully put together. The *car* to contain the adventurer resembles that of the balloon, only smaller.

It is *estimated* that a circular *parachute* to descend, in safety, with an adult, weighing, with the apparatus, 225 *lb.*, must have a diameter of at *least* 30 feet. Its *terminal velocity* would then be at the rate of 12 to 13 feet per second, or about 6½ miles per hour; and the shock experienced on contact with the earth would be equal to that which the aeronaut would receive if he dropped freely from a height about 2½ feet.

Several descents from balloons after they have acquired a great elevation, have been effected without accident by means of parachutes; and there is no more risk in the undertaking, *per se,* than there is in ordinary ballooning. Unfortunately, however, any want of integrity in the machine, or any accident which may happen to it after its detachment from the balloon, is irreparable and fatal. See Hutton's *Math. Tracts,* iii, 316.

PARACYANOGEN. The *brown solid matter* left in the retort when *cyanide of mercury* is decomposed by heat. It is insoluble in either water or alcohol, and is dissipated, with decomposition, at a very high temperature. Cyanogen and paracyanogen are isomeric compounds. (Johnston.)

PARAFFINE. Syn. *Tar-oil Stearine.* This remarkable hydrocarbon is one of the several substances discovered by Reichenbach in wood tar.

Prep. Distil *beech tar* to dryness, rectify the oily portion of the product which is heavier than water, until a thick matter begins to rise, then change the receiver, and moderately urge the heat as long as anything passes over; next digest the product (*pyrélaine* and *paraffine*) in the second receiver, in an equal measure of alcohol of 0·833, gradually add 6 or 7 parts more of alcohol, and expose the whole to a low temperature; crystals of paraffine will gradually fall down, which, after being washed in *cold alcohol,* must be dissolved in *boiling alcohol,* when crystals of *pure paraffine* will be deposited as the solution cools.

Prop., &c. White; odourless; tasteless; sp. gr. 0·87; melts at 110° to 112° Fahr., and boils at a somewhat higher temperature; it dissolves in boiling alcohol and in oils, and burns entirely away with a clear white flame without smoke. In its more obvious properties it closely resembles stearic acid, from which, however, it differs in its total indifference to chemical agents. Even the more powerful acids, the caustic alkalies, and chlorine, fail to exert the smallest action on it, nor does it form a single definite combination with any other body.

Obs. Since the preceding was written several attempts have been made to obtain paraffine, with other products, on the commercial scale, from Irish peat. The efforts for this purpose have turned out unsatisfactory, owing, according to Mr. Lewis Thompson, to too much heat having been employed, by which the paraffine, instead of being carried over into the receiver, is destroyed, and passes away as incondensable gas or useless matter. To obtain the greatest possible product in paraffine from Irish peat, the process must be conducted at a dull-red heat only, and in such a manner, that the volatile and gaseous matter given off from the contents of one retort, may be conducted over those of another simultaneously undergoing the same process of distillation, "by which the nascent paraffine and pyroligneous spirit will be rapidly swept out, and carried away from the injurious effects of the heat into the condenser." The product hitherto obtained by the *peat-companies* of Ireland, has been only at the rate of 3 *lb.* of *paraffine*, and ½ gall. of *pyroligneous spirit*, with several gall. of a highly fœtid and useless *oil*, from each ton of peat; whereas, by proper management, the quantity of paraffine should be from 9 to 12 *lb.*, or more. *All* the *products* obtainable from peat, may, however, be procured in much greater quantity, and at a less cost from the imperfectly formed *coal* of Bovey Hayfield, near Exeter, where the additional advantage of a ready market and the facilities of transport exist, to render any commercial speculation in connexion with the subject successful. A few years since we invited the attention of capitalists to this matter, but unfortunately, owing to the sudden commercial depression consequent upon the "railway panic," the enterprise was suspended, and finally abandoned.

PARAGUAY ROUX. Syn. *Compound Tincture of Para Cress.* A tincture *prepared* from the *root* of *pellitory of Spain* and the *leaves* and *flowers* of *Italian elecampane* (inula bifrons,—Linn.), of each, 1¼ *oz.;* *flowers of Para cress* (spilanthes oleracea,—Jacq.), 5 *oz.;* *rectified spirit*, ½ pint; macerated for 14 days, pressed, and filtered. Exceedingly stimulant; in toothache, &c.

PARAKAKODYLIC OXIDE. An oily liquid obtained by the action of air, very slowly admitted, on *alkarsine.*

PARALYSIS. Syn. *Palsy.* A loss or considerable diminution of power of voluntary motion, or functional action of any part of the body. In its most usual form one side only of the body is affected. "It not uncommonly seizes the lower extremities, or all parts below the pelvis; sometimes the arms only; and occasionally a part, as one side of the face, one eyelid, the tongue, or the muscles of deglutition." In these cases, the speech frequently becomes indistinct and incoherent, and the memory and judgment impaired, whilst the distorted features assume a more or less revolting aspect.

The *causes* of *paralysis* are various. It may be occasioned by anything that prevents the free flow of the nervous power from the brain into the organs of motion, as pressure on particular parts of the brain, the spinal marrow, or the nerves; by poisons, the long-continued use of sedatives, local injuries, the sudden suppression of profuse and habitual evacuations, and by whatever tends to greatly relax or enervate the system. It may also be a consequence of an attack of apoplexy, or it may be symptomatic of other diseases, as scrofula, syphilis, and worms. When it is of a distinctly local character, it may arise from excessive use or undue employment of the part or organ. That of old age is, probably, a mere consequence of the failing nervous energy of the system being unequally distributed.

"*Palsy* usually *comes on* with a sudden and immediate loss of the motion and sensibility of the parts; but, in a few instances, it is preceded by a numbness, coldness, and paleness; and, sometimes, by slight convulsive twitches. If the disease affects the extremities, and has been of long duration, it not only produces a loss of motion and sensibility, but likewise a considerable flaccidity and wasting away of the muscles of the parts affected."

When *palsy attacks* any *vital part*, such as the brain, heart, or lungs, it soon terminates in death.

The *treatment* of *paralysis* depends upon a careful consideration of its cause. The first object should be, as far as possible, to remove any compressing force, and to gradually arouse the torpid portion of the nervous system. In general, more or less depletion will be found beneficial, together with rather active purgation, and nervous stimulants, as *ammonia*, *musk*, &c. *Blisters* to the head and neck are also appropriate. With the debilitated and aged, venesection must be avoided. Stimulant and rubefacient frictions and liniments, the vapour bath, and other like remedies, also frequently prove useful. In local attacks of the disease, as the loss of use of one of the hands, arms, legs, &c., no agent has proved so generally successful as voltaic electricity. For this purpose the current should be in *one direction* only, and continued uninterruptedly for some time daily. When the direction of the current is *alternate*, with slight shocks, as in the common coil machine, this agent is of doubtful utility, except for occasional use. In all cases, *medical aid* should be sought as early as possible. See *Strychnia* and *Nux Vomica.*

PARAMIDE. A white, amorphous, insoluble substance, formed along with *euchronic acid*, during the distillation of *mellitate of ammonia.* When boiled in water it is converted into *bimellitate of ammonia.*

PARAMORPHINE. See *Thebaine.*

PARAMYLENE. A substance formed along with amylene during its preparation by the common process. It boils at 320° Fahr.; whereas amylene boils at about 103°.

PARANAPHTHALINE. Syn. *Anthracine.* A substance found in the naphthaline of coal tar. The two are separated by digestion in *alcohol,* which dissolves the *naphthaline* and leaves the *paranaphthaline* in an insoluble form; it is then purified by redigestion in hot alcohol, and final sublimation.

Prop., &c. White; crystalline; inflammable; soluble in ether and oil of turpentine; melts at 356° and boils at 570° Fahr. Naphthaline and paranaphthaline are isomeric compounds.

PARANTHINE. The mineral *scapolite.*

PARAPECTINE. See *Pectine.*

PARAPHOSPHORIC ACID. See *Phosphoric Acid.*

PARASITES. The parasitical animals that infest the human body are referred to under the heads *Acarus* and *Pediculi.*

PARATARTARIC ACID. See *Racemic Acid.*

PARCHMENT. See *Vellum.*

PAREGORIC. See *Compound Tincture of Camphor.*

PAREGORIC (Scotch). See *Ammoniated Tincture of Opium.*

PAREIRA BRAVA. See *Velvet Leaf.*

PARELLIC ACID. A compound obtained along with *orsellic acid* by boiling the lichen *lecanora parella* with *baryta,* by a process nearly similar to that adopted for erythric acid.

PARFUM (des Rois). See *Spirits* (Perfumed).

PARFUM (pour les autres poudres). *Prep.* Take of *poudre d'ambrette,* 12 *lb.; civette,* 1½ *oz.; musk,* 1 *dr.;* reduce the last two to powder by grinding them with some dry *lump sugar,* then mix the whole together, and pass it through a sieve. *Used* to perfume hair powder, sachets, &c.

PARILLIC ACID. See *Sarsaparilla.*

PARILLINE. See *Sarsaparilla.*

PARING AND BURNING. The operation of paring off the surface of worn-out grass land, or lands covered with coarse herbage, and burning it for the sake of the ashes, and for the destruction of weeds, seeds, insects, &c. "Agriculturalists differ as to the value of this mode of treating land; the greater number preferring a naked fallow even for one or two years, alleging that more injury is done by the vegetable matter lost in burning, than benefit obtained by the ashes produced." (Loudon.) It is, however, evidently the most rapid mode of bringing land abounding in coarse herbage into a state of good culture.

PARR. A name applied to the salmon until near the end of its second year, when it loses its dark lateral bars by the superaddition of a silvery pigment. It was formerly regarded as a distinct species (*salmo salmulus*).

PARROT COAL. Syn. *Cannel Coal, Kennel do.; Ampelitis, Terra A., Pharmacitis.* Formerly used as a vermifuge.

PARSLEY. Syn. *Petroselinum,*—Lat. This is the *apium petroselinum* (Linn.) The *root* is diuretic; the *fruit* (seed), carminative; the *leaves,* are a pleasant stimulating salad and condiment, and are much used to flavour broth and soup. "The fruit is a deadly poison to parrots." (Lind. *ex* Burnett.)

PARSNEP. The *pastinaca sativa* (Linn.) *Roots* (parsneps) are esculent, but are watery, and apt to offend the stomach; *juice,* made into sugar and wine; the last, when well prepared, closely resembles malmsey.

PARTING. See *Assaying.*

PASTE. Syn. *Pâte; Pasta,*—Lat. This word is very loosely applied to substances and preparations differing so widely from each other, that it would be scarcely possible to class them together. We shall, therefore, refer the reader to the individual articles. The pastes (*pâtes*) of French pharmacy are compound medicines of the consistence of hard dough, and which do not stick to the fingers. They are formed of *sugar* and *gum,* dissolved in *water* or in some medicated liquid. They are evaporated, so as to unite these principles by degrees, and give them the pliancy and the firmness of paste. They are *employed* internally in doses more or less variable, in a similar manner to lozenges. "Pâtes, properly so called, are divided into *transparent,* or such as are made without agitation, like jujubes of brown liquorice; and *opaque,* or such as are made with agitation, like the pâtes of marsh-mallow, lichen, &c." (Trousseau & Reveil.)

PASTE (Almond). Syn. *Pâte Royale; Pasta Amygdalina, P. Amygdalarum, P. Regia,*—Lat. *Prep.* 1. (*Moist.*)—*a.* Take of *blanched Valentia almonds,* 4 *oz.;* reduce them to a very smooth paste by patient pounding in a clean mortar, adding, towards the last, a little *rose water,* with some *eau de Cologne,* or 3 or 4 drops of *otto of roses* or *neroli,* or an equivalent quantity of any other perfume, according to the fancy of the artiste.

b. From *bitter* and *sweet almonds* (blanched), equal parts; *rose water,* q. s. It requires no other perfume.

c. To either of the preceding add of *spermaceti*, ½ *oz.* The *white of an egg*, or ¼ *oz.* of *white soap* is added by some makers. With about ½ dr. of *powdered camphor* to each *oz.* of the above, it forms the "*camphorated almond paste*" of the shops.

d. Take *fine Narbonne honey* and *white bitter paste* (see *below*), of each, 1 *lb.;* beat them to a smooth paste, then add, in alternate portions, of *oil of almonds*, 2 *lb.; yelks* of 5 *eggs;* and reduce the whole to a perfectly homogeneous pasty mass. Much esteemed. It is commonly sold under the name of "*honey paste*," "*pâte royale*," *&c.* In a similar manner are made *nosegay*, *orange*, *rose*, *vanilla*, and other like pastes having almonds for a basis, by merely adding the respective perfumes.

2. (*Pulverulent.*)—*a.* (*Gray.*) Prepared from the *cake of bitter almonds* from which the oil has been thoroughly expressed, by drying, grinding, and sifting it.

b. (*Bitter White.*) As the last, but the *almonds* are *blanched* before being pressed.

c. (*Sweet White.*) As the last, but using *sweet almonds.*

Obs. All the above are *used* as *cosmetics*, to soften and whiten the skin, prevent chaps, abrasions, chilblains, &c. The *honey paste*, and the *sweet* and *bitter white pastes*, are those most esteemed.

PASTE (Almond). *Prep.* 1. Take of *Valentia almonds*, ¾ *lb.; bitter do.*, ¼ *lb.;* blanch them, and reduce them to a very smooth paste by pounding, then put them into a clean copper pan along with *white sugar* and good *gum arabic*, of each, 1 *lb.;* (the last previously dissolved in about a pint of water;) apply a gentle heat, and stir until the whole is mixed and has acquired a proper consistence, then pour it out on a smooth oiled marble slab, and when cold cut it into squares.

2. As the last, but when the mixture has acquired the consistence of thick honey, setting it aside to cool; when nearly cold the *whites of* 6 *eggs* are to be added, and heat being again *gradually* applied, the whole is to be stirred until it acquires the proper consistence, as before.

3. *Blanched sweet almonds* and *white sugar*, of each, 1 *lb.; blanched bitter almonds* and *powdered gum*, of each, 3 *oz.;* beat them, in the cold, to a perfectly smooth paste, with *orange-flower water*, or *rose water*, q. s., so that it may be sufficiently stiff not to stick to the fingers, and then cut the mass into squares, as before. The above are eaten as *confections.*

PASTE (Anchovy). *Prep.* Remove the larger bones from the *fish*, and then pound them to a *smooth* paste in a marble mortar, adding a little *bay-salt* and *cayenne pepper*, at will; next rub the pulp through a fine hair sieve, and about 3-4ths fill the pots with it; lastly, cover the surface of each to the depth of about ⅛ inch with *good butter* in a melted state. It should be kept in a cool situation. Other *fish pastes*, as those of *bloaters*, *lobsters*, *shrimps*, *caviare*, &c., are made in a similar manner.

PASTE (Arsenical). See *Caustics*, *Patent Medicines*, and *Powders.*

PASTE (Baudry's). See *Pectoral Paste.*

PASTE (Bird). See *German Paste* (*p.*513).

PASTE (Black Currant). As *black currant lozenges*, but simply cutting the mass into dice or square.

PASTE (Chinese). *Prep.* From *bullock's blood*, 10 *lb.*, reduced to dryness by a gentle heat, then powdered, and mixed with *quicklime*, also in fine powder, 1 *lb.* It is *used* as a cement, made into a paste with water, and at once applied.

PASTE (Chloride of Zinc). See *Caustics.*

PASTE (Curry). See *Powders.*

PASTE (Dates). Syn. *Pâtes de Dattes; Pasta Dactyliferæ, P. Dactylorum*,—Lat. From *dates* (stoned), as jujube paste. Pectoral, and slightly astringent. "Pâte de gomme Senegal" is usually sold for it.

PASTE (De Handel's). *Prep.* From *opium*, ½ dr.; *camphor*, 1 dr.; (both in powder;) *extracts of belladonna* and *henbane*, of each, 1 dr.; *oil of cajeput* and *tincture of cantharides*, of each, 10 or 12 drops; *distilled water of opium* (or of *lettuce*), q. s. In toothache.

PASTE (Depilatory). Syn. *Pasta Epilatoria*,—Lat. Several preparations of this character are noticed at *pages* 324-5. A mixture of *slaked lime*, 2 parts, and *water*, 3 parts, saturated with *sulphuretted hydrogen*, is said to be so powerful, that "a layer a line in thickness denudes the scalp in three minutes." (Mr. Beasley.)

PASTE (Figs). Syn. *Pasta Caricarum, P. Ficaria*,—Lat. *Prep.* 1. From *figs*, as jujube paste.

2. (Soubeiran.) *Pulp of figs*, 1 part; press it through a sieve, mix it with *powdered sugar*, 4 parts, concentrate by a gentle heat (if necessary), roll the mass out, and cut it into squares or lozenges.

PASTE (Flour). Syn. *Colle de Pâte.* From *wheaten flour.* Paper-hangers, shoemakers, &c., usually add to the flour ⅙ to ¼th of its weight of *finely powdered rosin.* It is then sometimes called "*hard paste.*" The addition of a few drops of *creasote* or *oil of cloves*, or a little *powdered camphor*, *colocynth*, or *corrosive sublimate* (especially the first two and the last), will prevent insects from attacking it, and preserve it in covered vessels for years. Should it get too hard it may be softened with water. See *Cements.*

PASTE (Fruit). *Prep.* 1. To *each pint* of the *strained juice* add of *gum arabic*, 1 *oz.*, gently evaporate to the consistence of a *syrup*, and add an equal weight of *bruised white sugar ;* as soon as the whole is united, pour it out on an *oiled slab*, and when cold enough cut it into pieces.

2. *Citric acid,* $\frac{3}{4}$ *oz. ; gum arabic,* 6 *oz. ; white sugar,* $\frac{3}{4}$ *lb. ; water,* q. s.; dissolve, and flavour with any of the *fruit essences.* It may be coloured with any of the stains used for confectionery or liqueurs.

3. See *Fruit Lozenges* (*page* 727).

PASTE (Furniture). See *Polishes.*

PASTE (Glove). See *Ganteine.*

PASTE (Gum Arabic). Syn. *Pâte de Gomme, P. de G. Arabique ; Pasta Gummi, P. Gummosa,*—Lat. *Prep.* 1. As *pâte de guimauve,* omitting the mallow roots.

2. *Gum arabic* (picked), 1 *lb.; water,* 1 pint; dissolve, add of *white sugar,* 1 *lb.;* evaporate by a gentle heat to a very thick syrup, then add the *whites* of 3 *eggs,* previously beaten up with *orange-flower water,* 1 fl. oz., and strained through muslin, and continue the heat, with constant stirring, until of a proper consistence on being cooled. The last two are commonly sold for pâte de guimauve.

3. (*Transparent.*) From *gum arabic* (picked), 1 *lb.; cold water,* 1 pint; *white sugar,* 1$\frac{1}{4}$ *lb.;* proceed as the last, adding *orange-flower water,* 1 fl. oz., towards the end. Often sold under the name of "*white jujubes.*"

PASTE (Gum Senegal). Syn. *Pâte de Gomme Senegal.* As *jujube paste* without the fruit.

PASTE (Honey). See *Almond Paste.*

PASTE (Jujube). Syn. *Jujubes, Jujube Lozenges ; Pasta Jujubæ,*—Lat. *Pâte de Jujubes,*—Fr. *Prep.* (P. Cod.) *Jujubes* (the fruit), 1 ℔; *water,* 4 ℔; boil $\frac{1}{2}$ hour, strain with expression, settle, decant the clear portion, and clarify it with *white of egg ;* add a strained solution of *gum arabic,* 6 ℔, in *water,* 8 ℔, and to the mixture add of *white sugar,* 5 ℔; gently evaporate, at first constantly stirring, and afterwards, without stirring, to the consistence of a soft extract, then add of *orange-flower water,* 6 fl. oz., and place the pan in a vessel of boiling water. In 12 hours carefully remove the scum, pour the matter into slightly oiled tin moulds, and finish the evaporation (hardening) in a stove heated to 104° Fahr. It is commonly coloured with *beet root, cochineal,* or *saffron.* Expectorant; in coughs, &c. "Pâte de gomme" is usually sold for it.

PASTE (Lichen). Syn. *Pasta Lichenis,*—Lat. *Pâte de Lichen,*—Fr. *Prep.* (P. Cod.) *Iceland moss,* 1 ℔; *water,* q. s.; heat them to nearly the boiling point, strain with pressure, reject the liquor, and boil the moss in *fresh water,* q. s., for 1 hour; strain, press, add of *gum arabic,* 5 ℔; *white sugar,* 4 ℔; and evaporate to a proper consistence, as above. Pectoral. With the addition of $\frac{1}{2}$ gr. of *extract of opium,* to each oz., it forms the *opiated lichen paste.* (P. Cod.)

PASTE (Liquorice). Syn. *Liquorice Jujubes ; Pasta Glycyrrhizæ,*—Lat. *Pâte de Réglisse, P. de R. noire,*—Fr. *Prep.* 1. (P. Cod.) *Refined juice* and *white sugar,* of each, 1 ℔; *gum arabic,* 2 ℔; *water,* 3 quarts; dissolve, strain, evaporate considerably, add of finely powdered *orris root,* $\frac{1}{2}$ oz., *oil of aniseed* or *essence of cedrat,* a few drops, and pour the paste upon an oiled slab, or into moulds, as before.

2. (*Brown ; Pasta G. Fusca ; Pâte de R. brune.*) *Refined juice,* 4 *oz.; white sugar,* 2 *lb.; gum arabic,* 3 *lb.; water,* 4 pints; proceed as last.

3. (*Opiated ; Pâte de R. Opiacée,*—P. Cod.) To the last add of *extract of opium,* 15 gr.

4. (*White ; Pâte de Réglisse blanche.*) As No. 2, substituting the *powder* of the *decorticated root* for the extract. All the above are pectoral; the second is also slightly anodyne. They are useful in tickling coughs, hoarseness, &c.

PASTE (Marshmallow). Syn. *Pasta Althææ,*—Lat. *Pâte de Guimauve,*—Fr. *Prep.* (P. Cod. 1816.) *Decorticated marshmallow root* (French), 4 oz.; *water,* $\frac{1}{2}$ gall.; macerate for 12 hours, strain, add *white sugar* and *gum arabic,* of each, 2$\frac{1}{2}$ ℔; dissolve, strain, evaporate without boiling to the thickness of honey, constantly stirring, and add, gradually, the *whites of* 12 *eggs,* well beaten with *orange-flower water,* 4 fl. oz., and strained; continue the evaporation and constant stirring until the mass is so firm as not to adhere to the fingers, then proceed as before.

Obs. It should be very white, light, and spongy. In the P. Codex of 1839 the marshmallow root is omitted, and the name is changed to that of "*pâte de gomme,*" a compound long sold for it in the shops. Both are agreeable pectorals.

PASTE (Odontalgic). Syn. *Pasta Odontalgica,* — Lat. *Prep.* 1. *Pellitory* (in powder), 1 dr.; *hydrochlorate of morphia,* 3 gr.; triturate, add of *honey*, 2 dr.; and *oil of cloves*, 6 drops.

2. *Powdered mastic*, *pellitory*, and *white sugar*, of each, 1 dr.; *chloroform*, q. s. to form a paste. It must be kept in a stoppered bottle. See *Toothache* (and *below*).

PASTE (Orange). *Prep.* From *orange flowers*, 2 *lb.; bitter* and *sweet almonds*, of each, blanched, $2\frac{1}{2}$ *lb.;* beaten to a perfectly smooth paste. An agreeable cosmetic. See *Almond Paste.*

PASTE (Orgeat). *Prep.* From *blanched Jordan almonds*, 1 *lb.; blanched bitter do.* and *white sugar* or *honey*, of each, $\frac{1}{4}$ *lb.;* beaten to a paste with *orange-flower water*, q. s. (or *neroli*, a few drops), and put into pots. As a cosmetic or to make *orgeat milk*. For use, rub 1 *oz.* with $\frac{1}{2}$ pint of *water*, and strain through muslin.

PASTE (Pectoral). Syn. *Pasta Pectoralis*,—Lat. *Prep.* 1. (*Pâte pectorale de Baudry.*) Take of *gum arabic* and *white sugar*, of each, 7 ℔; *water*, q. s.; dissolve, add of *extract of liquorice*, 3 oz.; evaporate, add of *extract of lettuce*, 2 dr.; *balsam of tolu*, $1\frac{1}{4}$ oz.; *orange-flower water*, $4\frac{1}{2}$ fl. oz.; *whites of* 4 *eggs; oil of citrons*, 5 or 6 drops.

2. (*Regnault's; Pâte pectorale balsamique de Regnault.*) From the *flowers* of *coltsfoot*, *cudweed*, *mallow*, and *red poppy*, of each, 1 oz.; *water*, 1 quart; boil, strain, add of *gum arabic*, 30 oz.; *white sugar*, 20 oz.; dissolve, concentrate, add of *tincture of tolu*, 3 fl. dr., and pour the mixture on an oiled slab.

3. (*Anisated Coltsfoot Paste; Pâte de Tussilage à l'Anis.*) From *strong decoction of coltsfoot flowers*, 1 quart; *Spanish juice*, $\frac{1}{2}$ *lb.;* dissolve, strain, evaporate as before, and towards the end add of *oil of aniseed*, 1 dr. All the above are useful in hoarseness, coughs, &c.

PASTE (Phosphor). See *Rats.*

PASTE (Polishing). *Prep.* 1. (For *Copper* and *Brass.*) See *Brass* (*p.* 158).

2. (For *Iron* and *Steel.*) From *emery* (in fine powder) and *lard*, equal parts.

3. (For *Pewter.*) From *powdered Bath brick*, 2 parts; *soft soap*, 1 part; *water*, q. s. to make a paste. *Used* with a little water, and afterwards well rinsed off.

4. (For *Furniture.*) See *Polishes.*

PASTE (Razor). *Prep.* 1. From *jeweller's rouge*, *plumbago*, and *suet*, equal parts, melted together and stirred until cold.

2. From *prepared putty powder* (levigated oxide of tin), 3 parts; *lard*, 2 parts; *crocus martis*, 1 part; triturated together.

3. *Prepared putty powder*, 1 *oz.; powdered oxalic acid*, $\frac{1}{4}$ *oz.; powdered gum*, 20 gr.; make a stiff paste with *water*, q. s., and evenly and thinly spread it over the strop, the other side of which should be covered with any of the common greasy mixtures. With very little friction this paste gives a fine edge to the razor, and its action is still further increased by *slightly* moistening it, or even breathing on it. *Immediately* after its use, the razor should receive a few turns on the other side of the strop.

4. *Diamond dust*, *jeweller's rouge*, and *plumbago*, of each, 1 part; *suet*, 2 parts. Powdered quartz is generally substituted for diamond dust, but is much less effective.

5. (*Mechi's.*) *Emery* (reduced to an impalpable powder), 4 parts; *deer suet*, 1 part; well mixed together.

6. (*Pradier's.*) From *powdered Turkey stone*, 4 *oz.; jeweller's rouge* and *prepared putty powder*, of each, 1 *oz.; hard suet*, 2 *oz.*

Obs. The above (generally made up into square cakes) are rubbed over the razor strop, and the surface being smoothed off with the flat part of a knife or a phial bottle, the strop is set aside for a few hours to harden before being used.

PASTE (Regnault's). See *Pectoral Paste.*

PASTE (Rubefacient). Syn. *Pasta Rubefaciens*,—Lat. *Prep.* (Clarus.) From *acetate of lead*, 1 oz.; *bisulphate of potassa*, 3 oz.; *water*, q. s. It acts powerfully and quickly on the skin.

PASTE (Rust's). *Prep.* From *powdered opium* and *extract of henbane*, of each, 10 gr.; *powdered pellitory* and *extract of belladonna*, of each, 20 gr.; *oil of cloves*, 10 drops. In toothache.

PASTE (Shaving). *Prep.* 1. *Naples soap* (genuine), 4 *oz.; powdered Castile soap*, 2 *oz.; honey*, 1 *oz.; essence of ambergris*, and *oils of cassia* and *nutmegs*, of each, 5 or 6 drops.

2. *White wax*, *spermaceti*, and *almond oil*, of each, $\frac{1}{4}$ *oz.;* melt, and whilst warm, beat in 2 squares of *Windsor soap* previously reduced to a paste with a little *rose water.*

3. *White soft soap*, 4 *oz.; spermaceti* and *salad oil*, of each, $\frac{1}{2}$ *oz.;* melt them together, and stir until nearly cold. It may be scented at will. When properly prepared these pastes produce a good lather with either hot or cold water, which does not dry on the face. The proper method of using them is to smear a minute quantity over the beard, and then to apply the

wetted shaving brush, and not to pour water on them as is the common practice.

PASTE (Swediaur's). See *Chilblains.*

PASTE (Tooth). Syn. *Pasta Dentifricia, Electuarium Dentifricium,*—Lat. Various preparations are known under this name. They consist, for the most part, of the ordinary substances used as dentifrices, reduced to the state of a very fine powder, and mixed with sufficient *honey, sugar,* or *capillaire,* to give them the required consistence. *Honey of roses* is often used for this purpose, with some agreeable perfume at will. A little *eau de Cologne* or *rectified spirit* is a useful addition. The following are a few examples:—

1. (*Carbon Paste; Opiat Carbonique.*) The *chippings of Turkey stone, cylinder charcoal,* and *prepared chalk,* of each, 2 *oz.; cochineal* and *cloves,* of each, 1 *dr.; honey,* 5 *oz.; eau de Cologne,* q. s. It should not be put into the pots until the next day, and should be afterwards well preserved from the air. Much prized by smokers, and by parties troubled with a fœtid breath from rotten teeth.

2. (*Coral Paste; Opiat Dentifrice rouge.*) From *prepared coral,* 8 *oz.; cuttle-fish bone,* 4 *oz.; mastic,* 2 *oz.; cochineal,* ¼ *oz.; honey,* ¾ *lb.*; *essence of ambergris,* 1 fl. dr.; *oil of cloves,* ½ fl. dr., dissolved in *rectified spirit,* 1 fl. oz. As the last. Cleans the teeth rapidly.

3. (Dyon's *Charcoal Paste.*) From *chlorate of potassa,* 1 dr.; *mint water,* 1 fl. oz.; triturate until dissolved, then add of *powdered charcoal,* 2 oz.; *honey,* 1 oz.

4. (*Magic Paste.*) From *white marble dust,* 4 *oz.; pumice stone* (in impalpable powder), 3 *oz.; rose pink,* 1 *oz.; honey,* ½ *lb.; otto of roses,* 15 drops. Rapidly whitens the teeth, but it should not be used too freely, nor too frequently.

5. (P. Cod.) *Prepared coral,* 4 oz.; *bitartrate of potassa,* 2 oz.; *cuttle-fish bone* and *cochineal,* of each, 1 oz.; *alum,* ½ dr.; *Narbonne honey,* 10 oz.; with *essential oil,* q. s. to aromatize the mixture.

6. (Pelletier's *Odontine.*) This is stated to be a *mixture* of *pulverized sepia-bone, butter of cacao,* and *honey,* with *essential oil.*

7. (*Rose Paste.*) Coral paste scented with roses, or the following:—*Cuttle-fish bone,* 1 *oz.; prepared chalk,* 2 *oz.; cochineal,* ½ *dr.; honey of roses,* 3 *oz.; otto of roses,* 6 drops.

8. (*Soluble Paste, Saline Dentifrice.*) From *bitartrate of potassa* or *sulphate of potassa* (in fine powder), 3 *oz.; honey of roses,* 2 *oz.*

9. (*Spanish Dentifrice, Castilian Tooth Cream.*) From *Castile soap* (in fine powder) and *cuttle-fish bone,* of each, 2 *oz.; honey of roses,* 5 *oz.* An excellent preparation. It is superior to all the other pastes for removing tartar and animalculæ from the teeth.

10. (*Vanilla Paste.*) From *red cinchona bark,* 2 *dr.; vanilla,* 1 *dr.; cloves,* ½ *dr.;* (the last two reduced to powder by trituration with) *white sugar,* 1 *oz.; cuttle-fish bone* and *marble dust,* of each, ½ *oz.; syrup of saffron,* q. s.

11. (*Violet Paste.*)—*a.* From *prepared chalk* and *cuttle-fish bone,* of each, 3 *oz.; powdered white sugar,* 2 *oz.; orris root,* 1 *oz.; smalts,* ¼ *oz.; syrup of violets,* q. s. to mix.

12. (Winckler's *Roseate Dentifrice.*) From *cuttle-fish bone,* 1 part; *conserve of roses* (Ph. L.), 3 parts; with *otto of roses,* 2 drops to the *oz.*

13. *Chalk,* 8 *oz.; myrrh* and *rhatany root,* of each, 2 *oz.; orris root,* 1 *oz.; honey of roses,* q. s. to mix. In foul and spongy gums.

PASTE (Toothache). See *Odontalgic Paste.*

PASTE (Tormentil). Syn. *Pasta Tormentillæ,*—Lat. *Prep.* (M. Morin.) *Powdered tormentil root* (tormentilla erecta,—*Linn.*) made into a paste with *white of egg.* In whitloe; applied on linen. Mixed with an equal weight of *simple syrup* it has also been recommended in dysentery and diarrhœa.

PASTE (Vienna). See *Potassa with Lime.*

PASTE (Vohler's). *Prep.* From *dragon's blood,* 1 dr.; *powdered opium,* 2 dr.; *powdered gums* of *mastic* and *sandarich,* of each, 4 dr.; *oil of rosemary,* 20 drops; *tincture of opium,* q. s. to form a paste. In toothache.

PASTE (Ward's). See *Confection of Pepper.*

PASTES. Syn. *Artificial Gems, Factitious do.; Pierres Précieuses Artificielles,*—Fr. Vitreous compounds made in imitation of the gems and precious stones. The substances which enter into their composition, and the principles on which their successful production depends, have been already briefly noticed. The present article will therefore be confined to giving the reader a few original formulæ, together with several others carefully selected from the most reliable English and Continental authorities. Like enamels, the artificial gems have for their basis a very fusible, highly transparent and brilliant, dense glass, which is known under the name of *frit, paste, strass, flux, fondant*, or *Mayence base*, and which in its state of greatest excellence constitutes the *artificial diamond.* For convenience this will be noticed here under its last synonyme. (See *below.*)

Amethyst. 1. *Paste* or *strass*, 500 gr.; *oxide of manganese*, 3 gr.; *oxide of cobalt*, 2 gr.

2. (M. Douault-Wiéland.) *Strass*, 4608 gr.; *oxide of manganese*, 36 gr.; *oxide of cobalt*, 24 gr.; *purple of cassius*, 1 gr.

3. (M. Lançon.) *Strass*, 9216 gr.; *oxide of manganese*, 15 to 24 gr.; *oxide of cobalt*, 1 gr.

Aqua Marina. From *strass*, 4800 gr.; *glass of antimony*, 30 gr.; *oxide of cobalt*, 1½ gr. See *Beryl*, of which this is merely a variety.

Aventurine. 1. From *strass*, 500 gr.; *scales of iron*, 100 gr.; *protoxide of copper*, 50 gr.; fuse until the protoxide of copper is reduced to the reguline form, then allow the mass to cool very slowly, so that the minute crystals of metal may be equally diffused through it. Has a rich golden iridescence.

2. As the last, but substituting *oxide of chromium* for the protoxide of copper. Appears brown, filled with countless gold spangles; or, when mixed with more paste, of a greenish gray, filled with green spangles.

Beryl. (M. Douault-Wiéland.) *Strass*, 3456 gr.; *glass of antimony*, 24 gr.; *oxide of cobalt*, 1½ gr. See *Aqua Marina.*

Carbuncle. See *Garnet.*

Chrysolite. From *strass*, 7000 gr.; pure *calcined sesquioxide of iron* (crocus martis), 65 gr.

Cornelian. 1. (*Red.*) From *strass*, 7000 gr.; *glass of antimony*, 3500 gr.; *calcined peroxide of iron*, 875 gr.; *binoxide of manganese*, 75 gr.

2. (*White.*) From *strass*, 7200 gr.; *calcined bones*, 250 gr.; *washed yellow ochre*, 65 gr.

Diamond. 1. From *rock crystal* (purest), 1600 gr.; *borax*, 560 gr.; *carbonate of lead* (pure), 3200 gr.; *oxide of manganese*, ½ to 1 gr.; powder each separately, mix them together, fuse the mixture in a clean crucible, pour the melted mass into water, separate any reduced lead, and again powder and remelt the mass.

2. *Pure silica*, 150 gr.; *pure litharge*, 250 gr.; *borax* and *nitre*, of each, 50 gr.; *arsenious acid*, 21 gr.

3. (M. Douault-Wiéland.)—*a.* From *rock crystal*, 4056 gr.; *minium*, 6300 gr.; *potash*, 2154 gr.; *borax*, 276 gr.; *arsenic*, 12 gr.

b. From *rock crystal*, 3600 gr.; *ceruse of Clichy* (pure carbonate of lead), 8508 gr.; *potash*, 1260 gr.; *borax*, 360 gr.

4. (M. Fontanier.) *Pure silica*, 8 oz.; *salt of tartar*, 24 oz.; mix, bake, cool, treat the fused mixture with *dilute nitric acid* until effervescence ceases, and afterwards with *water* as long as the "washings" affect litmus paper; next dry the powder, add to it of *pure carbonate of lead*, 12 oz., and to every 12 oz. of the mixture add of *borax*, 1 oz.; triturate in a porcelain mortar, melt in a clean crucible, and pour the fused mass into *cold water;* dry, powder, and repeat the process a *second* and a *third* time in a clean crucible, observing to separate any revived lead. To the *third frit* add of *nitre*, 5 dr.; and again melt. The product is perfectly limpid and extremely brilliant.

5. (M. Lançon.) *Litharge*, 100 gr.; *pure silica*, 75 gr.; *white tartar* or *potash*, 10 gr.

6. (Loysel.) *Pure silica*, 100 parts; *red oxide of lead* (minium), 150 parts; *calcined potash*, 30 to 35 parts; *calcined borax*, 10 parts; *arsenious acid*, 1 part. This produces a paste which has great brilliancy and refractive and dispersive powers, and also a similar specific gravity to the oriental diamond. It fuses at a moderate heat, and acquires the greatest brilliancy when remelted, and kept for 2 or 3 days in a fused state, in order to expel the superabundant alkali, and perfect the refining. (Polytech. Journ.) The products of the above formula are not only employed to imitate the diamond, but they also form the basis of the other factitious gems.

7. (*Parisian Diamonds.*) These beautiful imitations of the "priceless gem," which have lately attracted so much attention, are made by a chemist in Paris, and are only fused *oxide of tin.* It is to be regretted that the brilliancy which has rendered this imitation so famous, cannot be depended upon, as, after exposure for some time, they become as dull as common glass. (Mining Journal.)

8. (*Yellow Diamond.*) *Strass*, 500 gr.; *glass of antimony*, 10 gr.

Eagle Marine. From *strass*, 3840 gr.; *copper stain*, 72 gr.; *pure zaffre*, 1 gr.

Emerald. 1. From *strass*, 7000 gr.; *carbonate of copper*, 65 gr.; *glass of antimony*, 7 gr.

2. *Paste*, 960 gr.; *glass of antimony*, 42 gr.; *oxide of cobalt*, 3¼ gr.

3. (M. Douault-Wiéland.) *Paste*, 4608 gr.; *green oxide of copper*, 42 gr.; *oxide of chrome*, 2 gr.

4. (M. Lançon.) *Paste*, 9612 gr.; *acetate of copper*, 72 gr.; *peroxide of iron*, 1½ gr.

Garnet, Oriental do., Syrian do., Ancient Carbuncle.—1. *Paste* or *strass*, 1200 gr.; *glass of antimony*, 580 gr.; *purple of cassius* and *binoxide of manganese*, of each, 3 gr.

2. (M. Douault-Wiéland.) *Paste*, 512 gr.; *glass of antimony*, 256 gr.; *purple of cassius* and *oxide of manganese*, of each, 2 gr.

3. (*Vinegar Garnet.*) From *paste*, 7000 gr.; *glass of antimony*, 3460 gr.; *calcined peroxide of iron*, 56 gr.

Lapis Lazuli. From *paste*, 7000 gr.; *calcined horn* or *bones*, 570 gr.; *oxides of cobalt* and *manganese*, of each, 24 gr. The *golden veins* are produced by painting them on the pieces with a mixture of *gold powder*, *borax*, and *gum water*, and then gently heating them until the borax fluxes.

Opal. 1. From *strass*, 960 gr.; *calcined bones*, 48 gr.

2. (Fontanier.) *Paste*, 1 oz.; *horn silver*, 10 gr.; *calcined magnetic ore*, 2 gr.; *absorbent earth* (calcined bones), 26 gr.

Ruby. 1. *Paste*, 45 parts; *binoxide of manganese*, 1 part.

2. *Paste*, 1 *lb.; purple of cassius*, 3 dr.

3. (M. Douault-Wiéland.) — *a.* From *paste*, 2880 parts; *oxide of manganese*, 72 parts.

b. Topaz-paste that has turned out opaque, 1 part; *strass*, 8 parts; fuse them together for 30 hours, cool, and again fuse it in small pieces before the blowpipe. Very fine.

4. (M. Fontanier.) *Strass*, 16 oz.; *precipitate of cassius*, *peroxide of iron*, *golden sulphuret of antimony*, and *manganese calcined with nitre*, of each, 168 gr.; *rock crystal*, 2 oz., or more.

5. *Paste* and *glass of antimony*, of each, 8 oz.; *rock crystal*, 1 oz.; *purple of cassius*, $1\frac{1}{2}$ dr. Turns on the orange.

Sapphire. 1. From *strass*, 3600 gr.; *oxide of cobalt*, 50 gr.; *oxide of manganese*, 11 gr.

2. (M. Douault-Wiéland.) *Paste*, 4608 gr.; *oxide of cobalt*, 68 gr.; fuse in a luted Hessian crucible for 30 hours.

3. (M. Fontanier.) *Paste*, 8 oz.; *oxide of cobalt*, 49 gr.

Topaz. 1. From *strass*, 1050 gr.; *glass of antimony*, 44 gr.; *purple of cassius*, 1 gr.

2. (M. Douault-Wiéland.) *Paste*, 3456 gr.; *calcined peroxide of iron*, 36 gr.

Turquoise. From *blue paste*, 20 to 24 parts; *calcined bones*, 1 part.

Concluding Remarks. It is absolutely necessary for the successful application of the preceding formulæ, that the substances employed should be perfectly free from impurities, more particularly those of a mineral kind. The litharge, oxide of lead, and carbonate of lead, above all things, must be entirely free from oxide of tin, as the smallest particle of that substance may impart a "milkiness" to the paste. All the ingredients must be separately reduced to powder, and, after being mixed, sifted through lawn. The fusion must be carefully conducted and continuous, and the melted mass should be allowed to cool *very* slowly, after having been left in the fire for 24 to 30 hours, at the least. Hessian crucibles are preferred for this purpose, and the heat of an ordinary pottery or porcelain kiln is sufficient in most cases; but a small wind-furnace, devoted exclusively to the purpose, is, in general, more convenient. It is found that the more tranquil, continuous, and uniform the fusion, the denser and clearer is the paste, and the greater its refractive power and beauty.

All the coloured vitreous compounds noticed at *pp.* 369-371, may be worked up as ornamental stones, in the same way as those just referred to.

It may be further observed that the beauty of *pastes* or *factitious gems*, and especially the brilliancy of *mock diamonds*, is greatly dependent upon the *cutting*, *setting up*, and the skilful arrangement of the *foil* or *tinsel* behind them. See *Enamels, Foils, Gems, Glass, &c.*

The *following method* of obtaining *artificial rubies* and *emeralds*, first pointed out by Boettger, is exceedingly simple and inexpensive, and deserves the serious attention of those interested in this ingenious art:—*Recently precipitated* and *well washed hydrate of alumina* is moistened with a few drops of *neutral chromate of potassa*, and kneaded so that the mass assumes a tinge scarcely perceptible; it is then rolled out into small sticks, about the thickness of a finger, and slowly dried, taking the precaution to fill the fissures (if any) that form during desiccation with fresh *hydrate of alumina.* When perfectly dry, and after having been submitted to a gentle heat, one end of these sticks is brought into the termination of the flame of an *oxyhydrogen blowpipe*, until a portion of the mass is fused into a small globule. After the lapse of a few minutes, several minute balls form, having a diameter of some millimetres, and of such intense hardness, that quartz, glass, topaz, and granite, may be easily and perceptibly scratched with them. These, when cut and polished, appear, however, slightly opaque. By employing *nitrate of nickel* in lieu of chromate of potassa, green-coloured globules, closely resembling the *emerald*, are obtained.

By the substitution of oxide of chromium for chromate of potassa, we have procured factitious gems of considerable hardness and beauty, though slightly opaque in some portion of the mass. The addition of a very little silica prevents, in a great measure, this tendency to opacity.

PASTELS. Coloured crayons. (See *p.* 295.)

PASTIL. Syn. *Pastille; Pastillus, Pastillum,*—Lat. A lozenge or confection. The pastilles (*pastilli*) of French pharmacy, are merely "*confectionery drops*" aromatized or medicated. The name is also given to mixtures of odorous substances made up into small cones and burnt as incense. (See *below.*)

PASTILS (Explosive). Fumigating pastilles, containing a little gunpowder. *Used* to produce diversion, but they often prove far from harmless.

PASTILS (Fumigating). Syn. *Aromatic Pastilles, Incense do.; Clous Fumans; Pastille Fumantes, P. Odorati,* — Lat. *Prep.* 1. *Benzoin,* 4 *oz.; cascarilla,* ½ *oz.; nitre* and *gum arabic,* of each, 3 *dr.; myrrh,* 1 *dr.; oils of nutmeg* and *cloves,* of each, 25 drops; *charcoal,* 7 *oz.;* all in fine powder; beat them to a smooth ductile mass with *cold water,* q. s.; form it into small cones with a tripod base, and dry them in the air.

2. (Henry and Guibourt.) Powdered *gum benzoin,* 16 parts; *balsam of tolu* and *powdered sandal wood,* of each, 4 parts; a *light charcoal* (Linden), 48 parts; *powdered tragacanth* and *true labdanum,* of each, 1 part; *powdered nitre* and *gum arabic,* of each, 2 parts; *cinnamon water,* 12 parts; as above.

3. (P. Cod.) *Benzoin,* 2 oz.; *balsam of tolu* and *yellow sandal wood,* of each, 4 dr.; *nitre,* 2 dr.; *labdanum,* 1 dr.; *charcoal,* 6 oz.; mix with a *solution* of *gum tragacanth,* and divide the mass into pastilles, as before.

4. (*Pastilles à la fleur d'orange.*) For *powdered roses* in the next formula substitute *pure orange powder,* and for the essence of roses use *pure neroli.*

5. (*Pastilles à la rose.*) *Gum benzoin, olibanum* (in tears), and *styrax* (in tears), of each, 12 *oz.; nitre,* 9 *oz.; charcoal,* 4 *lb.; powder of pale roses,* 1 *lb.; essence of roses,* 1 *oz.;* mix with 2 *oz.* of *gum tragacanth,* dissolved in *rose water,* 1 quart.

6. (*Pastilles à la Vanille.*) *Gum benzoin, styrax,* and *olibanum* (as last), of each, 12 *oz.; nitre,* 10 *oz.; cloves,* 8 *oz.; powdered vanilla,* 1 *lb.; charcoal,* 4½ *lb.; oil of cloves,* ½ *oz.; essence of vanilla,* 7 or 8 fl. oz.; as before.

Obs. The products of the above formulæ are all of excellent quality. They may be varied to please the fancy of the artiste, by the addition or substitution of other perfumes or aromatics. Cheaper pastilles may be made by simply increasing the quantity of the *charcoal* and *saltpetre.* The whole of the ingredients should be reduced to fine powder before mixing them. The use of *musk* and *civet,* so often ordered in pastilles, should be avoided, as they yield a disagreeable odour when burned. The addition of a little *camphor* renders them more suitable for a sick chamber. The simplest and most convenient way of forming the mass into cones, is by pressing it into a mould of lead or porcelain.

Pastilles are burned either to diffuse a pleasant odour, or to cover a disagreeable one. For this purpose they are kindled at the apex, and set on an inverted saucer or a penny-piece to burn. Persons who use them frequently employ a small china or porcelain toy (*pastille house*) sold for the purpose.

PASTILS (Mouth). Syn. *Breath Pills, Cachou Lozenges; Cachou Aromatisé, C. Aromatique, C. de Bologna, Grains de Cachou; Pastilli Cosmetici,*—Lat. *Prep.* 1. *Soft extract of liquorice,* 3 *oz.; gum catechu* and *white sugar,* of each, 1 *oz.; gum tragacanth* (powdered), ½ *oz.; oil of cloves,* 1 *dr.; oil of cassia,* ½ *dr.; essence of ambergris* and *oil of nutmeg,* of each, 12 drops; make a firm mass with *rose* or *orange-flower water,* q. s., and divide it into one-grain pills; when these are dry, cover them with gold or silver leaf.

2. *Solazzi juice* (dried by a gentle heat and powdered), 4 *oz.; lump sugar,* 3 *oz.; powdered catechu,* 2 *oz.; powdered tragacanth,* 1 *oz.; oil of cloves,* 2 fl. dr.; *oil of cassia,* 1 fl. dr.; *white of egg* or *rose water,* q. s. to form a pill-mass; as before.

3. *Powdered catechu,* 1 *oz.; Solazzi juice,* 4 *oz.; lump sugar,* 12 *oz.; oils of cloves, cassia,* and *peppermint,* of each, 1 fl. dr.; *mucilage of tragacanth,* q. s. to mix; as before.

4. *Extract of liquorice* (soft), 2 *oz.; white sugar,* 3 *oz.; powdered tragacanth* and *cascarilla* (or *orris root*), of each, ½ *oz.; oil of cloves,* ½ fl. dr.; *oil of cassia,* 12 drops; *water,* q. s.; as before.

5. (M. Chevallier.) *Powdered coffee, chocolate,* and *sugar,* of each, 1½ *oz.; powdered vanilla* and *freshly burnt charcoal,* of each, 1 *oz.; mucilage of tragacanth,* q. s.

6. *Chloride of lime* (dry and good), 1 dr.; *white sugar,* 3 *oz.; powdered tragacanth,* 1 *oz.; oil of cloves,* 30 drops; *rose water,* q. s. To disinfect the breath.

Obs. Almost every maker employs his

own forms for these articles. The objects to be aimed at, are the possession of a rather powerful and persistent odour, and a toughness to prevent their too rapid solution in the mouth. The original Italian formula included *liquorice*, *mastic*, *cascarilla*, *charcoal*, *orris root*, *oil of peppermint*, and the *tinctures of ambergris* and *musk*, but is now seldom employed in this country. The flavour of peppermint does not, indeed, appear to be approved of by English smokers. Sometimes, instead of being made perfectly spherical, they are flattened a little.

Cachou à l'ambre gris, *Cachou à la Canelle*, *Cachou à la fleurs d'Orange*, *Cachou Musqué*, *Cachou à la Rose*, *Cachou à la Vanille*, *Cachou à la Violette*, *&c.*, are merely flavoured and scented respectively with the essences or oils of ambergris, cinnamon, neroli, musk, rose, vanilla, violets, &c. See *Breath*, *Cachou Aromatisé*, *Lozenges*, *Pills*, *&c.*

PASTRY. Articles of food made of "paste" or dough, or of which "paste" forms a principle and characteristic ingredient. The word is popularly restricted to those which contain *puff-paste*, or such as form the staple productions of the modern pastrycook; but it is, in reality, of much more general signification.

Several varieties of *paste* are prepared for different purposes, of which the following are the principal:—

Puff Paste. The production of a first-class puff paste is commonly regarded as a matter of considerable difficulty, but by the exercise of the proper precautions, it is, on the contrary, an extremely simple affair. This paste, before being placed in the oven, consists of alternate laminæ of butter or fat, and ordinary flour dough, the latter being, of course, the thicker of the two. During the process of baking, the elastic vapour disengaged, being in part restrained from flying off by the buttered surfaces of the dough, diffuses itself between these laminæ, and causes the mass to swell up, and to form an assemblage of thin membranes or flakes, each of which is more or less separated from the other. Individually these flakes resemble those of an ordinary rich unleavened dough when baked; but, collectively, they form a very light crust, possessing an extremely inviting appearance, and an agreeable flavour.

The *precautions* above referred to are—the use of *perfectly dry flour*, and its conversion into dough with a "light hand," avoiding unnecessarily working it,—the use of *butter free from water* or *buttermilk*, and which has been reduced to *precisely the same degree of plasticity* as the *dough* between which it is to be rolled,—conducting the operation in a *cool apartment*, and after the second or third folding of the dough *exposing* it to a *rather low temperature* before proceeding further with the process; and lastly,—*baking the paste* in a *moderately smart* but not too hot an oven. The following are examples:—

1. (*Rich.*) Take of *flour*, 1 *lb.*; *butter*, ¼ *lb.*; *cold spring-water*, q. s.; make a moderately soft flexible dough, then roll in (as described above) of *dry fresh butter*, ½ *lb.*

2. (*Ordinary.*) Take of *flour*, 1 *lb.*; *cold water*, q. s.; make a dough, and roll in, as before, of *butter*, 6 *oz.*

3. (Rundell.) Take ¼ peck of *flour*, rub into it 1 *lb.* of *butter*, and make a *light paste* with *cold water*, just stiff enough to work well; next lay it out about as thick as a crown-piece; put a layer of *butter* all over it, sprinkle on a little flour, double it up, and roll it out again; by repeating this with fresh *layers of butter* three or four times, or oftener, a very light paste will be formed. Bake it in a moderately quick oven.

4. (Soyer.) Put 1 *lb.* of *flour* upon your pastry slab, make a hole in the centre, into which put a tea-spoonful of *salt*, mix it with *cold water* into a *softish flexible paste* with the right hand, dry it off a little with *flour* until you have well cleared the paste from the slab, but *do not work it more than you can possibly help*; let it remain for 2 or 3 *minutes upon the slab*, then take 1 *lb.* of *fresh butter*, from which you have squeezed all the buttermilk in a cloth, and brought to the *same consistency as the paste*, upon which place it; press it out flat with the hand, then fold over the edges of the paste so as to hide the butter, and reduce it with the rolling-pin to the thickness of about ½ an inch, when it will be about two feet in length; fold over one third, over which again pass the rolling-pin; then fold over the other third, thus forming a square; place it with the ends top and bottom before you, shaking a little flour both under and over, and repeat the rolls and turns twice again as before; flour a *baking-sheet*, upon which lay it, on ice, if handy, or otherwise, in some cool place, for about half an hour; then roll it twice more, turning it as before, and again place it upon *ice* or in the *cold* for ¼ of an hour; next give it *two* more rolls, *making seven in all*, and it is ready for use. "You must continually add *enough flour* while rolling to prevent your paste *sticking to the slab*."

Half-puff Paste. As the preceding, using only *one half* the *quantity of butter*, and giving the paste only 3 or 4 folds.

Short Paste, Short Crust.—1. *Flour* (dry and warm), 1 *lb.; sugar*, 3 *oz.; butter*, ¼ *lb.;* 2 *eggs; water*, ½ pint; make a light dough. If one half of "*Jones's patent flour*" be used, no eggs will be required.

2. (Soyer.) Put on the "*paste slab*" or "*pie board*" 1 *lb.* of *flour*, 2 *oz.* of *pounded sugar*, 6 *oz.* of *butter*, 1 *egg*, ½ tea-spoonful of *salt*, and ½ pint of *water;* mix the sugar and butter well together, add them with the water by *degrees* to the flour, and form a paste, but firmer than puff paste.

Pie Paste. That commonly used is "*short paste*," varied at will; but at good tables the *upper crust* of the pie is generally made of "*puff paste*," and the *remainder* of "*short paste*."

Pudding Paste. This for *baked puddings* may resemble the last. For *boiled puddings* (or indeed for any) the paste may be either ordinary "*short paste*," or one made with 2 to 6 *oz.* of *butter* or *lard*, or 3 to 8 *oz.* of *chopped beef suet*, to each *lb.* of *flour*, with or without an *egg*, and a *little sugar*, according to the means of the parties. The *first* is most appropriate for those containing *fresh fruit*, and that with suet for *meat puddings*, and those containing *dried fruit*, as grocer's currants, plums, &c. *Milk* or *milk-and-water* is often used instead of simple water to make the dough. *Ginger, spices, savory herbs, &c.*, are common additions to the crusts of puddings. Where economy is an object, and especially among the lower classes, *kitchen fat* is frequently substituted for suet, and *lard* for butter. When "*Jones's patent flour*" is employed, an excellent *plain pudding paste* may be made by simply mixing it up with *very cold water*, and immediately putting it into the water, which should be boiling, and kept in that state until the pudding is dressed.

PATENT MEDICINES. Syn. *Medicamenta Arcana*,—Lat. The majority of the preparations noticed under this head are the *nostrums* popularly termed "*Quack Medicines*," and which are sold with a *Government stamp* (!!) attached to them. A few other *secret* or *proprietary remedies* are also, for convenience, included in the list. An alphabetical arrangement based on the names of the reputed inventors or proprietors of the articles has been adopted, as being the one best suited for easy reference. The composition of a number of them is given from careful personal inspection and analysis, and that of the remainder on the authority of Gray, Griffith, Paris, Redwood, the Philadelphia College of Pharmacy, and other respectable writers.

(Those desirous of receiving further information on the *composition* of the *leading advertised nostrums* of the present day, and the doings of their vendors and proprietors, are referred to the "*Anatomy of Quackery*," or to the "*Medical Circular*," vols. ii, iii, iv, and v, in which most of the papers forming it appeared. A variety of articles not included in the following list are noticed along with other preparations of the class to which they belong, or under the names of their proprietors. See *Balms, Cerates, Drops, Pills, &c.*)

Albinolo's Ointment. See *Holloway's Ointment.*

Ali Ahmed's Treasures of the Desert. There are three preparations included under this name:—

a. (*Antiseptic Malagma.*) From *lead plaster*, 3 parts; *gum thus* and *salad oil*, of each, 2 parts; *bees' wax*, 1 part; melted together by a gentle heat, and spread upon calico.

b. (*Pectoral Antiphthisis* or *Cough Pills.*) From *myrrh*, 3½ *lb.; squills* and *ipecacuanha*, of each, 1 *lb.;* (all in powder;) *white soft soap*, 10 *oz.; oil of aniseed*, 1¼ *oz.; treacle*, q. s. to form a pill mass.

c. (*Sphairopeptic* or *Antibilious Pills.*) From *aloes*, 28 *lb.; colocynth pulp*, 12 *lb.; rhubarb*, 7 *lb.; myrrh* and *scammony*, of each, 3½ *lb.; ipecacuanha*, 3 *lb.; cardamom seeds*, 2 *lb.;* (all in powder;) *soft soap*, 9 *lb.; oil of juniper*, 7 fl. oz.; *treacle*, q. s. This, as well as the last, is divided into 3½-gr. pills, which are then covered with tin foil or silver leaf. An excellent aperient pill no doubt, and one likely to prove useful in all those cases in which the administration of a mild diaphoretic and stomachic purge is indicated. Unlike many of the advertised nostrums of the day there is nothing in their composition that can, by any possibility, prove injurious; but *beyond* this they are destitute of virtue.

For a *history* of the incubation and advent of "Ali Ahmed's Treasures of the Desert" (one of the most warily conceived and energetically carried-out quackeries of modern times), vide *Anat. of Quackery*, or *Med. Cir.*, ii, 328, 347-8, 386, &c.

Anglo-Yankee Sarsaparilla. See *Sarsaparilla.*

Anodyne Drops. See *p.* 340.

Antidynous Lotion. See *p.* 698.

Aperient Biscuits. See *Cakes* (Medicated.)

Baby Poisons. For an exposition of the effects of a number of nostrums vended for the especial service of unnatural mothers and drunken nurses, we must refer the reader to *Med. Cir.*, ii, 266, 286, &c.

Balm of Rackasiri. See *p.* 110.

Baume de Vie. See *Balsam of Life.*

Betton's British Oil. From *oil of turpentine*, 1 pint; *Barbados tar*, ½ *lb.; oil of rosemary*, 1 fl. oz.

Blake's Green-mountain Ointment. We are told that the active ingredient in this compound is *arnica montana*, with a basis of *soap cerate.* It is very useful as an external application in several affections, and testimonials as to its efficacy have been given by Mr. A. B. Harrison, and other surgeons who have tried it. The chief objection to its use, is that it is a secret preparation.

Blake's Toothache Essence. From *alum*, in fine powder, 1 dr.; *sweet spirit of nitre*, 5 dr.

Boerhaave's Odontalgic. From *opium*, ½ dr.; *oil of cloves*, 2 dr.; *powdered camphor*, 5 dr.; *rectified spirit*, 1½ fl. oz.

Bouchardat's Tasteless Aperient. From *phosphate of soda*, ⅝ *oz.*, placed in a soda-water bottle, which is then filled up with *carbonated water*, at the bottling machine. For a *dose.*

Brande's Tooth Tincture. From *pellitory of Spain* (bruised), 1 oz.; *camphor*, ¾ oz.; *opium*, ¼ oz.; *oil of cloves*, 1 dr.; digested for 10 days in *rectified spirit*, ½ pint.

Brodum's Nervous Cordial. See *p.* 291.

Cachou Aromatisé. See *Pastils.*

Chamomile Drops. See *Essence of Chamomile.*

Clarke's Conglutinum. See *p.* 282.

Cochrane's Cough Remedy. Acidulated syrup of poppies.

Corn Nostrums. See *p.* 293.

Cottereau's Odontalgic Essence. A nearly saturated *ethereal solution of camphor*, mixed with about $\frac{1}{12}$th of its volume of strong *liquor of ammonia.*

Coupelle's Crinoline or *Crinutriar.* Ordinary fatty matter agreeably scented.

Curtis's Anti-venereal Lotion. A mixture of Beaufoy's *solution of chloride of lime*, 2 fl. oz., with *cold soft water*, 8 fl. oz. For *use* 1 to 2 table-spoonfuls are put into a wine-glassful of water.

Dalby's Carminative. 1. (Dr. Paris.) *Carbonate of magnesia*, 40 gr.; *tincture of castor* and *compound tincture of cardamoms*, of each, 30 drops; *tincture of assafœtida* and *spirit of pennyroyal*, of each, 15 drops; *laudanum*, 5 drops; *oil of aniseed*, 3 drops; *oil of nutmeg*, 2 drops; *oil of peppermint*, 1 drop; *peppermint water*, 2 fl. oz. *Dose.* ½ to 1 tea-spoonful. The bottle should be well shaken before pouring it out.

2. (Wholesale.) *Carbonate of magnesia*, 1 *oz.; tincture of castor*, 5 fl. dr.; *tincture of assafœtida*, 3 fl. dr.; *oils of aniseed* and *pennyroyal*, of each, ½ fl. dr.; *oil of nutmeg*, 15 drops; *syrup of poppies*, 7 *oz.; rectified spirit*, 3½ fl. oz.; *peppermint water*, ½ pint; as before.

Davidson's Cancer Remedy. A mixture of *arsenious acid* and *hemlock*, both in powder. (Dr. Paris.)

Davis's (Dr.) *Calorific.* The "*liquid*" is *commercial acetic acid* (sp. gr. 1·048), diluted with about an equal volume of *water*, and coloured with *burnt sugar* or *spirit colouring.* The "*shield*" consists of a piece of *red flannel* backed with *oil skin* to prevent evaporation. A few drops of the *calorific* are sprinkled on the flannel, which is then bound over the affected part. The heat of the body gradually volatilizes the acetic acid, and the escape of the vapour being prevented by the oil skin, a strongly counter-irritant action is set up.

De Jongh's "Light-brown Cod-liver Oil." See *p.* 847 to 850.

Derbyshire's Embrocation. From *opium* and *mottled soap*, of each, 2 oz.; *extract of henbane*, 2 dr.; and *mace*, ½ dr.; boiled for 30 minutes in *water*, 3 pints; to the cold liquor, *rectified spirit*, 1 quart, and *liquor of ammonia*, 1 fl. oz., are added, and, after repose, the clear portion is decanted. As a preventive of sea-sickness.

Deshler's Cerate. Yellow basilicon.

Duncan's Gout Remedy. See *Gout.*

Dutch Ague Remedy. A mixture formed of *Peruvian bark* and *cream of tartar*, of each, 1 oz.; *cloves*, ½ dr.; reduced to fine powder. *Dose.* 1½ dr. every 3 hours. (Dr. Paris.)

Eau de Magnanimité. An *aromatized tincture of ants.*

Electuaire Arabique. See *Traitment Arabique.*

Gants Cosmetiques. See *Gloves.*

Gingerbread (Purgative). Each cake weighs about ¼ *oz.*, and contains 5 to 6 gr. of *powdered jalap.* The *dose* is 2 to 4.

Godfrey's Cordial. 1. (Original formula.) *Opium* (sliced), ¼ oz.; *sassafras chips*, 1 oz.; *English brandy*, 1 quart; macerate for 4 or 5 days, then add of *water*, 1 quart; *treacle*, 3½ ℔; and simmer the whole gently for a few minutes; the next day decant the clear portion.

2. (Dr. Paris.) *Aniseed, caraways*, and *corianders*, of each, bruised, 1 oz.; *sassafras chips*, 9 oz.; *water*, 6 pints; simmer gently until reduced to 4 pints, then add of *treacle*, 6 ℔; and when nearly cold, further add of *tincture of opium*, 3 fl. oz.

3. (Phil. Col. of Phar.) *Carbonate of*

potassa, 2½ oz.; *water*, 26 pints (old wine measure); dissolve, add of *sugar-house molasses* (treacle), 16 pints (o. w. m.); simmer the mixture, remove the scum, and when it has considerably cooled, add of *tincture of opium*, 24 fl. oz.; *oil of sassafras*, ½ fl. oz.; (dissolved in) *rectified spirit*, 1 quart (o. w. m.) It contains about 16 drops of laudanum (= 1⅛ gr. of *opium*) in each fl. oz.

The following forms are also current in the wholesale trade:—

4. From *molasses*, 16 *lb.; distilled water*, 2¾ gall.; *oil of sassafras*, 1 fl. oz.; (dissolved in) *rectified spirit*, ½ gall.; *bruised ginger*, ¾ *oz.; cloves*, ½ *oz.; laudanum*, 8 fl. oz.; macerate for 14 days, and strain through flannel.

5. *Sassafras chips*, 1 *lb.; ginger* (bruised), 4 *oz.; water*, 3 gall.; simmer until reduced to 2 gall., then add of *treacle*, 16 *lb.; rectified spirit*, 7 pints; *laudanum*, 1 pint.

6. *Opium*, ½ *oz.; treacle*, 7 *lb.; boiling water*, 1 gall.; dissolve, and add of *rectified spirit*, 1 quart; *oil of sassafras*, ½ dr.; *cloves* and *mustard seed*, of each, ¼ *oz.; coriander* and *caraway seeds*, of each, 1 dr.; digest for a week.

7. *Caraways*, *corianders*, and *aniseed*, of each, 1 *lb.; water*, 6 gall.; distil 5 gall., and add of *treacle*, 28 *lb.; laudanum*, 1 quart; and *oil of sassafras*, 1 fl. oz., previously dissolved in *rectified spirit*, 1 gall.

Obs. This preparation is anodyne and narcotic, and, amongst the lower classes, is commonly given to children troubled with wind or colic. Its frequent and excessive use has sent many infants prematurely to the grave. Gray says, "*It is chiefly used to prevent the crying of children in pain or starving.*" The dose is ⅓ tea-spoonful and upwards, according to the age and susceptibility of the child.

Golden Spirit of Scurvy Grass. From a *mixture* of the *juice of scurvy grass* (cochlearia officinalis,—*Linn.*) and *proof spirit*, equal parts; coloured with *gamboge*.

Grains (various). See *Pilules Angeliques*, *Dinner Pills*, *&c.*

Graves' Gout Preventive. A tincture prepared by steeping, for a week, *dried orange peel* and *hiera picra*, of each, 1 *oz.*, and *rhubarb*, ½ *oz.*, in *brandy*, 1 pint.

Grinrod's (Dr.) *Remedy for Spasms.* From *acetate of morphia*, 1 gr.; *spirit of sal volatile* and *sulphuric ether*, of each, 1 fl. oz.; *camphor julep*, 4 fl. oz.; for a mixture. It should be kept closely corked, in a cool place, and should be well shaken before use. *Dose.* A tea-spoonful in a glassful of cold water or wine, as required. It is a really valuable preparation.

Hawkin's Essence for the Headache. See *p.* 389.

Herrendschwand's Specific. A mixture of *gamboge*, 10 gr., with *carbonate of potassa*, 20 gr. (Dr. Paris.)

Holloway's Ointment. The original formula of *Albinolo's ointment*, of which this pretends to be a re-production, contains the "graisses de serpent et de vipère," curiosities only to be obtained "à la manufacture de Felix Albinolo, R.D.B." (?) or "à Paris, chez M. C. C——, Pharmacien, Rue——." The principal ingredients, however, in both *Albinolo's* and *Holloway's ointment* of the present day,—if, indeed, it were ever otherwise, are butter, wax, and resin. The formula adopted by those who prepare an imitation ointment on the large scale, and which closely resembles, if it be not actually identical with that employed by Mr. Holloway, is as follows:—*Fresh butter*, (free from water), ¾ *lb.; bees' wax* (good), 4 *oz.; yellow resin*, 3 *oz.;* melt them together, add of *vinegar of cantharides*, 1 fl. oz., and simmer the whole, with constant agitation, for 10 or 12 minutes, or until the moisture is *nearly* evaporated; then add of *Canada balsam*, 1 *oz.; expressed oil of mace*, ½ *dr.; balsam of Peru* or *liquid styrax*, 10 or 12 drops; again stir well, allow the mixture to settle, and when it is about half cold (not before) pour it into the pots, previously *slightly* warmed, and allow it to cool very slowly. The label will do the rest. No two samples of Holloway's ointment are precisely of the same colour or consistence.

Holloway's Pills. From *aloes*, 4 parts; *jalap*, *ginger*, and *myrrh*, of each, 2 parts; made into a mass with *mucilage*, and divided into 2-grain pills, of which about 4 dozen are put into each 1s. 1½d. box. (For a full exposition of the Hollowayan quackery and nostrums, see "*Anat. of Quackery*," or "*Med. Circ.*," ii, 45, 67, 86.)

Jackson's Bathing Spirit. A species of soap liniment, made of *soft soap*, 1 ℔; *camphor*, 6 oz.; *oils of rosemary* and *thyme*, of each, ¾ fl. oz.; *rectified spirit*, 1 gall.

Kaye's Infant's Preservative. A preparation partaking of the joint properties of Atkinson's nostrum and Godfrey's cordial, but more powerful than either, as indicated by the doses in which it is directed to be given during early infancy; viz., "*two, three*, or more drops." (*Med. Circ.*, ii, 248.)

Keating's Cough Lozenges. These are said to be composed of—*Lactucarium*, 2 dr.; *ipecacuanha*, 1 dr.; *squills*, ¾ dr.; *extract* *of liquorice*, 2 oz.; *sugar*, 6 oz.; made into a mass with *mucilage of tragacanth*, and divided into 20-gr. lozenges. (*Anat. of Quackery.*)

King's Sarsaparilla Pills. From the *compound extract.* "Instead of two pills being equivalent to ½ fl. oz. of the *concentrated decoction* or *essence of sarsaparilla*, as asserted, it takes about 32 of them to represent the given quantity, and about 4 of them to be equal in strength to the *common* decoction of the pharmacopœia." "Instead of one 2*s.* 9*d.* box of these pills being equal to a pint of the costly concentrated fluid preparation, it would take nearly 1½ *lb.* of them for that purpose." (*Med. Circ.*, ii, 493.)

Kitchener's Peristaltic Persuaders. See *Pills.*

Lambert's Asthmatic Balsam. The active ingredients in this compound are said to be *squills* and *aqueous extract of opium.*

Lemazurier's Odontalgic Essence. From *acetate of morphia*, 1 gr.; dissolved in *cherry-laurel water*, 1 oz. For *use*, a teaspoonful is added to ½ a wine-glassful of warm water, and the mouth well rinsed out with the mixture.

Leroy's Purgative.—a. (No. 1.) *Vegetable turbith*, 6 dr.; *scammony*, 1½ oz.; *jalap*, 6 oz.; *brandy*, 10 pints; digest for 24 hours, and add a syrup made of *senna*, 6 oz.; *water*, 1¼ pint; *sugar*, 32 oz.

b. (No. 2.) As the last, only 1-3rd stronger.

c. (No. 3.) Twice as strong as No. 1.

Lewis's Electuarium. A liquid nostrum, said to be alterative and to contain a small quantity of both antimony and mercury.

Lewis's Balsamic Ointment. This preparation, which is declared by its proprietor to be "utterly unsurpassable," for the most part resembles Holloway's ointment. (*Med. Circ.*, ii, 493.)

Lewis's Silver Cream. This nostrum is said to depend for its efficacy on *white precipitate* and a *salt of lead.*

Locock's Pulmonic Lozenges. See *Wafers.*

Mahomed's Paste. See *Electuaries.*

Mardant's Norton's Drops. A mixture of the *tinctures of gentian* and *ginger*, holding in solution a little *bichloride of mercury*, and coloured with *cochineal.*

Marriott's Dry Vomit. A mixture of equal parts of *tartar emetic* and *sulphate of copper.*

Marsden's Drops. A coloured solution of *corrosive sublimate.* (Dr. Paris.)

Matthieu's Vermifuge.—a. (To destroy the worm.) *Tin filings*, 1 oz.; *male-fern root*, 6 dr.; *worm seed*, 4 dr.; *resinous extract of jalap* and *sulphate of potassa*, of each, 1 dr.; *honey*, q. s. to form an electuary. *Dose.* A tea-spoonful repeated every third or fourth hour, for 2 or 3 days, when the following is to be substituted, and continued until the bowels are well acted on.

b. (To expel the worms.) *Jalap* and *sulphate of potassa*, of each, 40 gr.; *scammony*, 20 gr.; *gamboge*, 10 gr.; *honey*, q. s.; as before.

McKinsey's (Baron) *Golden Cerate.* This appears to resemble *Poor man's friend.*

McKinsey's (Baron) *Katapotia.* This notorious nostrum is compounded of *aloes*, 5 *oz.; soap*, 1½ *oz.;* (both in powder;) beaten up with *syrup of saffron* and a little *essential oil*, and divided into pills varying in weight from 2 to 2½ gr. each. (*Med. Circ.*, iv, 86.)

McKinsey's Medicinal Powder, Rev. T. Smith's do. From *dried lavender flowers* and *rosemary tops*, of each, 2½ *oz.; asarabacca*, 1 *oz.;* reduced to powder, and further disguised with a *little perfume.* A very small quantity of *subsulphate of mercury* is also most probably added. Two or three pinches of this powder taken 3 or 4 times a day, as snuff, is said by the proprietor to be sufficient to cure almost every known disease. "This is the '*great remedy*' on which Baron McKinsey offers to stake his claim for immortality!" (See *p.* 95; also *Anat. of Quackery*, or *Med. Circ.*, ii, 32, 86.)

Moat's Sarsaparilla. Resembles the ordinary decoction of the shops. See *Pills.*

Montein's Barèges Balls. Nearly similar to No. 2, p. 106.

Morison's Aperient Powder. A mixture of *cream of tartar* and *lump sugar*, in nearly equal proportions, with sufficient *powdered cassia* to give it an aromatic flavour. See *Pills.*

Morrison's Adhesive Paste. See *Plasters.*

Norton's Drops. Similar to *Green's* or *Marsden's drops.*

Ollivier's Biscuits. Take of the *white of* 2 *eggs; water*, ¾ pint; beat them together, strain the mixture, and add to it a *solution* of *bichloride of mercury*, 76 gr.; collect the precipitate, wash, dry, powder, and carefully weigh it; next add it to such a quantity of *flour*, &c., that each 2-dr. biscuit may contain exactly ⅐ gr.

Papier Fayard. See *Gout Paper* (*p.* 931).

Pâte Arsenicale. A powder composed of *arsenious acid*, 8 gr.; *dragon's blood*, 22 gr.; *cinnabar*, 70 gr. It is to be made into a paste with the saliva at the time of applying it. A favorite remedy in cancer on the Continent. (Dr. Paris.)

Perry's Balm of Syriacum. See *page* 108, and *Med. Circ.*, iii, 144, 283.

Perry's Preventive Lotion. This is said to be a *solution* of *sal alembroth*, 2 dr., in *water*, 1 pint. For *use*, it is diluted with 4 or 5 times its bulk of water. (*Med. Circ.*, iii, 284.)

Pierre Divine. See *p.* 675.

Pieste's Toothache Essence. From *liquor of ammonia*, 2 parts; *laudanum*, 1 part. It is applied on lint.

Pilules Angeliques, Grains de Santé. Take of *aloes* and *juice of roses*, of each, 4 oz.; *juices of borage* and *chicory*, of each, 2 oz.; beat them together, and when they are reduced to the consistence of a soft pill-mass, add of *powdered rhubarb*, 2 dr.; *powdered agaric*, 1 dr.; and divide the mixture into 1½-gr. pills. A good purgative. *Dose.* 4 to 12.

Poor-man's Friend (French). See *Brown Ointment.*

Poor-man's Friend (Dr. Roberts'.) This consists chiefly of *ointment of nitric-oxide of mercury.*

Portland's (Duke of) *Gout Powder.* A mixture of the *roots* of *birthwort* and *gentian*, and the *tops* of *germander*, *groundpine*, and *lesser centaury*, in equal proportions.

Pringle's Remedy for Typhus. (Dr. Paris.) *Pale cinchona* (bruised), ½ oz.; *water*, 12 fl. oz.; boil them together for 10 minutes, adding, towards the end, *Virginian snakeroot* (bruised), 2 dr.; macerate for an hour in a covered vessel, and to the strained liquid add of *dilute sulphuric acid*, 2 fl. dr., and when the mixture is cold, further add of *spirit of cinnamon*, 1 fl. oz. The *dose* is 2 table-spoonfuls every six hours.

Reynold's Gout Specific. Wine of colchicum disguised by some unimportant additions.

Righini's Odontalgic Drops. A *solution* of *creasote* in an equal weight of the strongest *rectified spirit*, coloured with *cochineal*, and disguised by the addition of a few drops of *oil of peppermint.*

Ruspini's Styptic. A strong *solution* of *gallic acid* in *spirit of roses.* Dr. A. T. Thomson says that it also contains sulphate of zinc.

Rust's Toothache Paste. See *p.* 940.

Scott's Drops, Tincture of Soot. From *wood soot*, 2 *oz.; assafœtida*, 1 *oz.; brandy* or *proof spirit*, 1 pint. *Dose.* 1 to 2 table-spoonfuls; in hysteria, &c.

Smith's Powder (Rev. T.). See *McKinsey's Powder.*

Solomon's Anti-impetigines. A solution of *bichloride of mercury* disguised by the addition of a little flavouring and tinctorial matter. (*Med. Circ.*, ii, 69-70.)

Standert's Red Mixture. Take of *carbonate of magnesia*, 1 oz.; *powdered Turkey rhubarb*, ½ oz.; *tincture of rhubarb*, 3 fl. oz.; *tincture of opium*, 2 fl. dr.; *oils of aniseed* and *peppermint*, of each, ½ dr.; (dissolved in) *gin* or *proof spirit*, 5 fl. oz.; agitate the whole together, then further add of *soft water*, 1¼ pint. In colic and diarrhœa. *Dose.* A wine-glassful. The spirit is frequently omitted, but then the mixture soon spoils.

Standert's Stomachic Candy. Take of *lump sugar*, 1 ℔; *water*, 3 fl. oz.; dissolve by heat, add *cardamom seeds*, *ginger*, and *rhubarb*, of each, 1 oz.; and when the mixture is complete pour it out on an oiled slab or into moulds.

Storey's Worm Cakes. Take of *calomel* and *cinnabar*, of each, 24 gr.; *powdered jalap*, 72 gr.; *ginger*, 1 dr.; *white sugar*, 1¼ oz.; *syrup*, q. s.; mix, and divide into a dozen cakes. Resemble Ching's lozenges in their action.

Struve's Lotion. See *p.* 720.

Succession Powder. A mixture of *powdered quartz* and *diamond dust;* chiefly the first. *Used* as an escharotic.

Tasteless Ague Drop. See *Ague.*

Tasteless Worm Medicine. See *Lozenges.*

Turlington's Balsam. See *Balsam of Life.*

Valangin's Solution of Solvent Mineral. From *arsenious acid*, ½ dr.; dissolved in *hydrochloric acid*, 1½ dr.; and the solution diluted with *distilled water*, 1½ pint. In ague, &c. It has rather less than half the strength of the *solution of arsenite of potassa*, Ph. L.

Vance's Cream. See *Chilblains.*

Wahler's Ointment. See *Chilblains.*

Ward's Purging Powder. A mixture of *jalap* and *cream of tartar*, equal parts, coloured with a little *red bole.* *Dose.* A tea-spoonful, or more, in broth or beer, twice or thrice daily; in dropsy.

Webster's Diet Drink. A *sweetened decoction* of *betony*, *dulcamara*, *guaiacum wood*, *liquorice root*, *sarsaparilla*, *sassafras*, *thyme*, and *turmeric.*

Wilson's Gout Tincture. This is said to be *wine of colchicum.*

Wright's Pearl Ointment. Take of *white precipitate*, 8 *oz.; Goulard's extract*, 1 pint; rub them to a cream, and add the mixture to *white wax*, 7 *lb.*, and *olive oil*, 16 *lb.*, previously melted together by a gentle heat; lastly, stir the whole until it is nearly cold. (Pharm. Journ.)

Young's Aperient Drink. From *carbonate* *of soda*, 2½ dr.; *bitartrate of potassa*, 3 dr.; (both in crystals;) throw them into a soda-water bottle containing *cold water*, 8 fl. oz., and immediately cork it down securely, and keep it inverted, in a cool place, until required for use.

Zanetti's Bohemian Restorative Tincture. From crushed *raisins*, ¾ *lb.; hay saffron*, 2 *oz.; aqueous extract of opium*, 3 dr.; *powdered cochineal*, 2 dr.; *capillaire* and *orange-flower water*, of each, ½ pint; *proof spirit*, 3 pints; digested together for a week, and then strained, with expression.

PAULLINIA. See *Guarana.*

PAYNIZING. The name given to Mr. Payne's process for *preserving* and *mineralizing wood.* The pores of the wood are first *exhausted of air* by the action of a powerful air-pump; a *solution* of *sulphuret of calcium* or of *sulphuret of barium* is next forced into them under a pressure of 100 to 150 *lb.* to the square inch; subsequently, a *solution* of *sulphate of iron* is applied in the same manner. In this way sulphate of baryta (*heavy spar*) or sulphate of lime (*gypsum*) is formed in the pores of the wood, which is thus rendered harder, more durable, and nearly fire-proof.

PEACH. Syn. *Persicum*,—Lat. The *fruit* of *persica vulgaris* (amygdalus persica, —*Linn.*) Two varieties are known in our gardens,—*clingstone peach* and *freestone peach*, terms which explain themselves. The *fruit* is wholesome; but the *flowers* and *kernels* contain prussic acid, and are poisonous.

PEACHWOOD. The produce of a species of *cæsalpinia*, now extensively used in calico-printing.

PEAR. Syn. *Pyrus*,—Lat. The fruit of *pyrus communis* (Linn.), one of the rosaceæ. Its general qualities resemble those of the apple.

PEAR FLAVOUR. See *Essences.*

PEARL. Syn. *Margarita, Margaritum, Perla, Unio*,—Lat. The most beautiful and costly pearls are obtained exclusively from the *pearl oyster* (*meleagrina margaritifera*) of the Indian Seas. The principal fisheries are on the coast of Ceylon, and at Olmutz, in the Persian Gulf. An *inferior description* of *pearl* is procured from a fresh-water shell-fish (*unio margaritifera*) in the neighbourhood of Omagh, county of Tyrone. A similar quality is also procured from the river Ythan, Aberdeenshire. It is probable that pearls from this source, collected by the ancient Britons, may have given rise to the statement by Tacitus, in his Life of Agricola, of pearls "not very orient, but pale and wan," being among the indigenous products of Great Britain.

Pearls are *composed* of *membrane* and *carbonate of lime;* or, in other words, of substances similar to *bladder* and *chalk*, in alternate layers. When steeped in *dilute hydrochloric acid*, or even in *vinegar*, the carbonate of lime is dissolved with effervescence, and the films of membrane remain, for a time, unacted on.

The *cause* of the *production* of *pearls* is highly curious and interesting. When any foreign body gains a permanent lodgment within the shells of any of the mollusca which are lined with pearly matter, or nacre, the pearly secretion of the animal, instead of being spread in layers on the inside of its habitation, is accumulated around the offending particles in concentric films of extreme tenuity, and more or less spherical, forming a *pearl.*

Pearls were *formerly used* in medicine as absorbents or antacids; and among the ancients they were occasionally taken, dissolved in wine or vinegar, both as a remedy and for the purpose of displaying the careless opulence and luxury of their possessors. A perfect pearl, large, truly spherical, highly iridescent, and reflecting and decomposing the rays of light with vivacity, claims to rank with the most costly of the gems, and in some parts of the East, is, with justice, more highly prized than even the diamond. In Europe, however, the present estimation of their value is somewhat different. "A handsome necklace of Ceylon pearls, smaller than a large pea, cost from £170 to £300; but one of pearls about the size of peppercorns may be had for £15. The pearls in the *former* sell at a guinea each, and those in the latter at about 1*s.* 6*d.*" (Mr. Milburn.) *Seed pearls* are of little value however beautiful.

PEARL (Artificial). These are hollow spheres or beads of glass, perforated with two holes at opposite sides to permit of their being strung into necklaces. A small portion of *essence d'orient* (see *p.* 388) is introduced into each, by suction, and is then spread over the inner surface of the glass. When this has become dry and hard, the globe is filled up with *white wax*, *spermaceti*, or *gum arabic.* The glass of which the beads are formed is *slightly* bluish and opalescent, and very thin. The latest improvement consists in removing the glassy appearance of the surface of the prepared bead by exposure to the *fumes of hydrofluoric acid*, highly diluted.

PEARL (Mother of). Syn. *Nacre; Nacre de Perle; Unionum Conchæ.* This is the internal or nacreous layer of those shells which produce the pearls for ornamenting the person; hence the term "mother" of pearl is by no means inappropriate. It is also derived from several other species, known in trade as *ear-shells, green snail-shells, Bombay-shells, &c.*

The brilliant hues of mother of pearl do not depend so much upon the nature of the substance as on its structure. Its surface is covered by minute corrugations or furrows, which give a chromatic appearance to the reflected light. Sir David Brewster was the first to show that this substance is capable of imparting its iridescent appearance to fusible metal or fine black wax.

Mother of pearl is *cut* and *wrought* with nearly similar tools to those used for ivory, but its treatment, owing to its more fragile nature and delicate structure, requires considerably greater care. It is polished with colcothar or putty powder.

The *numerous applications* of *mother of pearl*, for buttons, knife handles, boxes, inlaying work, &c., are well known.

PEARLASH. This is prepared by calcining the *crude potashes* on a reverberatory hearth, dissolving the calcined mass in *water*, and, after repose, decanting the clear solution, and evaporating it to dryness in flat iron pans, the product being constantly stirred towards the end to reduce it to a semi-granular state. Although purer, its richness in *absolute alkali* is less than that of the potashes from which it is prepared, being only from 47 to 51%. This exists almost entirely under the form of carbonate. The commercial value of this substance is determined by the ordinary processes of *Alkalimetry*. (See *p.* 39–44.)

PEARL BARLEY. See *Barley.*

PEARLS (Rose). Syn. *Rose Beads.* The *petals* of *red roses* beaten in an iron mortar for some hours, until they form a smooth, black paste, then rolled into beads and dried. Hard; very fragrant; take a fine polish.

PEARL WHITE. This is *subchloride of bismuth;* but the name is now commonly applied to *trisnitrate of bismuth*, which is sold for it.

PEAS. Syn. *Garden Peas, Motor do.; Pisa*,—Lat. The *seed* of *pisum sativum* (Linn.) In the fresh state (*green peas*) they are saccharine and nutritive, and with the *pods* which contain them are highly serviceable in scurvy. The last have been used for making beer. The *dried seeds* are still more nutritious, but are heavy and flatulent unless well cooked. For *kitchen use*, "*split peas*" should be chosen, and after having washed them in a little *clean soft water*, and allowed them to drain, they should be left to soak in *cold soft water*, for at *least* 12 hours before applying heat to them, and should then be dressed in the *same* water in which they have been soaked, and be only *gently simmered* until they are reduced to a pulp. Additions of meat, vegetables, &c., should not be made until they have nearly arrived at this condition. "*Whole peas*" require soaking for at least 18 or 20 hours.

A *substitute* for *green peas* in *winter* may be obtained by placing the dried seed on a flat dish, sprinkling them with *water*, and keeping them in a warm situation. In a few days germination commences, and after it has proceeded sufficiently far, the whole is dressed in the usual manner. An *easier* and *simpler plan* is to preserve the *green peas*, when they are in season, by the common method adopted for gooseberries and other like fruit.

PEAS (Issue). Syn. *Pisa pro Fonticulis*,—Lat. *Orange berries*, or the *small unripe fruit* of the *orange tree*, dried, and smoothed in a lathe. See *Issue.*

PEAT. For some remarks in connexion with this subject, see *Paraffine;* also an excellent paper on the "Irish Amelioration Society," by Mr. Jasper W. Rogers in "*The Chemist*" (new series), i, 120–3.

PEBBLE. The trade name for the transparent colourless variety of *rock crystal* or *quartz* used for the lenses of spectacles, instead of glass, over which, from its extreme hardness, it has the advantage of being little apt to be scratched.

PECTIC ACID. The name given by Braconnot to an acid which is found very generally diffused throughout the vegetable kingdom, and analogous to jelly.

Prep. From *carrot roots*, from which the juice has been pressed out, by boiling them with $\frac{1}{25}$th part of their weight of *carbonate of potassa*, and about 6 times their weight of *water*, until the liquid becomes gelatinous when neutralized with an *acid.* A *pectate of potassa* is formed, from which the acid may be obtained by neutralizing the alkali with a stronger acid, or by carefully adding a *solution of chloride of calcium* as long as a gelatinous precipitate (*pectate of lime*) falls, and after washing this with *water*, decomposing it with *dilute hydrochloric acid.*

Prop., &c. A colourless jelly, having an acid reaction; scarcely soluble in cold water, more so in hot water; and precipitated by acids, alkalies, alcohol, salts, and even sugar. Its compounds with the bases are called *pectates.* (See *below.*)

PECTINE. Syn. *Vegetable jelly.* Obtained by adding *alcohol* to the *juice of ripe currants* or *other fruit*, until a gelatinous precipitate forms, which must be drained, washed with a little *weak alcohol*, and dried.

Prop., *&c.* In the moist state it forms a neutral, tasteless, soluble, transparent jelly; when dried, a translucent mass, closely resembling isinglass; boiled with water, or with dilute acids, it is converted into *parapectine* and *metapectine;* in the presence of alkalies, these, as well as pectine, are changed into *pectic acid*, and, by continuing the ebullition for some time longer, into *metapectic acid*, which is not gelatinous. See *Pectic Acid.*

PECTORALS. Under this head are popularly included all the various remedies employed in breath or chest diseases.

PEDICULI. Three species of these parasites infest the human body:—*Pediculus humanus capitis*, or *head louse*, which lives and breeds in the hair of the scalp, and does not voluntarily extend its ravages beyond it;—*p. h. corporis*, or *body louse*, which resides on the trunk of the body and the garments, and is characterised by being white and nearly immaculate; and—*p. pubis*, or *crab louse*, (so named from the cheliform structure of its legs,) found chiefly on the pubes, but if not checked, gradually extending itself to the armpits, eyebrows, and other parts covered with hair. This is the most malignant species of the three, and frequently burrows so deeply in the skin as to be with difficulty dislodged.

The *presence of pediculi* is, in general, an indication of dirty habits, or of contact with the dirty and lazy. Persons who perform the duties of the toilet with ordinary care, and who change their linen sufficiently often, are utter strangers to the visitations of these insects. The use of the *hair-brush*, *strong scents*, *oil*, *soap-and-water*, and the like, are incompatible with their existence. For the *destruction* of the *p. pubis*, a solution of from 15 to 20 gr. each, of *bichloride of mercury* and *sal ammoniac*, in a pint of *distilled* or *pure soft water*, is most cleanly and effective. Weak *tobacco water*, *decoction of stavesacre seeds* or of *white hellebore*, and the *ointments* of *mercury*, *sulphur*, and *white precipitate*, are also frequently employed for the same purpose. See *Acarus, Vermin, &c.*

PEDILUVIUM. See *Baths.*

PELARGONIC ACID. A compound obtained from *pelargonium roseum.* It has precisely the same composition as *hydrated œnanthic acid*, and the two are probably identical.

PELLETIER'S ODONTINE. See *Tooth Pastes.*

PELLICLE. See *Crystallization.*

PELLITORY. Syn. *Pellitory of Spain; Pyrethrum*,—Ph. L. & E. "The root" of "*anacyclus pyrethrum*" (De Cand.); *anthemis pyrethrum* (Linn.) It is a powerful topical excitant. It is chiefly employed as a masticory in headache, toothache, palsy of the tongue, and facial neuralgia and rheumatism; and made into a *tincture* with *rectified spirit*, it is a common remedy among dentists for the toothache. Internally, it has been given as a gastric stimulant, and in intermittents, &c. ½ to 1 dr. may be chewed at a time.

PELOPIUM. A new metal discovered by H. Rose, along with *niobium*, in the *tantalite* of Bodenmais, in Bavaria. See *Tantalum.*

PELOSINE. A dark-coloured, bitter extractive matter found in the *root* of *cissampelos pareira*, or *velvet leaf.*

PELTRY. The name applied to fur skins in the state in which they are received from the hunters. To *prepare* them as *furs*, the inside of them is generally first "*tawed*" by the application of a *solution of alum.* They are next well dusted over and rubbed with *hot plaster of Paris* or *whiting*, and are, lastly, thoroughly dried and brushed clean. When it is desired to *change* or *modify their colour*, the grease being removed by lime water or a weak soda lye, they are stretched out on a table or board, and the ordinary *liquid mordants* and *dyes* are applied to them hot, by means of a painter's brush.

The *furs* of the *rabbit* and *hare* are rendered fit for the purposes of the *felt* and *hat manufacturers* by a process called by the French "*sécretage.*" This consists in thoroughly moistening the hair with a *solution* of *quicksilver*, 1 part, in *aquafortis*, 16 parts, diluted with half to an equal bulk of *water.* This is applied with a brush, and the moistened skins being laid together, face to face, are dried as rapidly as possible in a stove room. See *Furs.*

PEMPHIGUS. Syn. *Febris Bullosa, Pompholyx.* An eruption consisting of vesicles of various sizes, from a pea to a walnut, or even larger, filled with a pellucid or slightly coloured fluid, and attended by more or less fever. There are several popular synonymes of this affection. The French call it the "*bubble fever*," and the Germans, "*water-bladders.*" "The bubbles raised under a common blister are a local pemphigus, only differing from the disease in question in being produced by a known and local cause. The bubbles, in this disease, are raised upon a base of inflamed skin scarcely larger than the bladder which they support;" and they occur either singly or in patches. "They rise up very rapidly, frequently in the course of a few hours, and break in two or three days, when they are followed by an excoriated surface, which becomes covered by a thin crust, and speedily heals."

The *varieties* of *pemphigus* are *acute* and *chronic*, "the former being active and brief in its course, and accompanied by a smart attack of feverishness; the latter slow, without fever, but with more intrinsic constitutional disturbance." It is said to be infectious, and has occasionally spread as an epidemic.

The *treatment* of this *disease* has been already generally referred to under "*Vesicular Eruptions*." The best application to the eruption after the vesicles break is, perhaps, *powdered starch* or *arrow-root*, employed as a dusting powder. The fever, when severe, is usually of a typhoid character, and may be met by *port wine*, *bark*, and the *mineral acids*. In *slight cases* a few doses of some saline aperient are generally sufficient.

PENCILS. This name is applied to the small brushes made of *camel's hair* used by artists, as well as to the plumbago crayons familiarly known as *black-lead pencils*. The last are prepared by one or other of the following methods:—

1. The *blocks of plumbago* are exposed to a bright-red heat in a closely covered crucible, and are afterwards sawn into minute sticks, and mounted in cases of *cedar* or *satin wood*.

2. The *plumbago*, in powder, is calcined as before, and then mixed with an equal, or any other desired proportion of *pure washed clay*, also in powder, after which the mixture is reduced to a plastic state with *water*, and pressed into groves cut on the face of a smooth board, or into well-greased wooden moulds, in which state it is left to dry. When dry the pieces are tempered to any degree of hardness by exposing them, surrounded by *sand*, or *powdered charcoal*, in a closely covered crucible, to various degrees of heat. The crucible is not opened until the whole has become cold, when the prepared "slips" are removed and mounted as before. This method was invented by M. Conté, in 1795.

3. The *dough* or *paste*, prepared as last, is reduced to the required form by forcing it through a *perforated plate* (in a similar manner to that adopted for coloured crayons), or into *minute metallic cylinders*, from which it may be readily shaken after it has become partially dry.

Obs. The leads for some varieties of drawing pencils are immersed for a minute in very hot *melted wax* or *suet* before mounting them. To the composition for others a little *lamp black* is added to increase and vary the degree of blackness. The pencils for *asses' skin books* and *prepared paper* are tipped with "*fusible metal.*" (See *p.* 501.) Numerous inprovements in pencil cases and pencil mounts have been patented of late years by Stevens and others.

PENNYROYAL. Syn. *Pulegium*,—Ph. L. & E. *Mentha P.*,—Ph. D., & Ph. L. 1836. "The recent and dried flowering herb" of "*mentha pulegium*, Linn." (Ph. L.) *Pennyroyal tea* is a popular emmenagogue, expectorant, and diaphoretic, and is in common use in asthma, bronchitis, hooping-cough, hysteria, suppressions, &c. *Water*, *essence*, *oil*, and *spirit of pennyroyal*, are officinal. They are now chiefly used as mere adjuncts or vehicles.

PENS. The manufacture of *steel pens* is purely mechanical, and only conducted on the large scale. Those made of "*quills*" are noticed under that head.

PEPPER (Black). Syn. *Pepper; Piperis Nigri Baccæ; Piper Nigrum*,—Ph. L. E. & D. "The immature fruit" (berry) of "*piper nigrum*," Linn., or the *black pepper vine*. (Ph. L.)

Pur. The *ground black pepper* of the shops is *universally* adulterated. In fact, the public taste and judgment are so vitiated, that the *pure* spice is unsaleable. A most respectable London firm on commencing business supplied their customers with *unadulterated* ground pepper, but in 3 cases out of every 4, it was returned on their hands and objected to, on account of its dark colour and rich pungency, which had induced the belief that it was sophisticated. The "house" alluded to was therefore *compelled* by their customers to supply them with an *inferior*, but *milder* and *paler* article. The substances employed to lower black pepper are known in the trade as—"P. D.," "H. P. D.," and "W. P. D.," — abbreviations of *pepper dust*, *hot do.*, *white do.* The *first* is composed of the *faded leaves of autumn*, dried, and powdered; the *second*, the *ground husks* (hulls) *of black mustard* obtained from the mustard mills; and the *third* is *common rice*, finely powdered. Equal parts of *black pepper-corns*, *H. P. D.*, and *W. P. D.*, form the *very best* ground pepper sold. The *ordinary pepper* of the shops does not contain more than ⅛th to ⅙th of *genuine pepper*, or 2 to 2½ *oz.* in the *lb.* Very recently, *ground oil-cake* or *linseed meal* has been chiefly employed as the adulterant, instead of the old "P. D."

A *factitious pepper-corn*, formed of various pungent and acrid substances, amongst which are capsicums and mustard hulls, made up with *linseed* and *rice meal*, with sufficient *genuine pepper* to disguise them, is now extensively prepared for the grocers and oilmen. The resemblance, to the common observer, is complete. The manufacturers, in order to render the deception more difficult of detection, introduce into the interior of each of the false grains, as a kernel, a mustard seed which has become swollen by immersion in water, so that on breaking the artificial grain, the mustard, which has become loose by drying, falls out, and leaves a little hollow, which closely simulates that found in the centre of genuine peppercorns.

Another fraud is the admixture of *exhausted berries* (those which have been used to flavour sauces, pickles, &c.) with those kept for sale.

Assay 1. (The *Microscope.*) The appearance of a sample of the suspected article under the microscope should be compared with that of a known genuine one.

2. Pure pepper, reduced to coarse powder, loses 30% of its weight by digestion in ether; and the ethereal tincture by spontaneous evaporation on the surface of water, deposits an intensely hot, biting, yellowish oleo-resin, which smells strongly of pepper, together with some nearly insipid extractive matter.

3. It should not contain less than $\frac{1}{65}$th, or about 1½% of piperine. See *Piperine.*

4. *Factitious pepper-corns* on being immersed in hot water, swell, become soft, fall to pieces, and are partly dissolved; *genuine ones* swell a little, but remain solid, spherical, and exhibit no very marked alteration.

5. The berries should be hard, and little wrinkled, or shrivelled, and should not easily break when pressed between the fingers.

Uses, &c. Black pepper is a powerful stimulant, carminative, and rubefacient. Its use, in moderation, as a condiment, is peculiarly serviceable to persons who are of a cold habit, or who suffer from a weak digestion; but in inflammatory habits, and in affections of the mucous membranes, it is generally highly injurious. As a *medicine* it is often serviceable in nausea, vomiting, chronic diarrhœa, and agues. In North America, a common remedy for the last is ½ *oz.* of *ground pepper* stirred up with a glassful of warm beer; or a like quantity made into a *tincture* by steeping it in 5 or 6 times its weight of *gin, rum,* or *whisky,* for a few days.

Prepared black pepper is made by steeping the berries for 3 days in 3 times their weight of vinegar, and then drying and grinding them. It is milder than common pepper. See *Confections, Piperine, &c.*

PEPPER (Cayenne). Syn. *Bird Pepper, Chilli do., Guinea do., Indian do., Red do.; Piper Capsici, P. Cayenne,*—Lat. This is prepared from *tschillies* or the pods of *capsicum frutescens* (Linn.), or from *capsicum baccatum* (Willd.) or *bird pepper*, but generally from the first on account of its greater pungency and acrimony; and, occasionally, from *capsicum annuum* (Linn.) or medicinal capsicum.

Prep. 1. From the *dried pods* (powdered), 1 *lb.;* and *wheaten bread* or *captain's biscuits* (heated until they are perfectly dry and brittle, and begin to acquire a yellow colour throughout, and then powdered), 7 *lb.;* mixed and ground together. *Colouring matter* and *common salt* are frequently added, but are unnecessary.

2. As the last, but making the mixture into a dough with *water*, then forming it into small cakes, drying these as rapidly as possible at a gentle heat, and then grinding them.

3. (Loudon.) The *ripe pods*, dried in the sun, are stratified with *wheaten flour* in a dish or tray, and exposed in a stove-room or a half-cold oven until they are quite dry; they are then removed from the flour, and ground to fine powder; to every *oz.* of *this powder*, 1 *lb.* (say 15 *oz.*) of *wheaten flour* (including that already used) are added, and the mixture is made into a dough with a little *tepid water*, and a tea-spoonful of *yeast;* after fermentation is well set up, the dough is cut into small pieces, and baked in a slow oven until it is perfectly hard and brittle; it is then beaten or ground to powder, and forms "*cayenne pepper.*"

Pur. The *cayenne pepper of the shops* is commonly a spurious article made by grinding a mixture of any of the reddish woods or sawdust, with enough red pods or tschillies to render the mixture sufficiently acrid and pungent. Common salt, colcothar, red bole, brick dust, vermilion, and even red lead, are also common additions. The presence of these substances may be detected as follows:—

1. Water digested on cayenne pepper

containing *common salt* gives a white curdy precipitate with *nitrate of silver*, soluble in ammonia, and darkened by exposure to the light. Every grain of this, after being washed, dried, and gently fused, is equivalent to $\frac{5}{12}$ gr. of common salt (nearly).

2. Acetic acid or dilute nitric acid digested on a sample containing *red lead*, gives a black precipitate with sulphuretted hydrogen, and a heavy white one (*sulphate of lead*) with dilute sulphuric acid. Each grain of that with the last, after being washed, dried, and ignited, represents $\frac{4}{5}$ gr. of red lead (nearly).

3. If the acetic or nitric solution (*see* No. 2) is blackened by tincture of galls, or turned blue by a solution of prussiate of potash, the pepper contains *colcothar* or *sesquioxide of iron.*

4. If a tea-spoonful of the suspected sample be agitated in a wine-glassful of water, and after repose for a few seconds, the water be poured off, the reddish sediment (if any) is probably either *red lead* or *vermilion.* The *first* of these may be removed by digesting the sediment in dilute nitric acid, and the new solution may be tested as before. The undissolved portion, if it is volatilized by a strong heat, is vermilion.

5. *Pure cayenne pepper*, when burnt, leaves a scarcely perceptible quantity of white ash; a red-coloured ash indicates the presence of *red ochre, brick dust, Armenian bole*, or other *earthy colouring matter.* If *red lead* is present, it will be left behind under the form of a dark-coloured powder, or a small metallic globule.

Uses, &c. The capsicums resemble the other peppers, except in their greater energy, and their pungency being unmodified by the presence of essential oil. As a condiment, under the form of cayenne pepper, and in all diseases in which the employment of a powerful stimulant or rubefacient is indicated, their uses are well known. In *medicine*, the *fruit* of *capsicum annuum* (Linn., Ph. E. & D.; *C. fastigiatum*, Blume, —Ph. L.) or *annual capsicum* is ordered (*Capsicum*,—Ph. L. E. & D.) The London College directs the fruit to be that of "Guinea," "less than one inch long, oblong, cylindrical, and straight." See *Essence of Cayenne.*

Prepared cayenne pepper is the *residuum* of cayenne vinegar, essence, or tincture, dried and ground.

PEPPER (Cayenne,—Soluble). Syn. *Crystallized Soluble Cayenne. Prep.* 1. *Capsicum pods* (recent, ground in a pepper mill), 1 *lb.; rectified spirit*, 2½ pints; proceed by percolation so as to obtain 2½ pints; from this distil *one half* of the spirit by the heat of a water bath; to the residuum add of *fine dry salt*, 5 *lb.;* mix them well together, and dry the mixture at a very gentle heat, frequently stirring; lastly, rub it through a sieve, and put it into warm dry bottles. It is usually coloured with a little *vermilion* or *rouge* (sesquioxide of iron), but it possesses an agreeable colour without it.

2. *Essence of cayenne* (No. 1, *p.* 387), 6 pints; distil off 3 pints, add to the residual liquor, of *dry salt*, 12 *lb.;* mix well, dry by a gentle heat, and otherwise proceed as before.

3. *Capsicums* (ground), 3 *lb.; red sanders* or *Brazil wood* (sliced or rasped), 10 *oz.; rectified spirit*, 1 gall.; macerate for 14 days, then express the tincture, filter, distil off one half, add of *dry salt*, 15 *lb.;* and proceed as before.

4. As the first formula, with the addition of a *strong decoction of saffron*, q. s. It gives a beautiful colour to soups, &c.

Obs. The above formulæ are those actually employed by the houses most celebrated for their "soluble cayenne." The products are of the very finest quality, and are perfectly wholesome. We speak from an extensive experience in the manufacture. The spirit distilled from the essence forms a most suitable menstruum for making fresh essence or tincture of cayenne.

PEPPER (Cubeb). Syn. *Cabob Pepper, Tailed do.* See *Cubebs.*

PEPPER (Jamaica). See *Pimento.*

PEPPER (Kitchen). See *Mixed Spice.*

PEPPER (Long). Syn. *Piperis Longi Fructus; Piper Longum*,—Ph. L. & E. "The immature fruit" (dried female spikes) of "*piper longum*, Linn." (Ph. L.) or *long-pepper vine.* The spikes are about 1½ inch in length, with an indented surface, and are of a dark-gray colour. In its general properties it resembles black pepper, but it is less aromatic, though equally pungent. *Elephant pepper* is merely a larger variety of this species. (Gray.) The *root* and *stems*, sliced and dried, form the "*pippula moola*" of the East Indies. (Roxburgh.)

PEPPER (Red). See *Cayenne Pepper.*

PEPPER (White). Syn. *Piper Album*, —Lat. This is made by either soaking ordinary *black pepper* in a *solution of common salt*, until the outside skins are soft, and then rubbing them off in the hands, or by merely rubbing off the skins of the *over-ripe* berries that fall from the vines. An *inferior quality* is made by bleaching black pepper with chlorine.

Obs. The use of *white* pepper instead of black is one of those contemptible specimens of squeamishness by which the palate and stomach is continually injured to please the eye. Pure *white* pepper has only about 1-4th of the strength of pure *black* pepper, whilst it is nearly destitute of the fine aroma of the latter. It also contains a *mere trace* of piperine, one of the most valuable constituents of black pepper. Luca says it *does not* contain *any piperine.*

PEPPER PODS. Capsicum. See *Cayenne Pepper.*

PEPPERMINT. Syn. *Mentha Piperita,*—Ph. L. E. & D. "The recent and dried flowering herb" of "*mentha piperita*" (Ph. L.) or *garden* peppermint. The flavour and odour of this herb are well known. It is the most pleasant and powerful of all the mints. *Peppermint water* and the *essential oil* have long been employed in nausea, griping, flatulent colic, hysteria, diarrhœa, &c.; but in regular practice chiefly to cover the taste of nauseous medicines, or as an adjunct or vehicle for more active remedies. See *Essential Oils, Waters, &c.*

PEPSINE. A peculiar principle found in the gastric juice, and which, in conjunction with hydrochloric acid, also present in the stomach, confers upon it the power of digesting certain portions of the food.

Prep. (M. Vogel.) Digest the *glandular skin of a hog's stomach,* cut into pieces, in cold water for 24 hours, then strain off the liquid portion, and repeat the maceration with *fresh water;* mix the liquors, and add to them *dilute solution of acetate of lead;* diffuse the precipitate through *water,* decompose it by a stream of *sulphuretted hydrogen,* again filter, gently evaporate the filtrate to a syrupy consistence, and add to it an excess of *absolute alcohol;* collect the bulky precipitate that gradually forms, and carefully dry it by exposure to dry air.

Prop., &c. An amorphous mass. By the heat of a salt-water bath it forms a white powder, but in this state it is found to have lost some of its power of assisting digestion. A *very small* quantity of hydrochloric acid added to its weak aqueous solution, renders it capable of artificial digestion. Liebig denies the existence of pepsin as a distinct principle, in opposition to the opinions of Wasman and some others.

PERCHLORATE. Syn. *Perchloras,*—Lat. A salt of perchloric acid.

The *perchlorates* are distinguished from the *chlorates* by their greater stability, and by not turning yellow when treated with hydrochloric acid. Like the chlorates, they give off oxygen when heated to redness. They may be *prepared* by directly neutralizing a solution of the acid with a *solution of the base.* See *Perchlorate of Potassa* (and *below*).

PERCHLORIC ACID. Syn. *Oxychloric Acid; Acidum Perchloricum, A. Oxychloricum,*—Lat. A compound of chlorine containing more oxygen than chloric acid, discovered by Count Stadion.

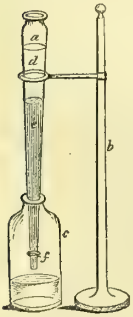
Prep. To *perchlorate of potassa,* contained in a retort, is added about ½ its weight of *strong sulphuric acid,* previously diluted with an equal weight of *water;* heat is then applied, and as it rises to 284° Fahr., vapours of *perchloric acid* pass over and condense in the receiver.

Prop., &c. A colourless liquid, of the sp. gr. 1·65, which fumes slightly in the air, is very greedy of moisture, and distils unchanged at about 392° Fahr. It is a more stable compound than chloric acid, and does not inflame organic substances. By distillation from concentrated sulphuric acid Serullas obtained it in a solid form. In this state it hisses when thrown into water, like red-hot iron.

PERCOLATION. Syn. *Method of Displacement.* A method of extracting the soluble portion of any substance in a divided state, by causing the menstruum to filter or strain through it. The "sparging" of the Scotch brewers is an example of the application of this principle on the large scale. In *pharmacy,* the "method of displacement" is frequently adopted for the preparation of tinctures, infusions, &c., and is, in some respects, superior to digestion or maceration. "The *solid materials,* usually in coarse, or moderately fine powder, are moistened with a sufficiency of the *solvent* to form a thick pulp. In twelve hours, or frequently without delay, the mass is put into a cylinder of glass, porcelain, or tinned iron, open at both ends, but obstructed at the lower end by a piece of calico or linen, tied tightly over it as a filter; and the pulp being packed by pressure, ranging as to degree with different articles, the *remainder* of the *solvent* is poured into the upper portion of the cylinder, and allowed gradually to percolate. In order to obtain the portion of the fluid which is absorbed by the residuum, an *additional quantity* of the *solvent* is poured into the cylinder, until the tincture which has passed through, equals in amount the spirit originally prescribed. The spirit employed for this purpose is then recovered, for the most part, by pouring over the residuum as much *water* as there is spirit retained in it, which may be easily known by an obvious calculation in each case. The method of percolation is now preferred by all who have made sufficient trial of it to apply it correctly." (Ph. E.)

The first portion of liquid obtained by the "method of displacement," is always in a state of high concentration. In general, it is a simple solution of the soluble ingredients of the crude drug in the fluid employed. But sometimes the solvent, if compound, is resolved into its component parts, and the fluid which passes through at any given time, is only *one* of these, holding the soluble parts of the drug in solution. Thus, if diluted alcohol be poured over powder of myrrh, in the cylinder of the percolator, the fluid which first drops into the receiver is a solution of an oily consistence chiefly composed of *resin* and *volatile oil* dissolved in *alcohol.* In like manner, when the powder of gall-nuts is treated in the same way by *hydrated sulphuric ether*, two layers of fluid are obtained, one of which is a highly concentrated solution of tannin in the water of the ether, and the other a weak solution of the same principle in pure ether. In all cases, therefore, in which it is not otherwise directed, it is absolutely necessary to agitate the several portions of the liquid obtained by percolation together, in order to ensure a product of uniform strength or activity.

Several forms of displacement apparatus are employed by different operators. A simple and useful one is that figured in the margin. It has also the advantage of being inexpensive, and may be made by any worker in tin plate.



a. Percolator.

b. Stand.

c. Receiver.

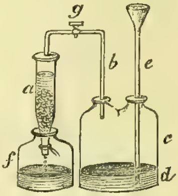
d. Menstruum.

e. Substance operated on.

f. Calico strainer.

In operating on some substances it is found advantageous to hasten the process by pressure. This may be effected by any of the methods adopted for that purpose, and already described under "*filtration.*" (See *p.* 462.) An *ingenious little apparatus* which is well adapted for *retail use,* or small quantities, is shown in the Engr. By pouring *mercury* or *water* through (*e*), into the bottle (*c*), the air in the latter suffers compression, and acts in a corresponding manner on the percolating liquor in (*a*). The whole of the joints must be made airtight.

a. Percolator.
b. Tube connecting it with—
c. A double-necked bottle containing—
d. Mercury.
e. Feeding tube.
f. Receiver.
g. Stop-cock to regulate or arrest the pressure of air on the contents of the cylinder (*a*).



The "*method of displacement,*" although apparently simple, requires for its successful application no inconsiderable amount of experience and skill in manipulation. The *principal points* to be *attended to* are the—*reduction of the substance to the proper state of comminution* (neither too coarse nor too fine),—the *due regulation of the period of the maceration* according to the hardness, density, and texture of the substance; and, more important still,—the *proper packing of the ingredients in the cylinder.* On the correct performance of the last, the success of the process mainly depends. *Some substances* require *considerable pressure* to be used, whilst others, when even *lightly packed,* scarcely permit the fluid to pass through them. When the *material* is too *loosely packed,* the menstruum passes through quickly, but without exerting its proper solvent action; when *too great pressure* is employed, percolation either progresses very slowly, or not at all. On the whole, the firmness of the packing should be inversely as the solvent and softening power of the menstruum upon the solids exposed to its action; but to this rule there are many exceptions, and each substance may be said to require special treatment. An *excellent plan,* applicable to all substances, and especially to those of a *glutinous* or *mucilaginous nature,* is to mix the *powder* with an *equal bulk* of *well-washed siliceous sand* before rubbing it up with the menstruum. In reference to the *coarseness* of the *powder,* it must be observed that substances which readily become soft and pappy when wetted by the menstruum, should not be used so fine as those that are more woody and fibrous, and not of a glutinous or resinous nature.

The "method of displacement" has the advantage of expedition, economy, and yielding products possessing considerable uniformity of strength; but the difficulties attending its application by the inexperienced are serious obstacles to its general adoption in the laboratory. It answers admirably for the preparation of all *tinctures* that are not of a *resinous nature,* and for most *infusions* of woody and fibrous substances; as, roots, woods, barks, leaves, seeds, insects, &c., and particularly when cold or tepid water is taken as the solvent. It is also especially adapted for the preparation of *concentrated infusions* and *essences,* as they may thus be obtained of any required strength without loss, or requiring concentration by heat, which is so destructive to their virtues.

"When (ordinary) *tinctures* are made in *large quantities,* displacement is never likely to supersede maceration, on account of any practical advantages it may possess. If the prescribed directions be duly attended to, the process of *maceration* is unexceptionable. The process is more simple than the other; the mode of operating is more uniform, it is, in fact, always the same; it requires less of skill and dexterity in conducting it; it requires less constant attention during its progress, which, in operating on large quantities, is a consideration; and, finally, the apparatus required is less complicated. When, however, only *small quantities* of *tincture* are made at a time, and kept in stock, the adoption of the process of displacement will often be found convenient and advantageous. It offers the means of making a tincture in two or three hours, which, by the other process, would require as many weeks." (Mohr and Redwood.)

Another useful *application* of the *method* of *displacement* is to the manufacture of *extracts* on the *large scale.* Here it is superior to any other plan. By an extremely simple and inexpensive apparatus which we have recently designed for the purpose, and which will shortly be made the subject of a patent, not merely a first-class product is ensured, but a saving of fully 60 per cent. in fuel and labour is at the same time effected. See *Extracts, Brewing, Tinctures, &c.*

PERCUSSION CAPS. The explosive compound employed to prime these articles consists of *fulminating mercury* with a little *gunpowder,* or a mixture of sulphur and chlorate of potassa, ground to a smooth paste with a little *water.* When this composition has become quite dry and hard, a drop of *varnish* is applied over it, by which it is secured in its place and protected from change.

The *explosive power* of a *good percussion cap* is *not affected* by immersion in cold water, even during several days; nor by exposure to a moist atmosphere for any length of time.

According to Dr. Ure, "8½ parts of gunpowder exploded by a percussion cap, have an equal force to 10 parts exploded by a flint lock."

PERFECT LOVE. See *Liqueurs.*

PERFUME. A substance that emits or casts off volatile particles which, when diffused through the atmosphere, agreeably affect the organs of smelling. The term is also applied to the volatile effluvia so perceived. The most fertile source of perfumes is the vegetable kingdom. Its flowers, seeds, woods, and barks, furnish a rich variety, from which the most fastidious connoisseur may select his favorite bouquet. A few perfumes, as *musk, ambergris,* and *civet,* are derived from the animal kingdom; but none of these evolve an aroma comparable in freshness to that of the rose, or in delicacy to that of the orange-blossom, or even the unpretending jasmine. The inorganic world yields not a single perfume, properly so called; nor has the science of chemistry yet been able to produce a single odoriferous compound from matter absolutely inorganic. There is a wonderful consistency in the works of nature; and not the least pleasing and remarkable example of this is exhibited in all those substances essential to the existence and well-being of man—his food, clothing, luxuries, and corporeal enjoyments, being furnished either directly, or indirectly, by the vegetable kingdom, and exclusively by the organic world.

PERFUMERY. Perfumes in general; also the art of preparing them. In its *commercial application* this word embraces not merely perfumes, but also cosmetics, and other articles of a closely allied character employed at the toilet, the manufacture and sale of which constitute the trade of the modern perfumer. It was our intention to have presented the reader with a compendious notice of this interesting subject in all its various relations to beauty, civilization, personal comfort, and hygiene, condensed from our book and lectures on personal beauty and the toilet, but, at the instance of our publisher, who points to the growing bulk of our volume, we are driven to defer its introduction to some other opportunity. *Formulæ* for the preparation of all the *more valuable perfumes*, as well as of others met with in trade, both *simple* and *compound*, will be found under the heads *Cosmetiques, Depilatories, Essences, Hair Dyes, Oils, Pastes, Pastils, Pommades, Spirits, Waters, &c., &c.*, to which, for the present, we must refer the reader.

PERFUMES (Acetic). See *Vinegars.*

PERFUMES (Ammoniated). These may be *prepared* by simply adding a sufficient quantity of *liquor of ammonia* to the liquid perfumes. *When* the *articles* are to be *distilled*, a cheaper plan is to add about 5 *dr.* of *sal ammoniac*, and 8 *dr.* of *carbonate of potassa* to each pint of the article just before distillation. *Ammoniated Cologne water* is now a fashionable substitute for spirit of sal volatile.

PERILYMPH. The fluid in which the membranous labyrinth of the ear is suspended.

PERIODIC ACID. A compound of analogous constitution to perchloric acid, discovered by Ammermüller and Magnus.

Prep. Pure *caustic soda* is added to a *solution of iodate of soda*, and the mixture is saturated with *gaseous chlorine;* the pulverulent white salt which falls either at once, or after concentration, is dissolved in *dilute nitric acid*, and the solution precipitated with *nitrate of silver;* the filtrate, on evaporation, yields yellow crystals (*periodate of silver*), from which the acid is obtained by the action of *water*, which resolves the salt into free *periodic acid*, which remains in solution, and into *basic periodate of silver*, which is insoluble. The solution yields crystals by cautious evaporation.

Prop., &c. Permanent in the air; a strong heat resolves it into iodine and oxygen; it forms numerous compounds (*periodates*) with the bases.

PERISTALTIC PERSUADERS. See *Kitchener's Pills.*

PERLATE ACID. The name given by Bergmann to *superphosphate of soda.*

PERMANENT WHITE. *Sulphate of baryta;* so called on account of its not being affected by sulphuretted hydrogen, like white lead. *Carbonate of baryta* is also frequently sold under the name. They are both natural productions, but the finest variety is prepared by precipitating a *solution of chloride of barium* by a *solution* of either *sulphate* or *carbonate of soda.* The white precipitate is then collected, washed, and dried. See *Baryta* and *White Pigments.*

PERMANGANIC ACID, or *Hypermanganic Acid.* See *Manganesic Acid.*

PERNAMBUCO WOOD. The product of *cæsalpinia echinata.* It constitutes the paler variety of Brazil wood used by the dyers.

PEROXIDE. See *Nomenclature.*

PERRY. Syn. *Pyraceum*,—Lat. A fermented liquor prepared from pears in the same way as cider is from apples. The red rough-tasted sorts are principally used for this purpose. The *best perry* contains about 9% of absolute alcohol; *ordinary perry*, from 5 to 7%.

Perry is a very pleasant-tasted and wholesome liquor. When bottled "*champagne fashion*" we have seen it frequently passed off for champagne, without the fraud being suspected.

PERSIAN BERRIES. See *French Berries.*

PERSPIRATION. The liquid or vapour secreted by the ramifications of the cuticular arteries over the surface of the body. The perspiratory apparatus consists of a gland deeply seated in the corium, communicating by means of tubules (*pores*) with the surface of the scarf-skin. On the palm of the hand the orifices of these pores are faintly perceptible to the naked eye, and distinctly so with a lens of small magnifying power. An old author remarks, that, "If one will, with an indifferent glass, survey the palm of his hand, very well washed, he may perceive innumerable little ridges of equal bigness and distance, and everywhere running parallel one with the other. Upon these ridges stand the pores all in even rows, and of that magnitude as to be visible to a very good eye without a glass; but, being viewed with one, each pore looks like a little fountain, and the sweat may be seen to stand therein as clear as rock-water, and as often as it is wiped off to spring up within them again." (Grew.) The entire length of these perspiratory tubes in the skin of a man of ordinary height and bulk is estimated at 1,750,000 inches, or nearly 28 miles.

According to Lavoisier and Seguin the greatest amount of perspiration exceeds 6 ℔ in the 24 hours, and the smallest, 2 ℔. It is at its maximum immediately after taking food, and decreases during digestion. Anselmino found the perspiration to consist of *water* holding in solution about 1% of solid animal and saline matter, besides carbonic acid gas and nitrogen.

The *uses* of the *perspiratory functions* appear to be to preserve the suppleness and sensibility of the skin, to maintain the temperature of the body at a uniform standard, and to remove from the system a number of compounds noxious to animal life. The perspiration "is a fluid whose *regularity* and *continuance of exhalation* are not merely *conducive*, but ABSOLUTELY NECESSARY TO HEALTH; without such regularity, the animal temperature would run riot, and substances of an injurious quality would be allowed to permeate the finest and most delicate of the tissues of the body." (Eras. Wilson.) "From the constriction or constipation of the cutaneous pores by the ambient air, especially when the body, beforehand put into a heat, is suddenly exposed thereunto, the serous particles, which used to fly off continually in vapour, being now pent in, excite an intense and feverish effervescence; till finding some other passage, either by the kidneys or by the glandules of the nose and windpipe, they are discharged by way of a *catarrh;* or missing this separation, still keep up the ebullition, very often to the hazard of life, by *suffocating the vital flame.* And *this* is the *natural consequence* of *obstructed insensible perspiration*, which, in the vulgar phrase, is the same with what they mean by *catching cold*, and of which, give me leave to remark, that as *fevers* make two-thirds of diseases infesting mankind, according to the computation of the judicious Sydenham, so *two-thirds of fevers* very probably may *take their rise* from *perspiration hindered.*" (Daniel Turner.) Suppressed perspiration is also one of the commonest causes of *diarrhœa.*

PERUVIAN BALSAM. Syn. *Balsam of Peru; Balsamum Peruvianum,*—Ph. L. & E. "The balsam flowing from the incised trunk of uncertain species of *myrospermi* (myroxyli)." Ph. L. It was formerly assigned to the *myroxylon Peruiferum* (Linn.) It is a chocolate-coloured or reddish-brown liquid, of the consistence of treacle, and possessing a bitterish, somewhat pungent taste, and an agreeable aromatic odour. It is reputed stimulant, tonic, and expectorant, and has long been a popular remedy in chronic asthma, catarrh, and other pulmonary affections, debility, &c. It is now, however, principally used as an ingredient in pommades, hair-oils, lip-salves, and other cosmetics, and in compound perfumery.

Pur., Tests, &c.—1. The sp. gr. should not be less than 1·15; nor higher than 1·16.—2. Ether dissolves it readily and completely.—3. Alcohol, in quantity, also dissolves it completely. — 4. It should undergo no diminution in volume when agitated with water.—5. 1000 parts should be exactly saturated by 15 gr. of pure crystallized carbonate of soda.—6. Sulphuric acid converts it into artificial tannin or charcoal.—7. Treated with nitric acid some hydrocyanic acid is formed, benzoic acid sublimes, and the residual matter is artificial tannin.—8. The alkalies and their carbonates form with it a thickish semi-crystalline mass, which, on being treated with sulphuric acid, deposits a peculiar resinous matter, with crystals of benzoic and cinnamic acid. Balsam of Peru, like most other costly articles, is very commonly met with adulterated. The following formulæ for the purpose are extant in the trade:—

PERUVIAN BALSAM (Factitious). *Prep.* From *gum benzoin* (in coarse powder), 3 *lb.;* dissolved in the least possible quantity of *rectified spirit*, and then mixed with *balsam of tolu*, 1 *lb.;* and *liquid styrax*, 2 *oz.;* adding of *rectified spirit*, q. s.

PERUVIAN BALSAM (Reduced).—1. *Balsam of Peru*, 3 *lb.; balsam of tolu*, 2 *lb.; rectified spirit*, q. s. to reduce it to a proper consistence.

2. *Balsam of Peru*, 3 *lb.; gum benzoin* (dissolved in the least quantity of spirit possible), 1 *lb.*; as before.

PERUVIAN BARK. See *Cinchona.*

PERUVINE. A light, colourless, oily liquid, produced along with cinnamate of potash by boiling *cinnameine* with *alkalies;* or better, by distilling *cinnameine* with *hydrate of potassa.* It also occurs under a crystalline form, when it is called *styrone.*

PESSARY. Syn. *Pessus, Pessarium,*—Lat. An instrument made of caoutchouc, gutta percha, box-wood, or ivory, inserted into the vagina to support the mouth and neck of the uterus. They are variously formed, to meet the prejudices of the party or the necessities of the case. The *cup, conical, globe,* and *ring pessaries* (pessi) are those best known. The improved form of this instrument, known as '*Coxeter's patent,*' manufactured by the Gutta Percha Company, is, however, the only one adapted to permanent use.

Medicated Pessaries are prepared by adding the *active ingredients* to a *hard cerate*, and pressing the mixture into the desired form. *Astringents* (various), *belladonna, acetate of lead, iodine, mercury, opium, &c.*, have been thus applied by Dr. Simpson, and others.

PESTILENCE. See *Plague.*

PESTILENTIAL DISEASES. All those diseases which are epidemic and malignant, and assume the character of a plague.

In another portion of this volume we expressed a hope that under this head we should be enabled to give the reader the results of important investigations then in progress touching the treatment of *malignant* or *pestilential cholera.* Time has not, however, fulfilled our expectations, and, to repeat a painful truth recently enunciated by one of the medical journals,—"Our knowledge of the treatment of cholera at the present time (1854) is scarcely greater than it was during its first visitation in 1832." The principle on which we have acted throughout this work, has been to avoid, as much as possible, any expression of opinion of our own on medical affairs; our desire being merely to give such an outline of the prevailing treatment of the more constantly occurring diseases as might prove useful to parties either remote from, or unable to obtain, professional assistance. We shall, therefore, now content ourselves with reproducing, from the '*Medical Circular*,' a condensed outline of the recent report of the "*Treatment Committee*" of the *Medical Council* appointed by the *President of the General Board of Health* to inquire into the results of the different methods of treatment adopted in epidemic cholera, during its recent visit to this kingdom. The reporters were—Dr. Alderson, Dr. Babington, Dr. Paris, Dr. Tweedie, and Mr. Ward.

"The *number* of *cholera cases* from which the *deductions* have been drawn was 2749. These cases were arranged for examination in three classes,—those which were *attended* in *hospitals;* those *attended* in *metropolitan districts*, not in hospitals; and those which *occurred* in the *provinces.* There is a remarkable agreement as to results in these classes of cases; and the usefulness of the inquiry derives from this circumstance an important confirmation."

"The plans of treatment adopted were arranged for convenience under four heads:—1. The *alterative.*—2. The *astringent.*—3. The *stimulant.*—4. The *eliminant.* We now give the results, in the words of the committee:—

"'The evidence of these tables *condemns* the *eliminated treatment* altogether as a principle of practice.

"'It testifies *against* the *stimulant principle*, excepting as a resource in extreme cases.

"'It displays a *decided advantage* in the *alterative principle*, especially as carried out by *calomel* and *opium;* and it shows a *still superior advantage* in the *astringent principle*, as applied through the means of chalk and opium—the *general per centage of deaths* following each plan of treatment being—

	Per cent.
Of Eliminants	71·7
Stimulants	54·
Alteratives, calomel and opium	36·2
Astringents, chalk and opium	20·3

"'In order to judge correctly of the value of this evidence, it is necessary to examine, as far as may be possible, the degree of severity of the cases brought beneath this test. The only means at our command (on the present occasion at least) to make this examination, is, to consider the relative proportion which the cases of *collapse* bear to the number of deaths of their own classes respectively. Examining, therefore, the collapse cases with the number of deaths, we find that *calomel* and *opium* stands highest in the scale of success, and the *order of preference* appears as follows:—

	Per cent.
Calomel and opium	59·2
Calomel (*larger doses*)	60·9
Salines	62·9
Chalk and opium	63·2
Calomel (*small doses*)	73·9
Castor oil	77·6
Sulphuric acid	78·9

"'According to this result, the superior success of calomel and opium in severer cases appears as a distinct fact, elicited by the present inquiry. It is accompanied by other facts, viz., the relative advantages of those other modes of treatment which follow in their order of success. This order marks the use of *calomel* in small doses, of *castor oil*, and of *sulphuric acid*, as actually to be deprecated in severe cases. *Chalk and opium*, as shown above, stands at the head of the list in the general per centages, both in hospitals and in private practice; but in the comparison of the *collapse cases* with the number of deaths, the *average declines to the 4th rank.*'

"Other important tables are given of the results of the treatment of the premonitory diarrhœa, with a view to show which method of treatment was best in preventing the diarrhœa from running into cholera. On this point the authors say:—

"'Thus the order of per centage of failure to stay the disease in its earlier stages, or that of premonitory diarrhœa, is as follows:—

	Per cent.	Or, *including the Deaths from Diarrhœa as Failures, per cent.*
Salines	13·6	—
Chalk mixture	8·9	12·6
Calomel, with opium	6·9	7·1
Opium	—	2·6
Calomel	2·4	—
Chalk, with opium, calomel, and astringents	1·5	1·7
Sulphuric acid, with opium and calomel	1·3	1·5
Sulphuric acid, with opium	—	0·3
Chalk, with opium, ammonia, and catechu	0·2	—

Taking sulphuric acid with and without opium, and with calomel as an adjunctive remedy	1·33	1·54
Taking chalk with, and without opium, together with aromatic confection and ammonia, with catechu, kino, logwood, and calomel as an adjunctive remedy	1·31	1·55

Showing a decided preference to the astringent plan of treatment in the early stages of the disease, or in the premonitory diarrhœa.'

"The astringent method of treatment is again shown to have been the best; salines having been the least successful, and the ordinary chalk mixture second to it in inefficiency. The value of the sulphuric acid method in diarrhœa appears to be confirmed by these tables, although it *failed* in cases of collapse. There are many other interesting points in this Report, to which we shall advert at greater length on a future occasion." ('*Med. Circ.*,' April 11, 1855.)

Before closing this article we must express our regret that the committee in their first report on the *Castor-oil treatment*, which they thought proper to publish in the 'Times' and other newspapers, should have suppressed (substituted dashes for) the names of the parties who were reported to have tried it, as well as of the institutions in which the experiments were made, in all cases in which it was unsuccessful; whilst the name of the eminent and benevolent surgeon who advocated it, and of others on the same side of the question, were so freely "bandied" before the public. This omission, which was undoubtedly accidental or unintentional, is the more to be regretted, since it has led some persons hastily to infer the existence of a prejudice in the minds of the committee incompatible with the absolute impartiality of their subsequent investigations; whereas the committee appear to have bestowed considerable labour and pains in analysing the complex evidence they had to deal with, and have doubtless arranged their figures with rigorous accuracy, and made their deductions with the utmost fairness.

PETININE. Syn. *Butylamine* (?). A basic substance analogous to biethylamine, found by Dr. Anderson in Dippel's animal oil. It boils at 175° Fahr.

PETONG. Same as *packfong.*

PETROLENE. The pure liquid portion of *mineral tar.* It has a pale-yellow colour, a penetrating odour, and a high boiling point; is lighter than water, and is isomeric with the oils of turpentine and lemons. In its general properties it resembles rectified mineral naphtha.

PETROLEUM. Syn. *Rock Oil, Liquid Bitumen, Oil of Petre; Oleum Petræ, Bitumen Liquidum,*—Lat. Under this name are commonly included all those native hydrocarbons which are darker, and more unctious and consistent than naphtha, but less so than common tar or true bitumen. These substances vary in their boiling points, from about 180° to 600° Fahr. One of them (*Barbadoes tar*) is officinal in the Ph. L. 1851.

PETROLINE. A substance, analogous to paraffine, obtained by distillation from the *petroleum* of Rangoon.

PE-TUNT-SE. See *Porcelain.*

PEUCEDANINE. A white crystallizable substance discovered by Schlatter in the root of *peucedanum officinale* (Linn.) or *hog's fennel.* It is obtained by the action of *alcohol* in the usual manner.

PEUCILE. A peculiar liquid obtained by the action of *quicklime* upon the *hydrochlorate of oil of turpentine*, of which oil it appears to be an isomeric modification. (Brande.)

PEWTER. This is an alloy of tin and lead, or of tin with antimony and copper. The first only is properly called *pewter.* Three varieties are known in trade:—

Prep. 1. (*Plate Pewter.*) From *tin*, 89%; *antimony*, 7%; *bisbuth* and *copper*, of each, 2%; fused together. *Used* to make plates, tea-pots, &c. Takes a fine polish.

2. (*Trifle Pewter.*) From *tin*, 79%; *antimony*, 15%; *lead*, 6%; as the last. *Used* for minor articles, syringes, toys, &c.

3. (*Ley Pewter.*) From *tin*, 80%; *lead*, 20%. *Used* for measures, inkstands, &c.

Obs. According to the report of the French commission, pewter containing more than 18 parts of *lead* to 82 parts of *tin*, is unsafe for measures for wine and similar liquors, and indeed for any other utensils exposed to contact with our food or beverages. The legal sp. gr. of pewter in France is 7·764; if it be greater, it contains an excess of lead, and is liable to prove poisonous. The proportions of these metals may be approximately determined from the sp. gr.; but correctly, only by an assay for the purpose. See *Brass, German Silver, Lead,* and *Tin.*

PHARMACEUTICAL. The pronunciation of this word has been a *quæstio vexata* for many years with those to whom it more particularly applies. Parties who had never troubled themselves with Greek before, suddenly became eloquent on its direct derivation from φαρμακευτικος or φαρμακον, and in defiance of its immediate etymology and the rules of analogy, discarded one of its letters, and converted its soft sibilant into the guttural *kappa* (κ) or the Hebrew *koph* (ק). For months the subject was even made a matter of controversy in one of our periodicals, but was left unsettled by the parties most concerned; as the belligerents were too impetuous to be influenced by the opinions of our leading philologists, and appeared determined to wage war on independent principles. We well recollect that on our induction (now many years since) to a celebrated metropolitan laboratory, we committed the heinous offence of calling certain publications "*pharmaçeutical*" (seu). Need we say, that our temerity cost us dear. Such, however, is the truth. For some time we lost "caste" amongst those around us, and whispered doubts often reached our ears, as to the possibility of one so ignorant (?) being an efficient laboratorian. Happily, ignorant as we doubtless were, we had John Walker, Noah Webster, Worcester, Smart, Ogilvie, Jameson, and others, on our side, with only the obsolete authority of Perry, and that of the fantastic Knowles, against us. Years have rolled away since the period alluded to, but the "pharmaceutical chemists" of Great Britain, appear to be still uncertain as to the pronunciation of the very appropriate adjective by which they are distinguished. In the recent trial, the *Queen* v. *The Pharm. Society*, Lord Chief-Justice Campbell, a man alike distinguished for his learning and research, expressed, in very forcible language, his opinion in favour of the soft sound of the *c;* and since that date, both in the Court of Queen's Bench and the Court of Exchequer, the word has been pronounced pharmaçeutical (seu). We therefore trust the question is now finally settled, and that the eccentric enemies of poor letter *c*, will abandon their "*coo-ing*" for ever.

PHENYLAMINE. Aniline; on account of its relation to the phenyl-series.

PHENAMYLOL. An unimportant phenyl-compound.

PHENE. Benzole.

PHENECINE. See *Indigo Purple.*

PHENETOLE. A compound of the phenyl-series, possessing no practical interest.

PHENOLE. See *Carbolic Acid.*

PHENYLE. The hypothetical compound radical of the *phenyl-series.* Carbonic acid is said to be its *hydrated oxide.* The following are some of the phenyl compounds:—

Alcohol of Phenyle. This is aniline.

Benzoate of Phenyle. A substance analogous to benzoate of ethyle, obtained along with hydrochloric acid, by treating *hydrated oxide of phenyle* with *chloride of benzoyle.* It is white, fusible, and crystallizable; when heated with ammonia it yields phenyl-alcohol (*aniline*).

Chloride of Phenyle. A heavy oily liquid obtained by the action of *pentachloride of phosphorus* upon *hydrated oxide of phenyle.*

Cyanide of Phenyle. Benzonitrile.

Hydrated Oxide of Phenyle. Carbolic acid.

PHENYLE BASES. Of these the more important are *aniline,* and its derivatives, *chloraniline, cyaniline, melaniline, nitraniline, &c.*

PHILANTROPE MUOPHOBON. See *Rats.*

PHILLYRINE. Syn. *Phillyrina.* An alkaloid obtained from the *leaves* and *young twigs* of *phillyrea latifolia,* a species of privet, by a process similar to that adopted for the cinchona alkaloids. The sulphate (*phillyrinæ sulphas*) has been strongly recommended by M. Jachelli, and others, as a febrifuge in the place of disulphate of quinine; but recent trials of it have not induced a favorable impression as to its value.

PHILONIUM. The ancient name of an aromatic opiate, reputed to possess many virtues, invented by Philo. A collyrium containing numerous ingredients, was also so called. (See *below.*)

PHILONIUM. (London.) Syn. *Philonium Londinense, Ph. Romanum,*—Lat. *Prep.* (Ph. L. 1746.) *Caraway seeds, ginger,* and *white pepper,* of each, in powder, 2 oz.; *strained opium* (dissolved in wine), 6 dr.; *diacodion* (syrup of poppies), boiled to the consistence of honey, 3 times the weight of all the other ingredients; make an electuary. For the modern representative of this once celebrated compound see *Confection of Opium.*

PHILOSOPHER'S STONE. Syn. *Lapis Philosophorum,*—Lat. A wonderful substance, the discovery of which formed the day dreams of the alchemists. It was supposed to be capable of converting all the baser metals into gold, and of curing all diseases. Some of the alchemists appear to have laboured under the delusion that they had actually discovered it. The last of these enthusiasts was the talented and unfortunate Dr. Price of Guildford, who fell a victim to the jealousy and persecution of a society and notabilities, who would have better acquitted themselves in some nobler game. Modern discoveries tend to deprecate the opprobrium that has been so lavishly heaped upon the alchemists. The recently expressed opinions of Faraday and Dumas, two of the most illustrious chemical philosophers of the present day, must forcibly impress on the mind the conviction of not merely the *possibility,* but the *high probability* that some important discoveries on the constitution of the metals will ere long be made.

PHILOSOPHIC CANDLE. An inflamed jet of hydrogen gas.

PHILOSOPHIC WOOL. Flowers of zinc.

PHILTRE. Syn. *Philtrum,*—Lat. A charm or potion to excite love. The ancients had great faith in such remedies.

Nothing certain is now known respecting their composition; but there is sufficient evidence that recourse was frequently had to them by the ancients, and that "their operation was so violent that many persons lost their lives and their reason by their means." The Thessalian philtres were those most celebrated. (Juv., vi, 610, &c.) At the present day the administration of preparations of the kind is interdicted by law.

PHLORETINE. A crystallizable, sweet substance formed along with grape sugar, when *phloridzine* is acted on by *dilute acids.*

PHLORIDZINE. Syn. *Phlorizine; Phloridzinum,*—Lat. *Prep.* 1. By acting on the *fresh root-bark* of the *apple, pear,* or *plum tree,* with *boiling rectified spirit;* the spirit is distilled off, and the *phloridzine* crystallizes out of the residual liquor as it cools.

2. From the *aqueous decoction,* decolored by a little *fresh oxide of lead* (the excess of lead being removed by the cautious addition of a few drops of dilute sulphuric acid); the crystals that form as the solution cools are purified by recrystallization from *rectified spirit.*

Prop., &c. Fine, colourless, silky needles, freely soluble in rectified spirit and in hot water, but requiring 1000 parts of cold water for its solution; its taste is bitter and astringent. By the joint action of ammonia and oxygen it is converted into a gum-like substance, which has been named *phloridzéine.* When its solution is boiled with a little dilute sulphuric acid or hydrochloric acid, it is changed into *grape sugar* and *phloretine.*

Phloridzine is said to be a *more powerful febrifuge* than even quinine. (M. Lebandy.) Others compare it to salicine. *Dose.* 3 to 15 gr.

PHOCENIC ACID. Syn. *Delphinic Acid.* An oily acid, prepared from the *oil* of the *porpoise, seal,* and *whale,* in the same way as the volatile acids from butter. It is volatile and odoriferous, and dissolves in 18 parts of water. Its salts are called *phocenates.* Recent researches go to show that it is merely valerianic acid.

PHOCENINE. The name given by Chevreuil to a peculiar fatty matter which is mixed with oleine in the *oil of the porpoise.* By saponification it is converted into *phocenic acid,* and other products.

PHŒNICINE. See *Indigo Purple.*

PHORONE. A peculiar volatile oil obtained by the distillation of *camphorate of lime.* It is odorous and freely soluble in rectified spirit; anhydrous phosphoric robs it of a portion of its combined water, and converts it into *cumol.*

PHOSGENE GAS. See *Chloro-carbonic Acid.*

PHOSPHATE. Syn. *Phosphas,*—Lat. A salt of phosphoric acid. See *Phosphoric Acid* and the *respective bases.*

PHOSPHATIC ACID. Syn. *Acidum Phosphaticum,*—Lat. A name given by M. Dulong to the oil-like acid liquor resulting from the slow oxidation of phosphorus when exposed to the air. According to Sir H. Davy, it is a mere mixture of phosphoric and phosphorus acid. Largely diluted with water it acts as a powerful aphrodisiac on some of the lower animals.

PHOSPHIDES. See *Phosphurets.*

PHOSPHITE. Syn. *Phosphas,*—Lat. See *Phosphorous Acid.*

PHOSPHO-ETHYLIC ACID. See *Phosphovinic Acid.*

PHOSPHO-MESITYLIC ACID. *Glacial phosphoric acid* dissolved in *acetone.* It forms soluble salts (*phospho-mesitylates*).

PHOSPHORIC ACID. Syn. *Tribasic Phosphoric Acid; Acidum Phosphoricum,* —Lat. This compound abounds in each of the three kingdoms of nature. In combination with lime it forms the earthy portion of the bones of animals.

Prep. 1. (*Anhydrous.*) By the vivid combustion of *phosphorus* in a stream of *dry atmospheric air,* or under a bell-jar, copiously supplied with *dry air.* The product is *pure anhydrous phosphoric acid* under the form of snow-like flakes. It must be immediately collected and put into a warm, dry, well-stoppered bottle. In this state (*anhydrous pyrophosphoric acid*) it exhibits an intense attraction for water, and when thrown into it combines with it with explosive violence; exposed to the air for only a few seconds, it deliquesces to a syrupy-looking liquid; when dissolved in water and heated, or kept for some days, a solution of pure *hydrated tribasic phosphoric acid* alone remains. Once combined with water it cannot be again reduced to the anhydrous state.

2. (*Hydrated.*)—*a.* Ordinary *nitric acid* is heated in a tubulated retort connected with a receiver, and *small fragments* of *phosphorus* are dropped into it, singly and at intervals; as soon as the oxygenation of the phosphorus is complete, the heat is increased, the undecomposed acid distilled off, and the residuum evaporated to the consistence of a syrup. In this state it forms the *phosphoric acid* of the shops. By transferring it to a platinum crucible,

and gradually raising the heat to redness, pure *hydrated metaphosphoric acid*, or *glacial phosphoric acid*, is obtained. By solution in water and ebullition for a few minutes, it is reconverted into *common* or *tribasic phosphoric acid.* The product, in both cases, must be carefully preserved from the air. See *Dilute Phosphoric Acid*, Ph. L.

b. Bones (calcined to whiteness and powdered), 3 parts, are digested for several days in *oil of vitriol*, 2 parts, previously diluted with *water*, 6 parts, the mixture being frequently stirred during the time; a large quantity of *water* is next added, the whole thrown in a strainer, and the residual matter washed with some *hot water;* the mixed liquids are then precipitated with a *solution of carbonate of ammonia*, in slight excess, and the filtrate evaporated as before. Heat facilitates the process.

c. (Ure.) From *ground bone-ash*, and a solution of *oxalic acid* in *water*, digested together. The solution merely requires to be evaporated.

d. From *bone-ash*, 5 parts; *oil of vitriol*, 3 parts; *water*, 30 parts; mix, boil for 1 hour, filter, evaporate to the consistence of honey, and pour it out on an oiled slab; when cold break it into pieces, and put it at once into a bottle. The product is merely an *acid phosphate of lime*, although recognised as medicinal phosphoric acid in Russia and some parts of Germany.

Prop. Solid hydrated or glacial phosphoric acid contains 89% of real acid and 11% of water. It is a highly deliquescent, glassy-looking substance, very soluble in water, yielding a solution exhibiting powerful acid properties. Its concentrated solution differs from it chiefly in being in the liquid form. Its dilute solution is not poisonous, nor does it precipitate albumen. See *Tribasic Phosphoric Acid* (below.)

Tests.—1. Chloride of barium produces in aqueous solutions of the neutral and basic phosphates a white precipitate which is insoluble in either hydrochloric or nitric acid, and with difficulty soluble in a solution of sal ammoniac.—2. Solution of sulphate of lime produces in neutral and alkaline solutions of the phosphates a white precipitate, freely soluble in acids, even the acetic.—3. Sulphate of magnesia produces in solutions of the phosphates to which some sal ammoniac and free ammonia or its carbonate has been added a white, crystalline, and quickly subsiding precipitate of the basic phosphate of ammonia and magnesia, which is insoluble in a solution of either ammonia or sal ammoniac, but readily soluble in acids, even the acetic.—4. Acetate and nitrate of lead in neutral and alkaline solutions produce a white precipitate, which is nearly insoluble in acetic acid, but freely soluble in nitric acid.—5. Nitrate of silver, in the same cases, gives a light yellow precipitate. If the fluid in which the precipitate is suspended contained a *basic* phosphate, it does not affect test paper; if it contained a *neutral* phosphate, the reaction will be acid. If the phosphate examined has been heated to redness before solution, it then gives a white precipitate with nitrate of silver.—6. Hydrochloric acid is added to the solution to acid reaction, and afterwards 1 or 2 drops of a concentrated solution of sesquichloride of iron; a solution of acetate of potassa is next added in excess, when a flocculent, gelatinous, white precipitate (*sesquiphosphate of iron*) will be formed if phosphoric acid was present in any form or combination in the original liquor. This test is highly characteristic, and of general applicability.—7. *Phosphoric acid* is *distinguished* from *arsenious acid* by not being affected by sulphuretted hydrogen.—*Obs.* The *insoluble phosphates* must be first treated with diluted hydrochloric or sulphuric acid, and the resulting solution filtered and neutralized with an alkali before applying the reagents. When the substance under examination consists of a *very small quantity* of *phosphoric acid* in combination or admixture with a *large quantity* of *sesquioxide of iron*, it should be fused with some carbonate of soda, the residuum of the ignition exhausted with water, and the tests applied to the filtered solution. Arsenious acid, if present, should be removed by sulphuretted hydrogen before applying the tests. When the *acid exists* in *combination with alumina*, the solution in hydrochloric acid is neutralized with carbonate of soda; carbonate of baryta is next added in excess, followed by the addition of caustic potassa, also in excess, after which the whole is boiled. An insoluble phosphate of baryta is formed, which may be decomposed by sulphuric acid, as before.

Estim. Pure solutions of phosphoric acid may be tested by the common methods of *Acidimetry.* When in a state of combination it may be separated and weighed in either of the forms noticed under *Guano.* (See *p.* 549, 550.)

Uses, &c. Phosphoric acid is extensively employed by the bleacher, dyer, calico-printer, and enameller. Unlike sulphuric acid and the other strong acids, it does not coagulate albumen, nor injure vegetable fibre, and is not decomposed by contact with organic matter. In combination with alumina and a little boracic acid, it is said to be capable of producing a glaze for earthenware of extreme beauty and durability, and perfectly innocuous. It is also *used* in *medicine.* (See *below.*)

PHOSPHORIC ACID (Dilute). Syn. *Medicinal Phosphoric Acid; Acidum Phosphoricum Dilutum,*—Ph. L. *Prep.* (Ph. L.) A mixture of *nitric acid,* 4 fl. oz., and *distilled water,* 8 fl. oz., is poured on *phosphorus* (placed in a retort), 6 dr., and the heat of a sand-bath being applied, 6 fl. oz., are allowed to pass over into the receiver; this liquid is returned into the retort, and a second like quantity allowed to distil, which is rejected; the liquid remaining in the retort is next evaporated in a platinum capsule until reduced to 2 oz., and, when it has cooled, as much *distilled water* is added to it as will make the whole accurately measure a pint.

Pur., &c. It is "free from colour and odour. Neither chloride of barium nor nitrate of silver disturbs its solution. It does not in any way affect strips of copper or silver, nor is it coloured by sulphuretted hydrogen either before or after contact with these metals. 1 fl. oz. of this acid is saturated by 132 gr. of crystallized carbonate of soda, and no precipitate is formed. Sp. gr. 1·064." (Ph. L.) By heat it yields pure glacial phosphoric acid. It contains about 8·7% of dry phosphoric acid; or nearly 10% of glacial acid.

Uses, &c. As a remedy in nervous disorders, phosphatic urinary deposits, diabetes, morbid ossifications, caries, rickets, &c. *Dose.* 10 to 30 drops, in water or any bland fluid; also made into *lemonade,* to allay thirst, as the other mineral acids; and into a *liniment,* as a friction to osseous tumours.

PHOSPHORIC ACID (Bibasic). Syn. *Pyrophosphoric Acid.* This compound is best obtained by strongly heating *common* or *tribasic phosphate of soda.* The water of crystallization only is at first expelled, and the salt becomes anhydrous; but as the temperature reaches that of redness, the basic water of the acid is also driven off. By solution of the *altered salt* in *water* crystals of *bibasic phosphate of soda* may be obtained. A solution of this last compound, treated with *acetate of lead,* and the resulting precipitate (*bibasic phosphate of lead*) suspended in *cold water,* and decomposed by *sulphuretted hydrogen,* yields a solution of pure *hydrated bibasic phosphoric acid.* Heat resolves it into a solution of the ordinary or tribasic acid. Bibasic phosphoric acid precipitates the salts of silver of a white colour. The salts of this acid are called *pyrophosphates* or *bibasic phosphates.*

PHOSPHORIC ACID (Monobasic). Syn. *Metaphosphoric Acid, Paraphosphoric do.* When *tribasic phosphoric acid* is added to a *strong solution* of *tribasic phosphate of soda,* and the mixture, after concentration, is exposed to a low temperature, prismatic crystals are deposited. These, after being strongly heated to expel their basic water, are pure *monobasic phosphate of soda.* From the solution of this salt in *cold water,* a solution of pure *hydrated monobasic phosphoric acid* may be obtained, as above, by means of *acetate of lead* and *sulphuretted hydrogen.* This acid precipitates the salts of silver white, and is distinguished from the other modifications of phosphoric acid by the property which its solution possesses of coagulating albumen. Heat rapidly converts its solution into that of the tribasic acid, but when this solution is evaporated to dryness and heated to redness, the acid is reconverted into the monobasic state. The salts of this acid are termed *paraphosphates, metaphosphates,* or *monobasic phosphates.* See *Phosphoric Acid.*

PHOSPHORIC ACID (Tribasic). This is the common form of phosphoric acid, and the only one which enters into the composition of the salts used in medicine or the industrial arts, or which occurs in nature. When *phosphoric acid* is spoken of, it is this compound which is alluded to.

Prep. This has been already noticed. (See *p.* 965.) *Another method,* very convenient on the *small scale,* is as follows:—*Commercial phosphate of soda* is dissolved in *water,* and the solution precipitated with another of *acetate of lead;* an abundant white precipitate (*phosphate of lead*) falls; this is collected on a filter, well washed, and whilst still moist, is suspended in *distilled water,* and *sulphuretted hydrogen gas* passed into it, in excess; a black insoluble precipitate forms, while pure *tribasic phosphoric acid* remains in solution, and is easily deprived of the residual sulphuretted hydrogen by a gentle heat. By concentration in vacuo over sulphuric acid it may be obtained in thin crystalline plates.

Prop., &c. The solution of this acid may be boiled without change, but when concentrated and heated alone to about 400° Fahr., it is converted into a mixture of hydrated bibasic and monobasic phosphoric acid. At a red heat it is wholly converted into monohydrated (glacial or monobasic) phosphoric acid, which at a still higher temperature sublimes. Its salts are the *tribasic* or *common phosphates.* The preparation of the principal ones is noticed under the names of the respective bases. The *soluble phosphates* for which directions are not given may be obtained by the direct solution of the base or its hydrate in a solution of the acid; the *insoluble ones,* from solutions of a salt of the base and of phosphate of soda, by double decomposition. See *Phosphoric Acid.*

PHOSPHOROUS ACID. Syn. *Acidum Phosphorosum,*—Lat. This substance is slowly formed on the surface of phosphorus when exposed to the air at a temperature below 60° Fahr.

Prep. 1. (*Anhydrous.*) By burning *phosphorus* under a bell-glass, with a *very limited* supply of air. White; pulverulent.

2. (*Hydrated.*) Pure *phosphorus* is volatilized through a layer of *powdered bichloride of mercury,* contained in a glass tube; *terchloride of phosphorus* comes over, which on being mixed with *water,* is resolved into hydrochloric acid and phosphorus acid; by evaporating the mixed liquid to the consistence of a syrup, the first is expelled, and the residuum forms a crystalline mass of *hydrated phosphorous acid* on cooling.

Prop., &c. It is a powerful deoxydizing agent. Heated in a closed vessel, it is resolved into hydrated phosphoric acid, and pure phosphuretted hydrogen gas. With the bases it forms salts called *phosphites,* which possess little practical importance.

PHOSPHORUS. Syn. *Phosphorus,*—Ph. L. A remarkable elementary substance, discovered by Brandt, a chemist of Hamburgh, in 1669.

Prep. This is now only conducted on the large scale:—*Bone-ash* (in powder), 12 parts, and *water,* 24 parts, are stirred together in a large tub until the mixture is reduced to a perfectly smooth "pap;" *oil of vitriol,* 8 parts, is then added in a slender stream, active stirring being employed during the whole time, and afterwards until the combination appears complete; the next day the mass is thinned with *cold water,* and, if convenient, heated in a leaden pan or boiler until it has entirely lost its granular character; it is now transferred to one or a series of tall casks (according to the extent of the batch) and further diluted with a *large quantity of water;* after repose, the clear liquid is decanted, the sediment washed with *water,* and the "*washings*" and "*decanted liquor*" evaporated in a leaden or copper boiler until the white calcareous deposit (*gypsum*) becomes considerable; the whole is then allowed to cool, the clear portion decanted, and the sediment thoroughly drained on a filter; the liquid thus obtained is evaporated in an iron pot to the consistence of a thick syrup (say 4 parts), when *dry charcoal* (in powder), 1 part, is added, and the desiccation continued until the bottom of the pot becomes nearly red hot, after which, it is covered over and allowed to cool; the dry mixture, when cold, is put into one or more *earthen retorts* well covered with "*luting*" and properly dried, and heat is applied (sideways rather than at the bottom) by means of a good air-furnace; after a short time the beak of the retort is connected with a copper tube, the other end of which is made to dip about one-fourth of an inch beneath the surface of some lukewarm water placed in a trough, or wide-mouthed bottle.

The *distilled product* is *purified* by squeezing it through *chamois leather* under warm water, and is then *moulded for sale* by melting it *under water* heated to about 145° Fahr., and sucking it up to any desired height in slightly tapering, but perfectly straight glass tubes, previously warmed and wetted. The bottom of the tube being now closed with the finger, it is withdrawn, and transferred to a pan of cold water to congeal the phosphorus, which will then commonly fall out, or may be easily expelled by pressure with a piece of wire.

Prop., &c. Phosphorus is a pale yellow, semitransparent, and highly combustible solid; soft and flexible at common temperatures; it becomes waxy at about 75° Fahr.; melts at 108° (in close vessels at 95°,—Ure); begins to evaporate at 217½°; sublimes rapidly at 480° to 500°, and boils at 554° Fahr.; it takes fire at 165°, and at a lower temperature when slightly oxidized. Exposed to the air below 60° its surface is slowly converted into phosphorous acid. It is apparently insoluble in water, but it conveys its peculiar flavour and odour to that fluid when agitated with it; it is slightly soluble in ether, naphtha, and the fixed and volatile oils, and more freely so in bisulphuret of carbon. Its slow oxidation is entirely prevented by the presence of a small quantity of olefiant gas, or the vapour of ether, or of the essential oils; and what is singular, it suffers no change when immersed in *pure* oxygen below 60° Fahr., but oxidation is immediately set up if the oxygen be rarified, or diluted with any other gas; and unites with oxygen forming *acids,* and with the metals forming *phosphurets.* It is soluble in ether, naphtha, and the oils.

Pur. "Almost colourless; resembles wax; transparent; shines in the dark. It ought to be kept in water, and shut out from access of light." (Ph. L.) A small fragment heated at one end of a long closed tube should be volatilized, without residue, from the end to which the fire is applied. 32 gr. (dried by blotting paper) burned rapidly with free admission of air, in a tube or under a bell-glass, should yield fully 70 gr. of a snow-like substance, which is wholly soluble in water to a clear, colourless solution; this solution is not affected by sulphuretted hydrogen, and after agitation for some time with 100 gr. of dry precipitated carbonate of lime, the clear portion is volatile without the least residue.

Uses. The principal consumption of phosphorus is in the manufacture of Congreve matches. When swallowed it acts as a *powerful corrosive poison;* but small doses of its ethereal and oily solutions are occasionally administered in cases of chronic debility, extreme prostration of the nervous powers, impotency, &c. Its action is that of a powerful diffusible stimulant and diuretic; it is also aphrodisiac. Its use requires great caution, and the effects must be narrowly watched. The *treatment* of *poisoning* by *phosphorus* consists of the administration of a powerful emetic, and the copious use of mucilaginous drinks.

Concluding Remarks. From the great inflammability of phosphorus it can only be safely preserved under water. In *commerce,* it is always packed in tin cylinders filled with water, and soldered up air-tight. The leading points to be observed to ensure success in this manufacture are chiefly connected with the firing. "The heat of the furnace should be most slowly raised at first, but afterwards equably maintained in a state of bright ignition. After 3 or 4 hours of steady firing, carbonic acid and sulphurous acid gases are evolved in considerable abundance, provided the materials had not been well dried in the iron pot; then sulphuretted hydrogen makes its appearance, and next phosphuretted hydrogen, which last should continue during the whole of the distillation." "The firing should be regulated by the escape of this remarkable gas, which ought to be at the rate of about *two* bubbles per second. If the discharge comes to be intercepted, it is to be ascribed either to the temperature being too low, or to the retort getting cracked; and if upon raising the heat sufficiently no bubbles appear, it is a proof that the apparatus has become defective, and that it is needless to continue the operation. We may infer that the process approaches its conclusion by the increasing slowness with which the gas is disengaged under a powerful heat; and when it ceases to come over, we may cease firing, taking care to prevent reflux of water into the retort," (and consequent explosion) "from condensation of its gaseous contents, by admitting air into it through a recurved glass tube, or through the tube of the copper adopter." "The usual period of the operation upon the *great scale,* is from 24 to 30 hours." (Ure.)

PHOSPHORUS (Bromides of). When *bromine* and *phosphorus* are *cautiously* brought into contact in a vessel filled with dry *carbonic acid gas,* they unite with the evolution of light and heat, forming a crystalline yellow compound (*perbromide of phosphorus*) which sublimes and attaches itself to the upper part of the flask, and a liquid substance (*protobromide of phosphorus*) which remains at the bottom. Neither of them are used in medicine.

PHOSPHORUS (Chlorides of). Two of these are known:

Prep. 1. (*Terchloride; Chloride, Protochloride, Sesquichloride.*) By gently heating *phosphorus,* in excess, in *dry chlorine gas;* or by passing the *vapour of phosphorus* through a stratum of *powdered bichloride of mercury* strongly heated in a glass tube. It is limpid, colourless, highly fœtid, fumes in the air, and is slowly resolved by water into *phosphorous acid* and *hydrochloric acid.* Sp. gr. 1·45.

2. (*Pentachloride; Perchloride.*) By the spontaneous combustion of *phosphorus* in an excess of *dry chlorine;* or by passing a stream of *dry chlorine* into the *liquid terchloride.* By the first method it is obtained as a white crystalline sublimate; by the second, as a solid crystalline mass. It is volatile; water resolves it in *phosphoric acid* and *hydrochloric acid.*

PHOSPHORUS (Iodides of). *Prep.* 1. (*Protiodide.*) From *phosphorus,* 1 part; *iodine,* 7 parts; mixed together in a closed vessel, placed in a freezing mixture. Orange coloured; melts at 212°; volatile; decomposed by water.

2. (*Teriodide; Sesquiodide.*) From *phosphorus,* 1 part; *iodine,* 12 parts; as the last. A dark gray semi-crystalline mass, liquid at 84° Fahr.

3. (*Pentiodide; Periodide.*) From *phosphorus,* 1 part; *iodine,* 20 parts; as the last. A black mass, fusible at about 115° Fahr. All the above yield *hydriodic acid*

and *phosphorous* or *phosphoric acid,* by contact with water.

PHOSPHORUS (Oxide of). Syn. *Suboxide of Phosphorus.* A reddish-brown powder, formed when a *stream of oxygen* is forced upon *phosphorus* melted beneath the surface of hot water. By heat it is resolved into phosphorous and phosphoric acid. (For the other compounds of phosphorus and oxygen, see *Hypophosphorous, Phosphorous,* and *Phosphoric Acids.*)

PHOSPHORUS (Amorphous). Syn. *Red Phosphorus; Phosphorus Fuscus, P. Ruber.* This is phosphorus in that peculiar condition to which Berzelius has applied the term allotropic. The honour of its discovery is due to Dr. Schrötter of Vienna.

Prep. The ordinary *phosphorus of commerce,* rendered as dry as possible, is placed in a shallow vessel of thick, hard, and well-annealed Bohemian glass, fitted with a safety tube just dipping beneath the surface of a little *hot water* contained in an adjacent vessel; heat is then applied by means of a metallic bath (a mixture of lead and tin), the temperature of which is gradually raised until it ranges between 480 and 490° Fahr., and bubbles of gas escape from the end of the safety tube and catch fire as they come in contact with the air; this temperature is maintained until the amorphous condition is produced, the length of the exposure being regulated by a miniature operation with tubes conducted in the same bath; as soon as this point is reached, the apparatus is allowed to cool, and the amorphous phosphorus, which still contains some unconverted phosphorus, detached from the glass; it is then reduced to powder by careful trituration *under water,* drained on a calico filter, and, whilst *still moist,* spread thinly on shallow trays of iron or lead; in this state it is exposed, with frequent stirring, to heat in a chloride of calcium bath, at *first gentle,* and then gradually increased to its highest limit, and the heat continued until no more luminous vapour escapes; the residuum on the trays is then cooled, washed with *water* until this last ceases to affect test-paper, and is, lastly, drained and dried. To render it absolutely free from unaltered phosphorus, it may be washed with *bisulphuret of carbon.*

On the *small scale,* common phosphorus may be converted into *amorphous phosphorus* by simply exposing it for 50 or 60 hours to a temperature of about 480° Fahr., in closed glass tubes, or in any suitable vessel surrounded with an atmosphere which is unable to act chemically on it.

By keeping *common phosphorus* fused at a high temperature, under the above conditions, for fully 8 days, compact masses of amorphous phosphorus may be obtained.

Prop., &c. A reddish-brown, infusible, inodorous, solid substance, which is reconverted into ordinary phosphorus by simply exposing it to a heat a little above 500° Fahr. It is unaltered by atmospheric air; is insoluble in bisulphuret of carbon, alcohol, ether, or naphtha; is non-luminous in the dark below about 390° Fahr.; and does not take fire at a lower temperature than that necessary for its reconversion into the common or crystalline form. The sp. gr. ranges between 2·089 to 2·107, according to the method of preparing it. Its properties render it an admirable substitute for the common phosphorus in the composition for tipping matches, both as regards security from spontaneous ignition and the health of the manufacturers; but the anticipations that it would be thus applied, owing to its high price, have not been realized.

PHOSPHORUS (Baldwin's). Recently fused *nitrate of lime.* For this purpose it must be broken into fragments whilst still warm, and at once placed in dry and well-stopped phials. After exposure for some time to the direct rays of the sun, it emits sufficient light in the dark to render visible the figures on the dial-plate of a watch.

PHOSPHORUS (Bolognian). Syn. *Kercher's Phosphorus, Bolognian Stone.* This substance was accidentally discovered by a shoemaker of Bologna, and excited much interest about the middle of the 17th century. The following is said to have been the formula employed by the Logani family, who were particularly successful in its preparation, and acquired wealth by its sale to the curious throughout Europe:

Prep. Reduce recently calcined *native sulphate of baryta* to powder, make it into a paste with *mucilage of gum tragacanth,* and roll the mass into pieces about ¼ inch thick, and 1 to 2 inches long; dry these slowly by a moderate heat, and then expose them to ignition in a wind furnace, by placing them loosely among the charcoal; lastly, allow them to cool slowly, and at once place the pieces in well-stopped phials. Like the preceding substance, it phosphoresces in the dark after exposure to the sun's rays.

PHOSPHORUS (Canton's). *Prep.* From *calcined oyster shells,* 3 parts; *flowers of sulphur,* 1 part; placed in alternate layers in a covered crucible, and exposed to a strong heat for about an hour. It is preserved and used like the above.

PHOSPHORUS (Homberg's). Recently ignited *chloride of calcium.*

PHOSPHORUS (Kercher's). See *Bolognian Phosphorus.*

PHOSPHORUS BASES. Under this head chemists include various substances, analogous to organic bases, but containing phosphorus instead of nitrogen. Those yet examined are phosphuretted methyl-bodies, partly liquid and partly solid, obtained by passing a *current* of *chloride of methyle* over a layer of *phosphuret of calcium* heated to about 356° Fahr. From the mixed product, three distinct substances have been eliminated by M. Paul Thénard, two of which are powerfully basic.

PHOSPHORUS BOTTLES. *Prep.* 1. *Phosphorus,* 12 gr.; *olive oil,* ½ *oz.;* mix in an *oz.* phial, and place the latter, loosely corked, in a basin of *hot water;* as soon as the phosphorus is melted, remove the phial, cork it securely, and agitate it until nearly cold. On being uncorked, it emits sufficient light in the dark to see the time by a watch, and will retain this property for some years if not too frequently employed. These are frequently called "*luminous phials.*"

2. (*Briquets Phosphoriques.*)—*a.* From *phosphorus,* 3 parts; *white wax,* 1 part; cautiously melted together by the heat of *hot water;* as the mixture begins to cool, the bottles are turned round so that it may adhere to the sides.

b. (Bendix.) *Cork* (rasped small, and dry), and *yellow wax,* of each, 1 part; *phosphorus,* 4 parts; *petroleum,* 8 parts; mixed, by fusion, as the last.

Used as "*instantaneous-light bottles.*" A sulphur match rubbed against the composition immediately inflames on exposure to the air. They should be only unstoppered at the instant of introducing the match, and should be handled with caution.

PHOSPHORUS MATCHES. See *Matches* (and *above*).

PHOSPHORUS PASTE. Syn. *Anti-arsenical Rat-Poison, Phosphor Paste. Prep.* 1. *Phosphorus,* 1 *oz.; warm water,* 1 pint; place them in a bottle, cork it, and agitate them well together, until the phosphorus is reduced to a minute state of division, adding towards the end, *moist sugar,* ½ *lb.;* next add of *lard* (melted by a gentle heat), 1 *lb.,* and repeat the agitation until the whole is nearly cold; when *cold,* form it into a stiff dough with *oatmeal* or *barley meal,* and make this into small balls or cakes; lastly, dry these in the air, without artificial heat.

2. (M. Simon.) *Phosphorus,* 8 parts; *water* (lukewarm), 180 parts; mix in a mortar, and add of *rye meal,* 180 parts; when cold, further add of *butter* or *lard,* 180 parts; *sugar,* 125 parts; and mix the whole thoroughly together. This is the formula authorised by an ordonnance of the Prussian Government, dated April 27th, 1843.

Obs. Rats, mice, &c., eat the above composition with avidity, after which they soon die. It is said that the best method of using it, is to place small pieces of it in and about the holes, with some water in a shallow vessel for them to drink. It has the advantage of retaining its efficacy for many years, and is less dangerous to human beings than compositions containing arsenic, whilst it is even more effective for the purpose for which it is employed. Some persons recommend the addition of a little *oil of rhodium* or *oil of aniseed.* See *Rats, &c.*

PHOSPHOVINIC ACID. Syn. *Phosphethylic Acid.* A bibasic acid containing the elements of ether.

Prep. A mixture of *strong alcohol* and *syrupy phosphoric acid,* equal parts, are exposed to a temperature of 180° Fahr.; after 24 hours, the whole is diluted with *water,* and neutralized with *carbonate of baryta;* the filtered liquid, by evaporation at a gentle heat, yields crystals of *phosphovinate of baryta,* under the form of brilliant hexagonal plates; these are redissolved in *cold water,* the solution is precipitated with *dilute sulphuric acid* (carefully avoiding excess), and the filtered liquid evaporated *in vacuo* to the consistence of a syrup.

Prop., &c. Colourless; intensely sour; soluble in water, alcohol, and ether; easily decomposed by heat. Its salts are the *phosphovinates;* those of the *alkalies, magnesia,* and *strontia,* are freely soluble in water; those of *lime, silver,* and *lead,* only slightly so. According to Vögeli, a second acid is formed along with the phosphovinic by the action of syrupy phosphoric acid on alcohol, to which he has given the name of *phosphobiethylic acid.*

PHOSPHURET. Syn. *Phosphide; Phosphuretum, Phosphidum,*—Lat. A compound of phosphorus with a base. See the respective *Metals, &c.*

PHOTOGENIC DRAWING. See *Sun Painting.*

PHOTOGRAPHY. See *Sun Painting.*

PHOTOMETRY. The art of determining the relative intensities of different lights. Various methods have been adopted, at different times, for this purpose, among which, however, a few only are sufficiently simple for general application. The principle adopted by Bouguer and Lambert depends on the fact, that though the eye cannot judge correctly of the proportional force of different lights, it can, generally, distinguish with great precision when two similar surfaces or objects presented together are equally illuminated; or when the shadows of an opaque object produced by different lights are equally dark. Now, as light travels in straight lines, and is equally diffused, it is evident that its intensity will progressively lessen as the distance of its source increases. This diminution is found to be in the *duplicate ratio of the distance.* To apply this principle to *candles, lamps, gas-lights, &c.*, we have only to arrange two of them so that the *light* or *shadow* resulting from both shall be of *equal intensity,* after which we must carefully measure the distance of each of them from the surface on which the light or shadow falls. The squares of these distances give their relative intensity. In general some known light, as that from a *wax candle* (4 to the *lb.*), is taken as the standard of comparison.

Dr. Ritchie's "*Photometer*" consists of a *rectangular box*, about 2 inches square, open at both ends, and blackened inside to absorb extraneous light. In this, inclined at angles of 45° to its axis, are placed two precisely similar *rectangular plates* of *plain silvered glass,* and fastened so as to meet at the top, in the middle of a narrow slit about an inch long, and the eighth of an inch broad, and which is covered with a strip of *tissue* or *oiled paper.* In employing this instrument, the "lights must be placed at such a distance from each other, and from the instrument between them, that the light from each shall fall on the reflector next it, and be reflected to the corresponding portion of the oiled paper. The photometer is then to be moved nearer to the one or the other, until the two portions of the oiled paper corresponding to the two mirrors are equally illuminated, of which the eye can judge with considerable accuracy."

In Prof. Wheatstone's "*photometer*" the relative intensity of the two lights is determined by the relative brightness of the opposite sides of a *revolving silvered ball* illuminated by them.

In the *method of photometry* usually, but erroneously, ascribed to Count Rumford, the shadows of an opaque object formed by different lights, and allowed to fall on a *white wall* or *paper screen*, are contrasted. A wire about $\frac{3}{16}$ths of an inch thick, and about a foot in length, with the one end bent so as to form a handle, is commonly used to form the shadows. The method of proceeding is similar to that first above noticed.

It is generally supposed that the *equality* of *two shadows* can be appreciated with greater certainty than that of *two lights.*

PHRENITIS. Syn. *Phrensy; Encephalitis,*—Lat. Inflammation of the brain or its membranes. It is a highly dangerous and often fatal disease, requiring prompt and skilful medical treatment. In the *acute forms*, liberal venesection in the arm, or cupping, or leeches, an active and irritating purgative, (as a full dose of *calomel* and *jalap,*) followed by saline purgatives, and the *cold water douche*, or *ice* to the head (previously shaved), forms the common treatment. In the *subacute* and *chronic forms* active depletion is unnecessary, and often proves injurious.

PHTHALIC ACID. A new bibasic acid, obtained by boiling *tetrachloride of naphthaline* with *nitric acid,* or by acting on *alizarine* with *nitric acid.* It crystallizes in yellow plates, is only slightly soluble in water, but is freely soluble in alcohol and ether. Fuming nitric acid converts it into *nitro-phthalic acid.* Some *phthalates* have also been formed.

PHTHIRIASIS. Syn. *Morbus Pediculosus.* A disease in which lice breed on the body, puncture the skin, and produce small but irritating ulcers. It is symptomatic of a bad state of body, or of other diseases, to which the attention should be directed. The best *local treatment* is warm sea bathing, and the free use of clean linen.

PHTHISIC. A popular name for difficulty of breathing, from its supposed resemblance to phthisis. See *Bronchitis* (and *below*).

PHTHISIS. Syn. *Consumption, Pulmonary do., Tubercular do.* A diseased condition of the lungs, *distinguished* by progressive emaciation, debility, cough, difficulty of breathing, hectic fever, and purulent, and usually copious expectoration. As the disease advances, the expectorated matter is frequently streaked with blood; there is pain in the side (especially after coughing or a full inspiration), inability to lie with equal comfort on both sides, frequent flushings and chilliness, and a red sediment in the urine. The tongue is seldom much altered; the bowels, at first irregular, become at length habitually relaxed; profuse perspirations, attended by extreme debility and rapid emaciation, follow; the legs swell; the eyes brighten; and the patient sinks, generally retaining his senses in full vigour, and even his hope of recovery, and his spirits, to the last.

The *causes* which predispose to pulmonary consumption are numerous and varied.

Among these, hereditary disposition and scrofulous habit are the principal in the most alarming form of the disease, or that which arises from tubercles of the lungs. Particular formation of body, as narrow chest, or spinal or pectoral distortion, in which the functional action of the lungs is interfered with; unhealthy occupations; confined or unwholesome air; excessive indulgence of the passions; intemperance, or unnatural abstemiousness; exhausting habits and diseases; sudden or lengthened exposure to extreme cold, damp, &c.; insufficient clothing; checked perspiration; and, more particularly, neglected catarrh, bronchitis, asthma, and similar affections.

The *treatment* of this disease is necessarily not of a very decided character; much more depending on proper attention to diet and regimen, clothing, exercise, ventilation, and uniformity of temperature, than on medicine. In the early stages, the *tendency to inflammatory action* may be cautiously combated by cupping or blisters, and the use of mild saline aperients, as citrate of potassa, bitartrate of potassa, or even sulphate of magnesia in appropriate doses; and the *irritation* and *coughing* may be allayed by small doses of the salts of morphia, tincture or extract of henbane, and expectorants, with any of the ordinary demulcents. The *night-sweats* are often alleviated by the administration of draughts containing dilute sulphuric acid; and the *exhausting diarrhœa*, by the common cretaceous mixture, to which a little tincture of catechu may be added, with small doses of rhubarb and bicarbonate of potassa at intervals. Change of air is commonly recommended, but is seldom attended with advantage when the residence of the patient is already in a healthy locality.

Numerous *pretended specifics* in *phthisis* have at different times been brought before the public, but all of them, after a short course of puffing, have sunk into oblivion. The inhalation of air mixed with the vapour of *chlorine, iodine, medicated ether*, or *tar water;* the internal administration of *digitalis, wood naphtha*, and numerous other compounds, have each had enthusiastic advocates, but their once much vaunted effects appear to have been entirely imaginary. Unfortunately, no substance or treatment has yet been discovered capable of curing, or even of permanently arresting the progress of this disease in its more malignant forms. Evidence, both medical and non-medical, recently collected, certainly goes to show that substances of a bland oleaginous character, or which are rich in *carbon* or in *hydrocarbons*, exert, under favorable circumstances, an ameliorating, if not a curative action in phthisis. The value of *pale cod-liver oil*, when freely taken by consumptive patients, is indisputable; and the beneficial effects of that containing quinine (*oleum jecoris aselli cum quinâ*) is often still more perceptible. An equally curious fact is, that persons who have the skin constantly in contact with *oil* seldom suffer from pulmonary affections; and it is said that a case of fatal phthisis is very rare among them. This has suggested the use of *oil baths*, and frequent *frictions with oil.* The latter have been lately tried with very marked advantage, and deserve the serious consideration of the practitioner. Again, we have seen several consumptive patients who have wonderfully improved from constant exposure to the *fumes* of *coal-tar naphtha;* and of these, three or four, whose cases were reported hopeless, appear to have absolutely and completely recovered. The fumes of this naphtha have a very irritating effect on the eyes, but a precisely opposite effect on diseased lungs. The *modus operandi* of this remedy we do not pretend to explain. We merely record results, which an almost unlimited field of observation amongst workers in gutta percha and Indian rubber, who constantly use coal-tar naphtha, has enabled us to collect. Another singular fact is, that working in *gutta percha*, when naphtha is not used, tends greatly to increase the appetite and to promote digestion. In a recent number of 'L'Union Médicale' we are told that "Avicenna recommended *sugar* as the best palliative of consumption. At the present time *sugar-candy* and *honey* are popular remedies against catarrhs and chest-affections. Doubtless they moisten the throat, and facilitate expectoration; but, besides this, there has lately sprung up a regular plan of treating phthisis with sugar. A celebrated American physician sends his patients to pass several hours daily in sugar works. It appears that the fumes emanating from the sugar exert a beneficial influence on the lungs." It may here be observed that sugar, like mineral naphtha and oil, is a substance rich in carbon. *Gum*, an article closely approaching sugar in constitution, is one of the very best demulcents in all breath affections.

PHTHORE. Fluorine.

PHYLLIREINE. A bitter principle extracted from the *phyllirea latifolia.* It is crystallizable.

PHYSIC BALLS. See *Veterinary Medicines.*

PICA. See *Depraved Appetite.*

PICAMAR. Syn. *Picamare.* One of

the six peculiar principles discovered by Reichenbach in beech-tar, of which it constitutes about 1-6th. It is a viscid, colourless, oily liquid, only feebly odorous, but intensely bitter; insoluble in water; freely soluble in alcohol, ether, and oils; boiling point 520° Fahr.; Sp. gr. 1·095. It is characterised by forming crystalline compounds with the alkalies and ammonia, which are decomposed by water, but dissolve, without change, in alcohol. See *Kreasote.*

PICCALILLI. See *Pickles.*

PICKLE. The liquor in which substances used as food are preserved. That for *flesh* is commonly brine,—that for *vegetables,* vinegar; both of which are commonly flavoured with spices, &c.

Prep. 1. (For *meat.*)—*a.* From *bay salt,* 3 *lb.; saltpetre,* 2½ *oz.; moist sugar,* 1 *lb.; allspice* and *black pepper,* of each (bruised), 1 *oz.; water,* 9 pints; simmer them together in a clean covered iron or enamelled vessel for 7 or 8 minutes; when the whole has cooled, remove the skum, and pour it over the articles to be preserved. *Used* for hams, tongues, beef, &c., to which it imparts a fine red colour, and a superior flavour.

b. From *bay salt* and *common salt,* of each, 2 *lb.; moist sugar,* 1 *lb.; saltpetre,* ½ *lb.; allspice* (bruised), ½ *oz.; water,* 1 gall.; as before. *Used* chiefly for pork and hams. Common salt may be substituted for bay salt, but it is less powerfully antiseptic, and the flavour is less grateful.

2. (For *vegetables.*)—*a.* Strong *distilled vinegar,* to each quart of which, 1½ *oz.* of *good salt* has been added.

b. Good *distilled vinegar,* 4 pints; *common salt,* 2½ *oz.; black pepper,* ½ *oz.; unbleached Jamaica ginger,* 2½ *oz.;* (the last two bruised, but not dusty;) *mace* (shredded), ¼ *oz.;* simmer in an *enamelled iron* or *stoneware* vessel, as above, and strain through flannel. Sometimes a little *capsicum* is added. *Used* either hot or cold, according to the vegetable it is intended to preserve.

PICKLE (Lemon). See *Sauces.*

PICKLES. These well-known substances are easily *prepared* of the finest quality. The *vegetables* and *fruit,* selected of the proper quality and at the proper season, after being well cleansed with *cold spring-water,* are steeped for some time in *strong brine;* they are then drained and dried, and transferred to bottles or jars; the spice (if any) is then added, the bottles filled up with *strong pickling vinegar,* and *at once* securely corked down and tied over with bladder. As soon as the bottles are cold, the corks are dipped into *melted wax,* the more surely to preserve them air-tight. Good *wood* or *distilled vinegar* is commonly used for this purpose; but the best *malt* or *white wine* vinegar of the strength known as No. 22 or 24, is exclusively employed for the finer pickles which are not spiced. In those for early use the steep may be made in hot or boiling brine, by which the product will be ready for the table in a much shorter period; but with substances of a succulent and flabby nature, as cabbage, cauliflower, some fruit, &c., or in which crispness is esteemed a mark of excellence, this is inadmissible. For such articles a cold steep in strong *alum water* is preferable to one in brine. The vinegar should also be added *cold;* or, at furthest, should be only slightly warmed. As a *general rule,* the *softer* and *more delicate articles* do not require so long *soaking in brine* as the harder and coarser kinds; and they may be often advantageously pickled by simply pouring very *strong pickling vinegar* over them, *without applying heat.* It must also be observed that *beetroot,* and other like substances which are sliced, as well as certain delicate fruits, must not be steeped at all. The *spice* is commonly added *whole* to the bottles; but a more *economical plan* is to steep it (bruised) for some time, or to simmer it in the vinegar before using the latter, as in the forms given above.

The *spices* and *flavoring ingredients* employed for pickles are—*allspice, black* and *white pepper, capsicums* or *red pods, cloves, garlic, ginger, horse-radish, lemon-peel, mace, mustard, shallots,* and *turmeric.* These are chosen with reference to the particular variety of the pickle, or the taste of the consumer.

In the preparation of pickles it is highly necessary to avoid the use of metallic vessels; as both vinegar and brine rapidly corrode *brass, copper, lead,* &c., and thus become poisonous. These liquids may be best heated or boiled in a *stoneware* jar by the heat of a water-bath, or a stove. *Common glazed earthenware* should be avoided either for making or keeping the pickles in, as the glazing usually contains lead. *Pickles* should also *be kept from the air* as much as possible, and should only be touched with *wooden* or *bone spoons.* They are also better preserved in *small jars,* or *bottles,* than in *large ones,* as the more frequent opening of the latter, exposes them too much. *Copper* or *verdigris* is frequently added to pickles to impart a green colour; or the vinegar is boiled in a copper vessel until sufficiently "*greened,*" before pouring it on the vegetables. This *poisonous* addition may be readily detected by any of the tests mentioned at p. 287. If a green colour be desired, it may be imparted to the vinegar, and ultimately to the pickles, by steeping *vine leaves*, or the *leaves* of *parsley* or *spinach* in it. The evidence of Dr. Hassall (the *Lancet Commissioner*), and of Mr. Blackwell (*of the eminent firm of Cross and Blackwell*) goes to prove that the *pickles of the shops* are nearly always artificially coloured, and are thus rendered highly unwholesome, if not *actively* poisonous. A teaspoonful of *olive oil* may be advantageously added to each bottle, to keep the pickles white, and to promote their preservation.

The *following list* includes the *leading pickles* of the shops, and some others:—

Barberries. From the *ripe fruit*, without heat.

Beans. From the *young green pods* of the *scarlet bean*, and the *French* or *kidney bean*, with heat.

Beetroot. From the *sliced root*, without steeping in brine, and with *cold spiced vinegar.* When wanted for immediate use, the vinegar may be used boiling hot.

Brocoli. As *Cauliflowers.*

Cabbage. This, either *red* or *white*, is cut into thin slices, and steeped in *strong brine*, or sprinkled with *common salt*, and allowed to lie for 1 or 2 days; after which it is drained for 10 or 12 hours in a warm room, and then put into jars or bottles, with or without a little *mace* and *white peppercorns*, and at once covered with *cold strong white vinegar.*—*Another plan* is to steep the *sliced cabbage* in *alum water* for 10 or 12 hours, and after draining and drying it, to pour the *vinegar* over it as before. The product of the last formula eats very fresh and crisp, but takes longer to mature than that of the other. Some persons add a little *salt* with the vinegar; and others mix slices of *red beet* with the cabbage.

Capsicums. As *Gherkins.*

Cauliflowers. As *Cabbage* (nearly). *Or* they may be steeped in *hot brine* for 1 to 2 hours, before pouring the *vinegar* over them.

Cherries. From the *scarcely ripe fruit*, bottled, and covered with *strong* and *colourless pickling vinegar.*

Codlins. As *Beans.*

Cucumbers. See *Gherkins.*

Elderflowers. From the *clusters*, just before they open, as *red cabbage.* A beautiful pickle.

English Bamboo. From the *young shoots* of *elder*, denuded of the outer skin, pickled in *brine* for 12 or 14 hours; then bottled with a little *white pepper*, *ginger*, *mace*, and *allspice*, and pickled with *boiling vinegar.* Excellent with boiled mutton.

Eschalots. With *boiling spiced vinegar*, or *spices* added to each bottle.

French Beans. See *above.*

Garlic. As *Eschalots.*

Gherkins. From *small cucumbers* (not too young), steeped for a week in very *strong brine;* this last is then poured off, heated to the boiling point, and again poured on the *fruit;* the next day the *gherkins* are drained on a sieve, wiped dry, put into bottles or jars with some *spice* (ginger, pepper, or cayenne), and at once covered with *strong pickling vinegar*, boiling hot. Several other pickles may be prepared in the same way.

Gooseberries. From the *green fruit*, as either *cabbage* or *cauliflowers.*

Indian Mango. From *green peaches.* (See *below.*)

Indian Pickle, Piccalili. This is a mixed pickle which is characterised by being highly flavoured with curry-powder or turmeric, mustard, and garlic. The following form is commonly used:—Take 1 *hard white cabbage* (sliced); 2 *cauliflowers* (pulled to pieces); some *French beans;* 1 stick of *horseradish* (sliced); about 2 dozen *small white onions;* and 1 dozen *gherkins;* cover them with boiling brine; the next day drain the whole on a sieve, put it into a jar, and add of *curry-powder* or *turmeric*, 2 *oz.; garlic*, *ginger*, and *mustard seed*, of each, 1 *oz.; capsicums*, ½ *oz.;* fill up the vessel with *hot pickling vinegar*, bung it up close, and let it stand for a month, with occasional agitation. See *Mixed Pickles* (below).

Lemons. From the *fruit*, slit half way down into quarters, and cored, put into a dish, and sprinkled with a *little salt;* in about a week, the *whole* is placed in jars or bottles with a little *turmeric* and *capsicums*, and covered with *hot vinegar.*

Limes. As the last.

Mangoes. As *Lemons*, adding *mustard seed*, and a *little garlic*, with *spices*, at will. *English mangoes* are made from cucumbers or small melons, split and deprived of their seeds.

Melons. As *Lemons* (nearly).

Mixed Pickles. From *white cabbage*, *cauliflowers*, *French beans*, *cucumbers*, *onions*, or *any other* like vegetable, at will, *except* red cabbage or walnuts, treated as gherkins; with *raw ginger*, *capsicum*, *mustard seed*, and *long pepper*, for spice, added to each bottle. A little coarsely bruised *turmeric* improves both the colour and flavour.

Mushrooms. From the *small button mushrooms*, cleansed with *cold spring water*, and gently wiped dry with a towel, then placed in bottles, with a blade or two of *mace*, and covered with the strongest *white pickling vinegar*, boiling hot.

Myrobalans. The *yellow myrobalan* preserved in *strong brine.* Gently aperient.

Nasturtiums. From the *unripe* or *scarcely ripe fruit*, simply covered with *cold strong vinegar ; or*, as *cabbage* or *gherkins.*

Onions. From the *small button* or *filbert onion*, deprived of the outer coloured skin, and either at once put into bottles and covered with *strong white pickling vinegar*, or previously steeped for a day or two in *strong brine* or *alum water.* When required for early use, the vinegar should be poured on boiling hot.

Peaches. From the *scarcely-ripe fruit*, as *Gherkins.*

Peas. As *Beans* or *Cauliflowers.*

Piccalili. See *Indian Pickle.*

Radish Pods. As *Beans* or *Gherkins.*

Samphire. From the *perennial samphire* (erythmum maritimum, — *Linn.*), covered with *strong vinegar*, to each pint of which ¾ *oz.* of *salt* has been added, and poured on boiling hot. Said to excite the appetite.

Tomatoes. From the *common tomato* or *love apple*, as *Gherkins.*

Walnuts. From the *young fruit* of *juglans regia* (Linn.), or common walnut.—*a.* Steep them in *strong brine* for a week, then bottle them, add *spice*, and pour on the *vinegar* boiling hot.—*b.* On each pint of the *nuts*, spread on a dish, sprinkle 1 *oz.* of *common salt ;* expose them to the sun or a full light for 10 or 12 days, frequently basting them with their own liquor; lastly, bottle them, and pour on the *vinegar* boiling hot.—*c.* (Dr. Kitchener.) Gently simmer the *fruit* in *brine*, then expose it on a cloth for a day or two, or until it turns black; next put it into bottles or jars, pour *hot spiced vinegar* over it, and cork down immediately. In this way the pickle becomes sufficiently mature for the table in *half the time* required for that prepared by the common method. Dr. Kitchener also recommends this parboiling process for several other pickles. *Some persons* pierce the *fruit* with an awl or stocking-needle, in several places, in order to induce early maturation. The *spices* usually employed are mustard-seed, allspice, and ginger, with a little mace and garlic.

PICOLINE. An oily substance, discovered by Dr. Anderson, associated with aniline, chinoleine, and some other volatile bases, in certain varieties of coal tar. It is *separated* from these substances by careful distillation, being the most volatile. It is colourless, limpid, strongly odorous, acrid, and bitter tasted; miscible with water in all proportions, insoluble in alkaline and saline solutions, remarkably alkaline and basic, and forms well-defined and crystallizable salts with the acids; liquid at 0°, and boils at 272° Fahr. Sp. gr. 0·955. Unlike aniline, it does not become brown by age, or by slight exposure to the air.

PICRAMYLE. A name given to a hydrocarbon radical of which the essential oil of almonds is stated to be the *binoxide.*

PICRIC ACID. Syn. *Carbazotic Acid, Nitrophenisic do., Nitropicric do.; Acidum Carbazoticum, &c.*,—Lat. A peculiar compound formed by the action of strong nitric acid on indigo, aloes, silk, wool, and several other substances.

Prep. Add, cautiously and gradually, 1 part of *powdered indigo* to 10 or 12 parts of *hot nitric acid*, of the sp. gr. 1·43; when the reaction has moderated and the scum has fallen, add an *additional* quantity of *nitric acid*, and boil the whole until red fumes are no longer evolved; redissolve the crystals of *impure picric acid* deposited in *boiling distilled water*, and remove any oily matter found floating on the surface of the solution by means of bibulous paper; a second time redissolve in *boiling water* the crystals which form as the liquid cools, saturate the new solution with *carbonate of potassa*, and set it aside to crystallize; the crystals of *picrate of potassa* thus obtained must be purified by several re-solutions and re-crystallizations, and next decomposed by *nitric acid;* the crystals deposited as the liquid cools yield pure *picric acid* by again dissolving them in *boiling water*, and recrystallization.

Prop., &c. Brilliant yellow scales, scarcely soluble in cold water, but very soluble in boiling water, and in alcohol and ether; fusible; volatile; taste, insupportably bitter, and very permanent. It forms salts with the bases (*picrates, carbazotates*), mostly possessing a yellow colour, and exploding when heated. The *picrate* or *carbazotate of lead* has been proposed as a fulminating powder for percussion caps. The carbazotate of potassa has been given with advantage in intermittent fevers. A *solution of picric acid* in alcohol is an excellent test for potassa, if there be not too much water present, as it throws down a yellow crystalline precipitate with that alkali, but forms a very soluble salt with soda. Most of the *picrates* may be *made* by the direct solution of the *carbonate*, *hydrate*, or *oxide of the base*, in a *solution of the acid* in hot water. The *carbazotate of silver* forms beautiful starry groups of acicular crystals, having the colour and lustre of gold.

The *principal uses* of crude picric acid are in dyeing and the adulteration of beer. It is, however, highly poisonous. According to Prof. Rapp, it acts deleteriously both when swallowed and applied to the unsound skin. Five grains seriously affected a large dog, and killed it within 24 hours. It induces vomiting, feebleness, and general loss of nervous tone. The tissues of animals poisoned by it (even the white of the eye) were tinged of a yellow colour. See *Porter*, *&c.*

PICRO-ERYTHRINE. A crystallizable, bitter principle, formed, along with orsellinic acid, when *erythric acid* is boiled for some time with *water*.

PICROGLYCION. An extractive matter obtained from the stalks of the *solanum dulcamara* (Linn.) or *woody nightshade*. It possesses a mixed sweet and bitter taste; hence the name.

PICROLICHENINE. A crystallizable, bitter substance, found by Alms in the *lichen variolaria amara*. It is *extracted* by *alcohol*, and *purified* by washing it with a *weak solution of carbonate of potassa*. It is said to be a powerful febrifuge.

PICROMEL. The name given by Thénard to a dark-coloured substance, formerly supposed to be the bitter principle of bile. It may be *obtained* from *fresh bile*, by adding to it *sulphuric acid* diluted with 5 parts of *water*, applying a *gentle heat*, and, after repose, decanting the clear portion, edulcorating the sediment (*resin of bile*) with *water*, digesting with *carbonate of baryta*, and evaporating.

PICROTOXINE. Syn. *Picrotoxia*, *Picrotoxina*, *Picrotoxic Acid*, *Picrotoxium*. A poisonous principle discovered by Boullay in *menispermum cocculus* or *cocculus Indicus*.

Prep. 1. Precipitate a *decoction* of *cocculus Indicus* with a *solution of acetate of lead*, gently evaporate to dryness, redissolve the residuum in *alcohol* of 0·817, and crystallize by evaporation; repeat the solution and crystallization a second and a third time. Any adhering colour may be removed by agitating it with a very little *water*; or by *animal charcoal*, in the usual manner.

2. (Kane.) *Alcoholic extract of cocculus Indicus* is exhausted with the smallest possible quantity of *water*, and the mixed liquors filtered; to the filtrate *hydrochloric acid* is added, and the whole set aside to crystallize. The *product* may be purified as before.

Prop., *&c.* It forms small, colourless, stellated needles; soluble in alcohol, ether, and acetic acid, and feebly so in water; boiling water dissolves it freely; taste of solutions, inexpressibly bitter; reaction, neutral. It does not combine with acids, as formerly asserted, but it forms feeble combinations with some of the bases. It is a powerful intoxicant and narcotico-acrid poison. It acts powerfully on the spinal cord, and nervous system generally, occasioning an increase of the animal temperature, and peculiar movements, similar to those described by Flourens as resulting from sections of the cerebellum. It is frequently present in malt liquors, owing to their common adulteration with cocculus Indicus. (See *p.* 268.)

PIERRE DIVINE. Syn. *Cuprum Aluminatum*. See *Lapis Divinus*.

PIES. Alexis Soyer declares that everybody eats pies "in England," and that in these countries they "may, in fact, be considered as one of our best companions *du voyage* through life;" and therefore "it is needful that we should learn not merely how to make them, but to make them *well!* If all the spoilt pies made in London on a single Sunday were exhibited in a row beside a line of railway, it would take above an hour by special train to pass in review these culinary victims." The following is condensed from the instructions of this notable:—

To *make a pie to perfection*,—when your paste (*half-puff* or *short*) is carefully made, and your dish or form properly full, throw a *little flour* on your *paste-board*, take about a ¼ *lb.* of your *paste*, which roll with your hand, until (say) an inch in circumference; then moisten the rim of your pie-dish, and fix the paste equally on it with your thumb. When you have rolled *your paste* for the covering, or upper crust, of an equal thickness throughout, and in proportion to the contents of your pie (½ inch is about the average), fold the cover in two, lay it over one half of your pie, and turn the other half over the remaining part; next press it slightly with your thumb round the rim, cut neatly the rim of the paste, form rather a thick edge, and mark this with a knife about every quarter of an inch apart; observing to hold your knife in a slanting direction, which gives it a neat appearance; lastly, make two small holes on the top, and egg-over the whole with a paste-brush; or else use a little *milk* or *water*. Any small portion of paste remaining may be shaped to fanciful designs, and placed as ornaments on the top.

"For meat pies, observe, that if your paste is either too thick or too thin, the covering too narrow or too short, and requires pulling one way or the other, to make it fit, your pie is sure to be imperfect, the covering no longer protecting the contents. It is the same with fruit; and if the paste happens to be rather rich, it pulls the rim of the pie to the dish, soddens the paste, makes it heavy, and, therefore, indigestible as well as unpalatable."

Meat pies require the addition of either cayenne, or black pepper, or allspice; and *fruit pies*, of enough *sugar* to sweeten, with *mace*, *ginger*, *cloves*, or *lemon peel*, according to taste, and the substance operated on. See *Pastry*, *Tarts*, *&c.*

PIG. The pig or hog (*sus scrofa*,—Linn.), one of the *common pachydermata*, is now domesticated in all the temperate climates of the world. Its *flesh* constitutes *pork*, *bacon*, *ham*, *&c.*; its *fat* (lard) is officinal in the pharmacopœias. The *skin*, *bristles*, and even the *blood* and *intestines* of this animal, are either eaten as food, or turned to some useful purpose in the arts. See *Pork*, *Leather*, *&c.*

PIGMENTS. These are noticed under the *respective colours*.

PIKE. The *esox lucius* (Linn.), of the order of soft-finned abdominal fishes (*malacopterygii abdominales*). It is remarkable for its voracity, but is highly esteemed by epicures. Various parts of it were formerly used in medicine. The *fat* (*oleum lucii piscis*) was one of the simples of the Ph. L. of 1618, and was esteemed as a friction in catarrhs. It is even now used in some parts of Europe to disperse opacities of the cornea.

PILCHARD. The *clupea pilchardus*, a fish belonging to the same genus, and closely resembling the common herring, than which, however, it is smaller, but thicker and rounder, and more oily. It abounds on the coasts of Devon and Cornwall, where it is not only consumed as food, but pressed for its oil.

PILES. Syn. *Hæmorrhoides*,—Lat. A painful disease occasioned by the morbid dilatations of the veins at the lower part of the rectum, and surrounding the anus.

Piles are principally *occasioned* by costiveness and cold; and, occasionally, by the use of acrid food. They have been distinguished into—*blind piles*, or a varicose state of the veins without bleeding,—*mucous piles*, when the tumours are excoriated, and mucus or pus is discharged,—*bleeding piles*, when accompanied with loss of blood, and—*excrescential piles*, when there are loose fleshy excrescences about the verge of the anus and within the rectum.

The *treatment of piles* consists in the administration of *mild aperients*, as castor oil, or an electuary of sulphur and cream of tartar. When there is *much inflammation* or *bleeding*, cold and astringent lotions, as those of sulphate of zinc or alum, should be applied; and when the *pain is considerable*, fomentations of decoction of poppy heads may be used with advantage. To *arrest the bleeding*, ice is also frequently applied, but continued pressure is more certain. *When* the *tumours are large* and *flaccid*, the compound ointment of galls is an excellent application; and if there is a *tendency to inflammation*, a little liquor of diacetate of lead may be added. In *confirmed piles*, the internal use of copaiba, or still better, of the confection of black pepper, should be persevered in for some time, together with local applications. In *severe cases* the protruded tumours are removed by surgeons, by the knife or ligature. See *Ointments*, *Electuaries*, *&c.* (and *below*.)

PILL COCHIA. See *Compound Colocynth Pills.*

PILL RUFI. See *Pills of Aloes with Myrrh.*

PILLS. Syn. *Pilulæ*,—Lat. *Pilules*, *Saccharolés Solides*,—Fr. Pills are little balls, of a semi-solid consistence, composed of various medicinal substances, and intended to be taken whole. The facility with which they are made and administered, their comparatively little taste, their power of preserving their properties for a considerable length of time, and, lastly, their portability and inexpensiveness, have long rendered them the most frequently employed and the most popular form of medicine.

The *rapid* and *skilful preparation* of *pills* from all the numerous substances of which they are composed, is justly considered to demand the highest qualifications in the practical dispenser. The *medicinals* employed must be made into a consistent and moderately firm mass, sufficiently plastic to be rolled or moulded into any shape, without adhering to the fingers, knife, or slab, and yet sufficiently solid to retain the globular form when divided into pills. A few substances, as certain extracts, &c., are already in this condition; but the others require the use of an excipient to give them the requisite bulk or consistence. As a *general rule*, all the constituents of a pill which can be pulverized, should be reduced to fine powder, before mixing them with the soft ingredients which enter into its composition; and these last, or the excipient, should next be gradually added, and the mixture triturated and beaten until the whole forms a perfectly homogeneous mass. It is then ready to be divided into pills. This is effected by rolling it on a slab, with a pill or bolus knife, into small pipes or cylinders, then dividing these into pieces of the requisite weight; and, lastly, rolling them between the thumb and finger to give them a globular form. A little *powdered liquorice-root* or *starch* is commonly employed to prevent the pills adhering to the fingers, or to each other, after they are made. *Magnesia*, so frequently used for this purpose, is unsuited for pills containing metallic salts or the alkaloids, or other remedies which are exhibited in very small doses.

Instead of forming the mass into pills by hand, in the manner just referred to, a convenient and simple instrument, called a "*pill machine*," is now generally used by the druggists for the purpose. This consists of two pieces. The *first* (see *fig.* 1) is divided into three compartments;—*c* is a vacant space to receive the divided mass, which is to be rolled into pills;—*b* is a grooved brass plate, which assists in dividing the mass into pills; and—*a* is a box for containing the powder for covering the pills, and to receive them as they are formed. The *second* (see *fig.* 2) consists of a brass plate (*a*), grooved to match the plate *b* in *fig.* 1, and bounded at both ends by moveable projecting plates (*b b*), containing each two wheels under the ledge of the plate (*b*); and a wooden back (*c*), with two handles, (*d d*), to which this plate is affixed. In *using* this machine, the pill-mass is rolled into a cylindrical form on the front part of it, by means of *fig.* 2 inverted; the small roll is then laid on the cutting part of the instrument (1, *b*), and divided by passing *fig.* 2. over it, the little wheels enabling the latter to run easily on the brass plate which forms the margin of the bed of the machine. The pills, thus formed, are then drawn forward on to the smooth bed on which the mass was first rolled, and receive a finishing turn or two with the smooth side of the "cutter," by which they are rendered more nearly spherical. They are, lastly, thrown over into 1, *c*, ready to be transferred to the pill-box.

Fig. 1.

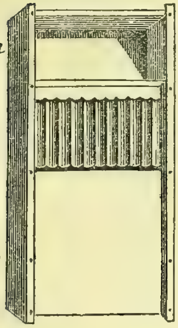
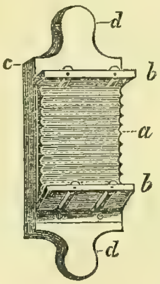


Fig. 2.



The *nature* of the *excipient* should be suited to that of the active ingredients in pills, as well as in all other forms of medicine. *Soft extracts*, and other substances of a like character, may be rendered more consistent by the addition of any simple powder, as that of liquorice or sugar. *Vegetable powders* are generally beaten up with syrup or treacle, and *heavy powders* with conserve of roses, or extract of liquorice. Castile soap (made of olive oil and soda) and medicinal soft-soap (made of olive oil and potash) are commonly employed for *fatty* and *resinous matters*, as well as for many others which are not decomposed by alkalies. When the chief ingredient of the mass is *resin*, rectified spirit is frequently used to soften it, either with or without the addition of soap to increase its solubility in the stomach. For many substances no excipient is required. Thus, most of the *gum-resins* and *stiff extracts* may be at once made into pills, or, at all events, after being slightly softened by heat. *Mucilage*, formerly so much used in the preparation of pills, is now only employed for those which are to be taken within a day or two after being made; as pills containing it become so hard and insoluble when kept for some time, as to resist the action of the stomach, and frequently to pass through the bowels without even losing their form.

It may be further remarked, that no *deliquescent salt* should enter into the composition of pills not intended for immediate use; and that when *efflorescent salts* are so employed, they should be first freed from their water of crystallization.

When the *mixed ingredients* are made into a mass (*pill-mass*) which it is not intended at once to divide into pills, it should be *preserved* in a piece of bladder or gut-skin placed in a covered stoneware or earthenware pot. In this state it may be occasionally moistened with a little weak spirit to prevent its getting hard.

The *weight* (size) of *pills* varies from ½ gr.

to 6 gr. If heavier than this, they are called *boluses.* Formerly, as a general rule, they were made of 5 gr. each; but pills of this weight are, in general, so large, that some persons find a difficulty in swallowing them. Another disadvantage of large pills is the trouble of nicely apportioning the dose,—*one* pill being, perhaps, too small a quantity, and *two* pills the reverse. Hence, 2 to 3-gr. pills are now the favorite size with both pill-takers and dispensers, notwithstanding that 5-gr. pills are still ordered in one of the British pharmacopœias.

Pills are occasionally *coated* with gold, silver, and other substances to render them more agreeable to the eye, or to prevent the taste of nauseous ingredients affecting the palate during deglutition. They are *gilded* and *silvered* by placing them, in the moist state, on a leaf or two of the metal in a small gallipot, and covering them in a similar manner with another leaf of metal; over the mouth of the gallipot is laid a piece of smooth writing paper, and on this the palm of the hand; a sudden and rapid circular motion is then given to the whole. If the pills are not sufficiently moist or sticky, they should be rendered so, by rolling them between the fingers *very slightly* moistened with mucilage, before proceeding to silver them. *Another method,* is to shake them in a similar manner with a little gold or silver dust.

When *pills* are to be covered with *gelatine,* each pill being stuck on the point of a very thin wire four or five inches in length, is dipped into a *solution of gelatine,* so as to coat it completely, and the wire is then inserted into a pin-cushion, or a vessel containing fine sand, and left until the gelatine is firm, which occurs in about a quarter of an hour; the pins may then be easily removed by simply warming them, by placing the centre of each for a second or two in the flame of a spirit lamp or candle. "*Sugar coated pills*" are prepared in nearly the same way, but substituting hot and highly concentrated syrup, to which a little gelatine has been added, for a simple solution of gelatine.

M. Durden covers pills with *collodion.* We have frequently used the *traumaticine* of the Gutta Percha Company for this purpose, for which a solution of gutta percha in either chloroform or bisulphuret of carbon may be substituted. The ready solubility in the stomach of pills thus covered has, with justice, been questioned. Gelatine, or still better, gelatine mixed with a little sugar, is unexceptionable in this respect; whilst it undoubtedly excludes the taste of nauseous medicines more effectually than any other substance.

As *pill-masses* are liable to *get hard* and *brittle by keeping,* an excellent plan is to keep the dry ingredients powdered and mixed together in well-corked bottles or jars, when a portion may at any time be beaten up with syrup, conserve, soap, &c., according to the formula, and as wanted for use. The mixed ingredients in this state are technically known as "*species*" or "*powder for*" the respective pills.

"It is generally said, that pills should be taken on an empty stomach, and at a considerable distance from a meal; but for ourselves, we think that it is nearly always better to take them during a meal; first, because the stomach does not then find itself immediately under the influence of substances, which, if not always dangerous, seldom fail to act more or less disagreeably; secondly, because its absorbent action is more certain; and, lastly, because they are then taken more easily." (Trousseau & Reveil.) The meal here referred to should be a light one, from which acidulous and other substances likely to interfere with the action of the remedy should be excluded. The dose should also be increased.

In the London pharmacopœia the singular number is now very properly employed to express the names of the officinal pill-masses; but in the other pharmacopœias the names are given in the plural form. As the latter is almost universally adopted in speaking of magistral formulæ and nostrums, we have used it in *all* cases for the sake of uniformity, and for ease of reference. See *Boluses* and *Prescribing* (and *below*).

PILLS (Abernethy's). See *page* 1.

PILLS (Acetate of Lead). Syn. *Pilulæ Plumbi Acetatis,*—Lat. *Prep.* 1. *Acetate of lead,* 20 gr.; *powdered camphor,* 15 gr.; *conserve of roses,* q. s.; mix, and divide into 12 pills.

2. (Radius.) *Acetate of lead* and *powdered mallow* or *liquorice root,* of each, ½ dr.; *simple syrup,* q. s.; divide into 18 pills. *Dose.* 1 to 5 daily, washed down with water soured with vinegar; as a powerful astringent in hæmorrhages, diarrhœa, the night-sweats in phthisis, &c. See *Opiated Lead Pills.*

PILLS (Acetate of Mercury). Syn. *Pilulæ Hydrargyri Acetatis,*—Lat. *Prep.* 1. *Acetate of mercury,* 18 gr.; *sugar of milk* (or *manna*), 1 dr.; *mucilage,* q. s.; divide into 24 pills. *Dose.* As an *alterative,* 1 daily; as a *sialogogue,* 1 every 4 or 5 hours, or oftener; in syphilis, &c. See *Keyser's Pills.*

2. (*Opiated,*—Carmichael.) *Acetate of mercury, camphor,* and *opium,* of each, 30 gr.; *syrup of poppies* to mix. For 30 pills. Less apt to affect the stomach and bowels than the last.

PILLS (Acetate of Morphia). Syn. *Pilulæ Morphiæ Acetatis,*—Lat. *Prep.* 1. *Acetate of morphia,* 2 gr.; *sugar of milk,* 15 gr.; *conserve of roses,* 20 gr.; for 12 pills. Anodyne, sedative, and soporific. *Dose.* One, as required.

2. (Dr. A. T. Thomson.) *Acetate of morphia,* 1 gr.; *powdered foxglove,* 6 gr.; *powdered camphor,* 10 gr.; *powdered gum arabic,* 8 gr.; *syrup of tolu,* q. s.; to be divided into 6 pills. Sedative and antispasmodic. *Dose.* One, every 3 or 4 hours; in phthisis, palpitations, spasms, &c. The *hydrochlorate of morphia* may be used instead of the acetate, with advantage.

PILLS (Aconite). Syn. *Pilulæ Aconiti, P. Extracti A.,*—Lat. *Prep.* (Dr. Turnbull.) *Alcoholic extract of aconite,* 1 gr.; *liquorice powder,* 12 gr.; *simple syrup,* q. s.; mix, and divide the mass into 6 pills. *Dose.* One pill, every 3 or 4 hours; as a powerful anodyne and sedative in excessive action of the heart, acute rheumatism, gout, neuralgia, &c. The utmost care should be taken both in their preparation and administration.

PILLS (Alibert's). See *Aperient Pills.*

PILLS (Aloes). Syn. *Pilulæ Aloeticæ; Pilulæ Aloes,*—Ph. E. *Prep.* 1. (Ph. E.) *Socotrine aloes* (in powder) and *Castile soap,* equal parts; *conserve of red-roses,* q. s. to form a pill-mass.

2. (Ph. U. S.) *Powdered aloes* and *Castile soap,* equal parts, beat into a mass, and divided into 4-gr. pills.

Obs. "This pill may be also correctly made with the finer qualities of East Indian aloes, as the (true) Socotrine variety is very scarce; and many, not without reason, prefer (pure) Barbadoes aloes." (Ph. E.) The *dose,* as a *laxative,* is 5 to 10 gr.; as a *purgative,* 12 to 20 gr., or more. See *Aloes Pills with Soap.*

PILLS (Aloes,—Compound). Syn. *Pilulæ Aloeticæ Compositæ; Pilula Aloës Composita,*—Ph. L. *Pilulæ A. Compositæ,*—Ph. D. *P. ex Aloë,*—Ph. L. 1788. *Prep.* 1. (Ph. L.) *Socotrine aloes* (in powder), 1 oz.; *extract of gentian,* ½ oz.; *oil of caraway,* 40 drops; *treacle,* q. s.; the whole to be beaten together until they form a mass proper for making pills.

2. (Ph. D.) *Hepatic aloes* (in powder), 2 *oz.; extract of gentian* and *treacle,* of each, 1 *oz.; oil of caraway,* 1 fl. dr.; as the last.

Obs. The above is a very valuable purgative in habitual costiveness and indigestion, in all cases in which the use of aloes is not contra-indicated. The *dose* is from 5 to 15 gr., or more.

PILLS (Aloes,—Diluted). Syn. *Pilulæ Aloës Dilutæ,*—Lat. *Prep.* (Dr. Marshall Hall.) *Barbadoes aloes, Castile soap, extract of liquorice,* and *treacle,* equal parts; *water,* q. s.; dissolve, with heat, strain, and evaporate to the consistence of a pill-mass. Resembles the *pilula aloës cum sapone,* Ph. L.

PILLS (Aloes and Assafœtida). Syn. *Pilulæ Aloës et Assafœtida,*—Ph. E. *Prep.* (Ph. E.) *Aloes* (Socotrine or East Indian, powdered), *assafœtida,* and *Castile soap,* equal parts; beat them with *conserve of red-roses* to a proper pill-mass. *Dose.* 5 to 10 gr., once or twice daily, as a stomachic tonic and laxative, in dyspepsia, flatulence, &c.; and 12 to 20 gr., as a purgative in similar cases. It is extremely useful in costiveness, with flatulency, occurring in hysterical and hypochondriacal subjects.

PILLS (Aloes and Ginger). Syn. *Pilulæ Aloës et Zingiberis,*—Lat. *Prep.* (Ph. D. 1826.) *Aloes,* 1 oz.; *Castile soap,* ½ oz.; *ginger,* 1 dr.; *oil of peppermint,* ½ dr.; beaten to a mass. A useful laxative in cold habits. *Dose.* As the last.

PILLS (Aloes and Ipecacuanha). Syn. *Dr. Baillie's Dinner Pills; Pilulæ Aloës et Ipecacuanhæ,*—Lat. *Prep.* (Dr. Baillie.) *Powdered aloes,* 30 gr.; *powdered ginger* (finest), 45 gr.; *ipecacuanha,* 12 gr.; *syrup of orange peel,* q. s. to mix. For 24 pills. *Dose.* One, about an hour before dinner.

PILLS (Aloes and Iron). Syn. *Pilulæ Aloës et Ferri,*—Ph. E. *Prep.* (Ph. E.) *Sulphate of iron,* 3 parts; *Barbadoes aloes,* 2 parts; *aromatic powder,* 6 parts; *conserve of red roses,* 8 parts; powder the aloes and sulphate of iron separately, beat the whole to a mass, and divide this into 5-gr. pills. An excellent medicine in chlorosis, hysteria, and atonic amenorrhœa. *Dose.* 1 to 3 pills daily.

PILLS (Aloes and Mastic). See *Dinner Pills.*

PILLS (Aloes and Mercury). Syn. *Pilulæ Aloës cum Hydrargyro,*—Lat. See *Abernethy's Pills* (*p.* 1).

PILLS (Aloes and Myrrh). Syn. *Pilula Aloës cum Myrrhâ,*—Ph. L. & D. *Pilulæ Rufi,* or *Communes,*—Ph. L. 1720. *Pil. Aloës et Myrrhæ,*—Ph. E. *Rufus's Pills, Common do,*—Obs. *Prep.* 1. (Ph. L.) *Socotrine* or *hepatic aloes* (in powder), ½ oz.; *saffron, myrrh* (powdered), and *soft soap*

(Ph. L.), of each, 2 dr.; *treacle*, q. s. to form a pill-mass.

2. (Ph. D.) *Hepatic aloes, 2 oz.; myrrh, 1 oz.; dried saffron, ½ oz.;* all in powder; *treacle, 2½ oz.*

3. (Ph. E.) *Aloes* (Socotrine or East Indian), 4 parts; *myrrh*, 2 parts; *saffron*, 1 part; beat them to a pill-mass with *conserve of red-roses*, q. s.

4. (Ph. L. 1836, and Ph. D. 1826.) *Aloes* (in powder), 2 oz.; *saffron* and *powdered myrrh*, of each, 1 oz.; *syrup*, q. s. to form a pill-mass.

Obs. This compound is a most excellent stomachic purgative and emmenagogue, when there are no febrile symptoms present. It is said to have been employed ever since the time of Rhazes, and is still in extensive use. *Dose.* 10 to 20 gr.

PILLS (Aloes and Rhubarb). Syn. *Pilulæ Aloës et Rhei, P. A. cum Rheo,*—Lat. *Prep.* Powdered *Socotrine* or *hepatic aloes*, powdered *rhubarb*, and *soft soap* (Ph. L.), of each, ½ dr.; *oil of chamomile*, 10 drops; for 30 pills. *Dose.* 1 to 5, either as a stomach tonic or laxative; especially in dyspepsia with loss of appetite.

PILLS (Aloes and Rose-juice). Syn. *Pilulæ Aloës Rosatæ,*—Lat. *Pilules Angeliques, Grains de Santé,*—Fr. *Prep.* Take *aloes* and *rose-juice*, of each, 4 oz.; *juices of borage* and *chicory*, of each, 2 oz.; dissolve with heat, evaporate to an extract, add of *rhubarb*, 2 dr.; *agaric*, 1 dr.; and divide the mass into 1½-gr. pills. *Dose.* 4 to 12, as a purge.

PILLS (Aloes with Soap). Syn. *Pilula Aloës cum Sapone,*—Ph. L. *Prep.* (Ph. L.) Powdered *extract of Barbadoes aloes, soft soap*, and *extract of liquorice*, equal parts; *treacle*, q. s. to form a pill-mass. *Dose.* 10 to 20 gr.; in the usual cases in which aloes is administered. It is more readily soluble in the juices of the primæ viæ, and is milder than most of the aloetic pills without soap. See *Pills* (Aloes,—Diluted).

PILLS (Alterative). Syn. *Pilulæ Alterantes,*—Lat. See *Calomel, Mercurial,* and *Plummer's Pills, &c.*

PILLS (Alum). Syn. *Pilulæ Aluminis, P. A. Compositæ,*—Lat. *Prep.* 1. (Augustin.) *Alum*, 20 gr.; *benzoic acid*, 6 gr.; *powdered gum* and *white sugar*, of each, 10 gr.; *water*, q. s. to form a mass. For 36 pills. In phthisis, and atonic mucous discharges. The whole to be taken in the course of 2 or 3 days.

2. (Capuron.) *Catechu*, 1 dr.; *alum*, ½ dr.; *opium*, 10 gr.; *syrup of red-roses*, q. s.; divide into 5-gr. pills. *Dose.* 1 to 3; in chronic diarrhœa and leucorrhœa.

3. (Radius.) *Alum* and *catechu*, equal parts; *extract of gentian*, q. s. to mix; divide into 2 or 3-gr. pills. *Dose.* 2 to 4 every four hours; in passive hemorrhages, mucous discharges, and chronic diarrhœa.

PILLS (Ammoniacum). Syn. *Pilulæ Ammoniaci,*—Lat. *Prep.* 1. *Gum ammoniacum*, 1 dr.; *powdered sugar*, ½ dr.; *conserve of hips*, q. s. In old coughs and hysterical affections.

2. (*Compound.*)—*a.* (Ainslie.) *Ammoniacum*, 1 dr.; *mercurial pill*, 15 gr.; *powdered squills*, 6 or 8 gr.; *simple syrup*, q. s. For 16 pills. In asthmatic coughs with deranged action of the liver. *Dose.* One, 2 or 3 times a day.

b. (W. Cooley.) *Ammoniacum* and *sagapenum*, of each, 1 dr.; *dried sulphate of iron*, ½ dr.; *conserve of hips*, q. s. In obstructed menstruation, and in the chronic diarrhœa of hysterical subjects.

PILLS (Ammoniated Copper). Syn. *Pilulæ Cupri Ammoniati,*—Ph. E. *P. C. Ammoniureti,*—Ph. E. 1839. *Prep.* (Ph. E.) *Ammoniated copper* (in fine powder), 1 part; *bread-crumb*, 6 parts; *solution of carbonate of ammonia*, q. s. to make a mass, which is to be divided so that each pill may contain ½ gr. of ammoniated copper. In epilepsy, and in some other spasmodic diseases. *Dose.* 1 pill, night and morning, gradually increased to 5 or 6.

PILLS (Ammoniated Iron). Syn. *Pilulæ Ferri Ammoniati, P. F. Ammonio-chloridi,*—Lat. *Prep.* 1. (Dr. Copland.) *Ammoniated iron*, 1 dr.; *aloes* and *extract of gentian*, of each, ½ dr.; for 30 pills. In scrofula, chlorosis, amenorrhœa, &c.

2. (Radius.) *Ammoniated iron* and *galbanum*, of each, 1 dr.; *assafœtida*, 2 dr.; *castor*, 20 gr.; *tincture of valerian*, q. s. For 3-gr. pills. *Dose.* 2 pills, night and morning; in atonic nervous disorders, epilepsy, &c.

PILLS (Ammonio-citrate of Iron). Syn. *Pilulæ Ferri Ammonio-citratis,* — Lat. *Prep.* (Beral.) *Ammonio-citrate of iron*, 1 dr.; *white sugar*, 3 dr.; *mucilage*, q. s. to mix. For 3-gr. pills. *Dose.* 1 to 3 or more; as a mild chalybeate tonic.

PILLS (Analeptic). See *James's Pills, &c.*

PILLS (Anderson's Scot's). Various formulæ for these pills are extant, the products of which differ widely from the genuine article. Dr. Paris, some years since, declared that they consisted of *Barbadoes aloes, jalap*, and *oil of aniseed.* A careful examination of the proprietary article, with other facts that have come to our knowledge, leads us to believe that the first of the following formulæ is the one now employed in the preparation of the "*Grana Angelica*," or "*Anderson's True Scot's Pills*," of the present day.

Prep. 1. (Anat. of Quackery.) From *Barbadoes aloes*, 7 *lb.; jalap* (in fine powder), 2¼ *lb.; treacle*, ½ *lb.; soap*, 6 *oz.;* melted together by the heat of a water-bath, and when partly cold, aromatized by stirring in of *oil of aniseed*, 1 *oz.* The mass is divided into about 3½-gr. pills, of which 26 or 27 are placed in each 1*s.* 1½*d.* box. A mild and useful aperient. *Dose.* 5 to 15 gr., or more.

2. (Original Formula.) *Socotrine aloes*, 1 oz.; *best myrrh*, ¼ oz.; *saffron*, 1 dr.; separately pounded very fine; mix them, in an earthen pipkin, with a spoonful each of *water* and *sweet oil*, by the heat of a slow fire, and form the mass into "common sized pills." For a copy of the original document in the "Chapel of the Rolls," see *Med. Circ.*, vol. ii, p. 248.

3. (P. Cod.) *Aloes* and *gamboge*, of each, 6 dr.; *oil of aniseed*, 1 dr.; *syrup*, q. s.; mix, and divide into 4-gr. pills. Much more powerful than the preceding, and closely resembling Morison's No. 2 pills.

4. (Phil. Coll. of Pharm.) *Barbadoes aloes* (in powder), 3 ℔; *Castile soap*, ½ ℔; *colocynth* and *gamboge* (both in fine powder), 2 oz.; *oil of aniseed*, 1 oz.; beat to a mass with *water*, q. s., and divide it into 3-gr. pills. Less active than the last; but more so than the "*True Scot's Pills*."

PILLS (Anodyne). Syn. *Pilulæ Anodynæ*,—Lat. *Prep.* 1. (Hosp. F.) *Opium* (in powder), 6 gr.; *camphor*, 15 gr.; *conserve of roses*, q. s.; divide into 12 pills. *Dose.* 1 to 3, as required.

2. (A. T. Thomson.) *Calomel*, *potassio-tartrate of antimony*, and *opium*, equal parts; *syrup of saffron*, q. s.; divide into 3½-gr. pills. In acute rheumatism and neuralgia. *Dose.* 1 pill, at bedtime.

PILLS (Antibilious). All the ordinary *aperient* and *stomachic pills* may be classed under this head. See the *names* of their proprietors or reputed inventors, or those of their leading ingredients.

PILLS (Antichlorotic). Syn. *Pilulæ Antichloroticæ*,—Lat. *Prep.* 1. (Radius.) *Aloes* and *carbonate of iron*, of each ½ dr.; *gum ammoniacum*, 1 dr.; *extract of taraxacum*, q. s. For 3-gr. pills. *Dose.* 2 to 6, night and morning; in chlorosis, amenorrhœa, &c.

2. (Trousseau & Reveil.) *Porphyrized iron filings*, 1 dr.; *extract of wormwood*, q. s. For 36 pills. *Dose.* 3 or 4; as the last.

PILLS (Antimonial,—Compound). Syn. *Pilulæ Antimonialis Compositæ*, *P. Antimonii Co.*,—Lat. *Prep.* 1. *Antimonial powder*, ½ dr.; *calomel*, *camphor*, and *powdered opium*, of each, 6 gr.; *conserve of roses*, q. s.; divide into 4-gr. pills. *Dose.* Two, at night; in acute rheumatism, neuralgia, chronic coughs, &c.

2. (St. B. Hosp.) *Tartar emetic*, 1 gr.; *guaiacum* and *pill of aloes and myrrh*, of each, ½ dr.; *treacle*, to mix. For 16 pills. As the last.

PILLS (Antispasmodic). Syn. *Pilulæ Antispasmodicæ*,—Lat. *Prep.* (Dr. A. T. Thomson.) *Opium*, 1 gr.; *Russian castor*, 13 gr.; *powdered digitalis*, 2 gr.; *syrup*, to mix; divide into 4 pills. *Dose.* 1 or 2, two or three times a day; in spasmodic asthma, difficulty of breathing, &c. Several other formulæ for *antispasmodic pills* will be found both above and below.

2. (Trousseau & Reveil.) *Musk*, 15 gr.; *extract of valerian*, ½ dr.; *liquorice powder*, q. s. For 20 pills. *Dose.* 1 every two hours until there is a marked improvement in the symptoms; in pneumonia, accompanied by delirium, especially in drunkards; in spasms of the uterus, and in various other spasmodic affections.

PILLS (Aperient). Syn. *Pilulæ Aperientes*,—Lat. *Prep.* 1. *Hepatic aloes*, 2 dr.; *rhubarb* and *Castile soap*, of each, 1 dr.; *scammony*, ½ dr.; (all in powder;) *essential oil* (at will), 10 or 12 drops; beaten to a smooth mass, and divided into pills.

2. *Compound extract of colocynth* (Ph. L. 1836), 1½ dr.; *extract of gentian*, ½ dr.; *powdered ipecacuanha*, 20 gr.; *oil of cloves*, *caraway*, or *cassia*, a few drops. In dyspepsia, loss of appetite, &c.

3. (Abernethy's.) See *page* 1.

4. (Alibert's.) From *calomel*, *resin of jalap*, and *Castile soap*, of each, 1 dr.; *oil of orange-peel* or *citron*, 6 or 8 drops. For 60 pills. As an occasional mild purgative, especially in bilious habits and worms.

5. (Sir B. Brodie.) *Compound extract of colocynth* and *mercurial pill*, of each, ½ dr.; *scammony* and *Castile soap*, of each, 15 gr.; *oil of caraway*, 6 or 7 drops. For 24 pills. As the last.

6. (W. Cooley.) *Aloes*, 1½ dr.; *jalap* and *Castile soap*, of each, 1 dr.; *rhubarb* and *cardamoms*, of each, ½ dr.; (all in powder;) *oil of juniper*, 12 drops. For 3-gr. pills. A useful mild aperient, for either frequent or occasional use.

7. (Dr. Copland.) *Compound extract of colocynth* (Ph. L. 1836), 40 gr.; *extract*

of henbane, 30 gr.; *Castile soap*, 12 gr.; *ipecacuanha*, 6 or 7 gr. For two dozen pills. *Dose.* 2, on retiring to rest. As an aperient in nervous affections and irritable habits.

8. (Harvey.) *Mercurial pill* and *powdered aloes*, of each, ½ dr.; *ginger*, 20 gr. For 24 pills. In constipation attended with a deficiency of bile.

9. (Dr. Neligan.) *Compound colocynth pill* and *soap of jalap*, equal parts; either with or without a few drops of some *aromatic essential oil.* For 4 or 5-gr. pills. As an aperient for general use.

10. (Sir C. Scudamore.) *Compound extract of colocynth*, 40 gr.; *extract of rhubarb*, ½ dr.; *scammony* and *soap*, of each, 12 gr.; *oil of caraway*, 5 or 6 drops. For 20 or 24 pills.

11. (*Stahl's Pills; Pilulæ Aperientes Stahlii*,—Ph. Hannov.) *Powdered aloes*, 1 oz.; *compound extract of colocynth*, ½ oz.; *iron filings*, 2 dr.; *mucilage*, q. s. In amenorrhœa, low habits, and worms.

12. (Vance.) *Compound extract of colocynth*, 80 gr.; *extract of rhubarb*, 12 gr.; *Castile soap*, 6 or 8 gr.; *oil of cinnamon*, 4 or 5 drops.

Obs. The products of the above formulæ may be divided into pills of any size deemed most agreeable to the patient, and they may be aromatized by the addition of any essential oil at will. The *dose* varies, according to circumstances, from 5 to 10 or 12 gr., or more. Those containing aloes or mercurials are best taken at bedtime. For *other formulæ*, see the various officinal and other pills containing *aloes, colocynth, gamboge, rhubarb, scammony, &c.*

PILLS (Arabian). See *Cholera Pills.*

PILLS (Aromatic). Syn. *Pilulæ Aromaticæ*,—Lat. *Prep.* (Ph. L. 1746.) *Compound powder of aloes*, 3 oz.; *balsam of Peru*, ½ oz.; *syrup of orange-peel*, q. s. Aperient, sudorific, and nervine. *Dose.* 10 to 20 gr.

PILLS (Arseniate of Iron). Syn. *Pilulæ Ferri Arseniatis*,—Lat. *Prep.* (Biett.) *Arseniate of iron*, 3 gr.; *extract of hops*, 2 dr.; *powdered mallow-root*, ½ dr.; *syrup*, q. s. For 48 pills. *Dose.* 1 to 2, daily; in cancerous, scrofulous, and herpetic affections.

PILLS (Arseniate of Soda). Syn. *Pilulæ Sodæ Arseniatis*,—Lat. *Prep.* (Erasmus Wilson.) *Arseniate of soda*, 2 gr.; *distilled water*, the smallest possible quantity to dissolve it; *powdered gum guaiacum*, ½ dr.; *oxysulphuret of antimony*, 20 gr.; *mucilage*, q. s. For 24 pills. *Dose.* 1 pill, as the last; in herpes, &c.

PILLS (Arsenical). Syn. *Asiatic Pills, Carnatic do., East Indian do., Tanjore do.; Pilulæ Arsenici, P. Arsenicalis, P. Asiaticæ, P. Acidi Arseniosi*,—Lat. *Prep.* (P. Cod.) *Arsenious acid*, 1 gr.; *black pepper* (in fine powder), 12 gr.; rub them together for some (considerable) time in an iron mortar, then add of *powdered gum*, 2 gr.; *water*, q. s. to make a mass; which is to be accurately divided into 12 pills. Each pill contains $\frac{1}{12}$ gr. of white arsenic.

Obs. This compound is commonly employed in the East Indies in syphilis, elephantiasis, intermittents, the bites of venomous snakes, &c.; and as a preventive to hydrophobia. The common practice in England is to employ 16 gr. of *pepper* to 1 gr. of *arsenious acid*, and to divide the mass into 16 instead of 12 pills. The *dose* is one or two pills daily, taken *after* a meal. The use of all compounds containing *arsenic* demands great caution.

PILLS (Arsenical,—Opiated). Syn. *Pilulæ Arsenici cum Opio*,—Lat. *Prep.* (A. T. Thomson.) *Arsenious acid*, 2 gr.; *powdered opium*, 8 gr.; *Castile soap*, 20 gr.; *simple syrup*, q. s. For 24 pills. *Dose.* As the last; in intermittents, herpes, lepra, psoriasis, periodical headaches, neuralgia, &c.

PILLS (Asiatic). See *Arsenical Pills.*

PILLS (Assafœtida). Syn. *Pilulæ Assafœtidæ*,—Ph. E. & U. S. *P. A. Compositæ*,—Ph. E. 1839. *Prep.* 1. (Ph. E.) *Assafœtida, galbanum*, and *myrrh*, of each, 3 parts; *conserve af red roses*, 4 parts, or q. s.; mix, and beat them to a proper pill-mass.

2. (Ph. U. S.) *Assafœtida*, 1½ oz.; *Castile soap*, ½ oz.; *water*, q. s.; divide into 240 pills.

Obs. The above (particularly the last) are stimulant and antispasmodic. *Dose.* 5 to 10 gr., twice or thrice daily; in hysterical affections, &c.

PILLS (Assafœtida,—Compound). Syn. *Pilulæ Assafœtidæ Compositæ*,—Ph. D. *Prep.* 1. (Ph. D.) *Assafœtida*, 2 oz.; *galbanum, myrrh*, and *treacle*, of each, 1 oz.; mix in a capsule, by the heat of steam or a water bath, and stir until it becomes a uniform mass. *Dose, &c.* As the last.

2. (Ph. E. 1817.) *Assafœtida, galbanum*, and *myrrh*, of each, 8 parts; *rectified oil of amber*, 1 part; *simple syrup*, q. s. As the last.

3. (Hosp. F.) *Assafœtida*, 1 dr.; *soft soap* (Ph. L.), 20 gr.; *ipecacuanha* and *squills*, of each (in powder), 12 gr.; *syrup*, q. s. *Dose.* 5 to 10 gr.; in chronic asthmas, coughs, &c.

PILLS (Assafœtida with Iron). Syn. *Pilulæ Assafœtidæ cum Ferro*,—Lat. *Prep.* (W. Cooley.) *Assafœtida*, 1 dr.; *extract of chamomile*. ½ dr.; mix with a slight heat, add of *dried protosulphate of iron*, 15 gr.; *oil of cajeput*, 10 drops; and divide into 36 pills. In hypochondriasis, hysteria, amenorrhœa, chlorosis, &c., after an aperient.

PILLS (Asthma). Syn. *Pilulæ Antasthmaticæ*,—Lat. *Prep.* 1. (*Expectorant.*) From *compound squill-pill*, 20 gr.; *calomel*, 5 gr.; *powdered opium*, 3 gr.; made into 6 pills. *Dose.* 1 or 2 at bedtime. Expectorant, and sometimes laxative.

2. (*Tonic.*) From *compound iron pill*, 2 dr.; *extract of gentian*, 1 dr.; mix, and divide into 60 pills. *Dose.* 2, night and morning, with an occasional dose of laxative medicine.

PILLS (Astringent). Syn. *Pilulæ Astringentes*,—Lat. See *Pills of Acetate of Lead, Alum, Gallic Acid, Nitrate of Silver, Tannin, Sulphate of Iron, &c.*

PILLS (Bacher's Tonic). Syn. *Pilulæ Tonicæ Bacheri*,—Lat. *Prep.* 1. (Dr. Paris.) *Extract of black hellebore* and *powdered myrrh*, of each, 1 oz.; *powdered blessed thistle*, 3 dr.; mix, and divide into 1-gr. pills. *Dose.* 2 to 6, three times a day.

2. (P. Cod.) *Alkaline extract of hellebore* and *extract of myrrh*, of each, 2 dr.; *powdered blessed thistle*, 1 dr. For 4-gr. pills. *Dose.* 1 or 2, as the last. An alterative tonic, hydragogue, and emmenagogue; in debility, dropsy, amenorrhœa, &c. A favorite remedy in some parts of Europe.

PILLS (Dr. Baillie's). *Prep.* (Anat. of Quackery.) *Aqueous extract of aloes* and *compound extract of colocynth*, of each, 3 dr.; *Castile soap*, 1 dr.; *oil of cloves*, 15 drops. For 4-gr. pills. A good occasional aperient. *Dose.* 1 to 3, at bedtime, or early in the morning. See *Dinner Pills.*

PILLS (Barbarossa's). These are supposed to have been the first mercurial preparation employed in medicine. They consisted of *quicksilver, rhubarb, musk*, and *amber*.

PILLS (Rev. D. Barclay's). *Prep.* (Anat. of Quackery.) *Resinous extract of jalap*, 1 dr.; *almond* or *Castile soap*, 1½ dr.; *extract of colocynth*, 2 dr. (or *powdered colocynth*, 3 dr.); *gum guaiacum*, 3 dr.; *potassio-tartrate of antimony*, 10 gr.; *oil of juniper*, 8 or 10 drops; *oils of caraway* and *rosemary*, of each, 4 drops; make a mass with *syrup of buckthorn* (the smallest possible quantity), and divide into 4-gr. pills. A diaphoretic aperient. *Dose.* 1 to 3, at bedtime.

PILLS (Dr. Baron's). *Prep.* From *compound rhubarb pill*, 30 gr.; *compound extract of colocynth*, 20 gr.; *powdered ipecacuanha*, 6 gr. For 3-gr. pills. An excellent stomachic aperient. *Dose.* 1 to 3 pills, at bedtime; in dyspepsia, loss of appetite, &c.

PILLS (Barthez's). *Prep.* From *myrrh*, 1 dr.; *aloes*, ½ dr.; *musk*, 15 gr.; *camphor*, 12 gr.; *balsam of Peru*, q. s. to form a mass. For 3½-gr. pills. *Dose.* 2, thrice daily; in hysteria, amenorrhœa, chlorosis, &c.

PILLS (Bath Digestive). *Prep.* (Anat. of Quackery.) *Rhubarb*, 2 oz.; *ipecacuanha* and *Castile soap*, of each, ½ oz.; *capsicum*, *ginger*, and *gamboge*, of each, ¼ oz.; (all in powder;) *syrup of buckthorn*, q. s. For 4-gr. pills. *Dose.* 1, as a dinner pill; 2 or 3, as an aperient.

PILLS (Bebeerine). Syn. *Pilulæ Bebeerinæ*,—Lat. *Prep.* From *sulphate of bebeerine*, ½ dr.; *aromatic confection*, q. s.; *oil of cajeput*, 5 or 6 drops. For 18 pills. *Dose.* 1 to 3, every four hours; as an antiperiodic, instead of bark or quinine.

PILLS (Bechic). *Pilulæ Bechicæ*,—Lat. *Prep.* (Trousseau & Reveil.) *Extract of digitalis*, 15 gr.; *white oxide of antimony*, 30 gr.; *extract of liquorice*, 40 gr.; mix carefully, and divide into 40 pills. Expectorant and sedative. *Dose.* 2 to 12, or more; in cases of irritating coughs, catarrh of the pulmonary capillaries or bronchia, &c. See *Cough Pills.*

PILLS (Beddoe's). *Prep.* From *dried* (effloresced) *carbonate of soda*, 1 dr.; *soap*, 1½ dr.; *oil of juniper*, 12 drops; *syrup of ginger*, q. s.; divide into 30 pills. In gravel, stone, &c. *Dose.* 2 to 5.

PILLS (Belladonna,—Compound). Syn. *Pilulæ Belladonnæ Compositæ*,—Lat. *Prep.* 1. (Ainslie.) *Extract of belladonna*, *mercurial pill*, and *powdered ipecacuanha*, equal parts. For 3-gr. pills. *Dose.* 1, night and morning; in cancerous and glandular affections.

2. (Debreyne.) *Camphor* and *assafœtida*, of each, 1 dr.; *extract of belladonna*, 20 gr.; *extract of opium*, 5 gr.; *syrup*, q. s. For 48 pills. *Dose.* 1 pill, gradually increased to 6, daily. In hysteria, amenorrhœa, &c.

PILLS (Belloste's). See *Mercurial Pills*.

PILLS (Bennet). See *Fuller's Pills.*

PILLS (Bichloride of Mercury). Syn. *Hoffmann's Pills; Pilulæ Hydrargyri Bichloridi, P. Majores Hoffmanni*,—Lat. *Prep.* 1. *Bichloride of mercury*, 3 gr.; *white sugar*, ½ dr.; triturate together in a glass mortar for some time, then add of *powdered gum arabic*, 20 gr.; and beat the whole to a mass with *dilute hydrochloric acid*, q. s. For 36 pills, each containing $\frac{1}{12}$ gr. of corrosive sublimate.

2. (Brera.) *Bichloride of mercury*, 3 gr.; *rectified spirit*, the smallest possible quantity to dissolve it; *bread-crumb*, q. s. to form a mass. For 24 pills, each containing $\frac{1}{8}$ gr. of the bichloride.

3. (Dr. Paris.) *Corrosive sublimate* and *sal ammoniac*, of each, 5 gr.; *water*, $\frac{1}{2}$ fl. dr.; triturate together until solution is complete, then add of *honey*, $\frac{1}{2}$ dr.; *liquorice powder*, 1 dr. (*or*, q. s.); and divide into 40 pills. Each pill contains $\frac{1}{8}$ gr. of the bichloride.

4. (Ph. Hannov.) *Corrosive sublimate*, 15 gr.; *distilled water*, $\frac{1}{2}$ fl. dr.; *crumb of bread*, q. s. to form a mass. For 120 pills, each containing $\frac{1}{8}$ gr.

Obs. The above formulæ are among those most usually employed. Other authorities order pills containing $\frac{1}{16}$th of a gr. Dzondi orders $\frac{1}{20}$ gr., and Hüfeland only $\frac{1}{30}$ gr. in each pill. The *commencing dose* should not exceed 1 pill containing the $\frac{1}{12}$th of a grain, twice or thrice a day. It may afterwards be safely kept at $\frac{1}{8}$th of a grain. They are chiefly employed in syphilis, but are also occasionally exhibited with great advantage in glandular indurations and enlargements, and in cancer; due caution being observed.

PILLS (Bichloride of Platinum). Syn. *Pilulæ Platini Bichloridi*,—Lat. *Prep.* (Dr. Hoefer.) *Bichloride of platinum*, 7$\frac{1}{2}$ gr.; *extract of guaiacum*, 1 dr.; *liquorice powder*, q. s. For 24 pills. *Dose.* 1 pill, twice or thrice daily; as an alterative in syphilis, &c.

PILLS (Bicker's). *Prep.* From *rust* (carbonate) *of iron*, 2 dr.; *aloes*, *myrrh*, and *sulphur*, of each, 1 dr.; *ox-gall*, q. s. to mix. For 4-gr. pills. *Dose.* 1 to 6, morning and evening; in debility, chlorosis, &c.

PILLS (Bittersweet). Syn. *Pilulæ Dulcamaræ*,—Lat. *Prep.* (Radius.) *Extract of bittersweet* (dulcamara), 1 dr.; *crude antimony* and *bittersweet* (in powder), of each, $\frac{1}{2}$ dr. For 3-gr. pills. *Dose.* 6 to 12, twice or thrice a day; in obstinate skin diseases.

PILLS (Blaud's). Syn. *Pilulæ Antichloroticæ*,—Lat. *Prep.* (Trousseau & Reveil.) *Sulphate of protoxide of iron*, 2 parts; reduce it to powder, and dry it in a stove at 104° Fahr.; add this to *dry carbonate of potassa*, 2 parts; *honey*, 1 part; and form the mass into 50 pills. Tonic and emmenagogue. *Dose.* 1 to 10, daily; in debility, chlorosis, &c.

PILLS (Blue). See *Mercurial Pills.*

PILLS (Bontius's). Syn. *Pilules de Bontius; Pilulæ Hydrogogæ, P. H. Bontii*,—Lat. *Prep.* (P. Cod.) *Socotrine aloes*, *gamboge*, and *gum ammoniacum*, of each, 1 dr.; *white-wine vinegar*, 6 dr.; dissolve by heat, at twice, press out the liquor, evaporate to a pilular consistence, and divide into 4-gr. pills. *Dose.* 1 to 3; as a strong cathartic, in dropsy.

PILLS (Brigg's Gout and Rheumatic). This nostrum is prepared by a grocer of Lincoln, and closely resembles in appearance, odour, and properties the *Plummer's pill* of the pharmacopœia; the two are probably identical. (Anat. of Quackery.)

PILLS (Bromide of Iron). Syn. *Pilulæ Ferri Bromidi*,—Lat. *Prep.* (Magendie.) *Bromide of iron* and *powdered gum arabic*, of each, 12 gr.; *conserve of roses*, 20 gr.; mix, and divide into 20 pills. They should be kept in a dry corked phial. Tonic and alterative. *Dose.* 1 to 2, night and morning; in debility, especially that of scrofulous habits, in chlorosis, &c.

PILLS (Brucine). Syn. *Pilulæ Bruciæ*,—Lat. *Prep.* (Magendie.) *Brucia* or *brucine*, 12 gr.; *confection of roses*, $\frac{1}{2}$ dr.; carefully mixed and divided into 24 pills, which are recommended to be silvered. The quantity of the confection may be advantageously doubled. *Dose.* 1 pill, night and morning; in the same affections as those for which strychnine is administered. The acetate, hydrochlorate, or sulphate of brucia may be substituted for the alkaloid in the above formula, in a slightly larger quantity.

PILLS (Calomel). Syn. *Pilulæ Calomelanos, P. e Calomelane, P. Hydrargyri Chloridi; P. H. C. Mitis*,—Ph. U. S. *Prep.* 1. *Calomel*, 4 dr.; *powdered gum arabic*, 1 dr; *simple syrup*, q. s.; mix, and divide into 240 pills. Each pill contains 1 gr. of calomel. A convenient form of exhibiting this drug when uncombined with other remedies. *Dose.* 1 to 5 pills, according to the indication.

2. (U. C. Hosp.) *Calomel*, 2 dr.; *rhubarb*, 1$\frac{1}{2}$ dr.; *confection of senna*, q. s. For 4 dozen pills. An excellent alterative aperient, especially in hepatic affections.

PILLS (Calomel,—Compound). Syn. *Pilulæ Calomelanos Compositæ*,—Ph. E. & D. *Prep.* 1. (Ph. E.) *Calomel* and *golden sulphuret of antimony*, of each, 1 part; *guaiacum* (in powder) and *treacle*, of each, 2 parts; beat the whole to a pill-mass, and divide it into 6-gr. pills.

2. (Ph. D.) *Calomel* and *precipitated sulphuret of antimony*, of each, 1 *dr.;* triturate them together, then add of *guaiacum resin* (in powder), 2 *dr.; castor oil*, 1 *fl. dr.;* and beat the whole to a uniform

mass. For the London formula, dose, &c., see *Compound Pills of Chloride of Mercury.*

PILLS (Calomel and Opium). Syn. *Pilulæ Hydrargyri Chloridi cum Opio; P. Calomelanos et Opii,*—Ph. E. *Prep.* (Ph. E.) *Calomel,* 3 parts; *opium,* 1 part; *conserve of red-roses,* q. s.; divide the mass so that each pill may contain 2 gr. of calomel. *Dose.* 1 or 2 pills, in rheumatism, facial neuralgia, and various inflammatory affections. They offer a convenient form for gradually introducing mercury into the system, and, if continued, induce salivation.

PILLS (Camphor). Syn. *Pilulæ Camphoræ, P. Camphoratæ,* — Lat. *Prep. Camphor* and *sugar,* of each (in powder), 2 parts; *conserve of hips,* 1 part. For 3-gr. pills. Anaphrodisiac, sedative, diaphoretic, and nervine. *Dose.* 1 to 5, twice or thrice a day.

PILLS (Camphor,—Compound). Syn. *Pilulæ Camphoræ Compositæ, P. Camphoratæ C.,*— Lat. *Prep.* 1. (Dupuytren.) *Camphor,* 24 gr.; *pure musk,* 8 gr.; *opium,* 2 gr.; *syrup,* q. s.; divide into 12 pills. *Dose.* 1 to 4, three or four times daily; in putrescent sores, hospital gangrene, &c.

2. (Fr. Hosp.) *Gum ammoniacum,* 40 gr.; *camphor,* 30 gr.; *musk,* 10 gr.; *opium,* 5 gr.; *tincture of valerian,* q. s.; divide into 4-gr. pills. *Dose.* 2 to 6 pills daily; in nervous and hysterical affections, &c.

3. (Ricord.) *Camphor* and *lactucarium* (or *extract of lettuce*), equal parts; divide into 4-gr. pills. *Dose.* 3 to 6 daily; as an anaphrodisiac.

4. (U. C. Hosp.) *Camphor,* 20 gr.; *assafœtida,* 1 dr.; *extract of valerian,* 2 dr. For 30 pills. As No. 2.

PILLS (Cantharides). Syn. *Pilulæ Cantharidis, P. C. Compositæ,*—Lat. *Prep.* 1. *Cantharides* (in very fine powder), 8 gr.; *extract of gentian,* ½ dr.; *liquorice powder,* 10 gr. For 12 pills. *Dose.* 1 to 4 daily; as a diuretic, emmenagogue, &c.

2. (Ellis.) *Cantharides* (in very fine powder), 18 gr.; *opium* and *camphor,* 36 gr.; mix, and divide into 36 pills. *Dose.* 1 pill, at bedtime; as an aphrodisiac, in parties labouring under general debility. They should be used with extreme caution, and but seldom.

PILLS (Caoutchouc). Syn. *Pilulæ Gummi Elastici,* — Lat. *Prep.* (M. Bouis.) *Indian rubber,* cut into small squares or spheres, then moistened with *syrup of tolu,* and lastly, shaken in a box with a mixture of *powdered gum* and *sugar.* In phthisis. *Dose.* 1 pill, three or four times a day. They pass through the primæ viæ unaltered, and may therefore fairly be presumed to be inert. Probably these pills, like '*gutta percha pills*' and homœopathic globules, act through the imagination.

PILLS (Capsicum). Syn. *Cayenne Pepper Pills: Pilulæ Capsici,*—Lat. *Prep.* 1. (Guy's Hosp.) *Capsicum,* 1 part; *rhubarb,* 2 parts; (both in powder;) *treacle,* q. s.; mix, and divide into 3½-gr. pills. *Dose.* 1 to 3, an hour before dinner; to create an appetite and promote digestion.

2. (Radius.) *Powdered capsicum,* 20 gr.; *extract of gentian,* 1 dr.; *powdered gentian,* q. s. to form a mass. For 60 pills. *Dose.* 2 to 4 pills, thrice daily; in chronic dyspepsia, especially in the loss of tone of the stomach arising from intemperance.

PILLS (Carbonate of Iron). Syn. *Vallet's Pills; Pilulæ Ferri Carbonatis,*— Ph. E. *Prep.* (Ph. E.) *Saccharine carbonate of iron,* 4 parts; *conserve of red-roses,* 1 part; mix, and divide the mass into 5-gr. pills. *Dose.* 1 to 3, or more; as a mild chalybeate and antichlorotic. For another formula, see *Dr. Blaud's Pills* (above).

PILLS (Catarrh). Syn. *Pilulæ Anticatarrhales,*—Lat. *Prep.* 1. (Trousseau & Reveil.) *Turpentine,* 4 dr.; *ammoniacum,* 1 dr.; *balsam of tolu,* ½ dr.; *aqueous extract of opium,* 6 gr.; *liquorice powder,* q. s.; mix, and divide into 80 pills. *Dose.* 5 or 6 daily; in chronic catarrh of the bronchi and bladder.

2. (Trousseau & Reveil.) *Alcoholic extract of aconite,* 30 gr.; *sulphuret of calcium,* 15 gr.; *powdered sugar,* q. s. For 24 pills. *Dose.* 1 pill, three or four times daily; in chronic pulmonary catarrh.

PILLS (Cathartic). Syn. *Pilulæ Catharticæ,*—Lat. *Prep.* 1. (Dr. Collier.) *Calomel,* 10 gr.; *powdered jalap* and *prepared chalk,* of each, ½ dr.; *oil of caraway,* 10 drops; *syrup of buckthorn,* to mix; divide into 5-gr. pills. *Dose.* 1 to 4.

2. (Dr. A. T. Thomson.) *Scammony,* 4 gr.; *extract of taraxacum,* 16 gr.; divide into 6 pills. *Dose.* 3 pills, twice daily; in hypochondriasis, and chronic inflammation of the liver.

3. (A. T. Thomson.) *Calomel,* 15 gr.; *powdered jalap,* 45 gr.; *mucilage,* q. s. to mix. For 18 pills. *Dose.* 1 to 3, at night, to empty the bowels, in bilious affections. Other formulæ for cathartic pills will be found both above and below.

PILLS (Cathartic,—Compound). Syn. *Pilulæ Catharticæ Compositæ,*—Lat. *Prep.* (Ph. U. S.) *Compound extract of colocynth,* 4 dr.; *powdered extract of jalap* and *calomel,* of each, 3 dr.; *powdered gamboge,* 40 gr.; *water,* q. s.; mix, and divide into 180 pills. An excellent purgative, especially in bilious affections, dyspepsia, &c. *Dose.* 1 to 3 pills.

PILLS (Chamberlain's Restorative). A nostrum composed of *cinnabar* and *milk of sulphur*, equal parts; beaten up with *conserve of hips*.

PILLS (Chamomile). Syn. *Pilulæ Anthemidis, P. Florum Chamæmeli*,—Lat. *Prep. Extract of gentian*, 1 dr.; *powdered aloes*, ½ dr.; *powdered rhubarb*, 20 gr.; *oil of chamomile*, 10 drops. A tonic and stomachic aperient. *Dose.* 5 to 15 gr. This forms the "*chamomile pills*" of the shops. They should be kept in a corked phial.

PILLS (Chamomile,—Compound). Syn. *Pilulæ Anthemidis Compositæ*,—Lat. *Prep.* 1. (Ainslie.) *Extract of chamomile*, 1 dr.; *assafœtida*, ½ dr.; *powdered rhubarb*, 20 gr.; divided into 30, or better, 36 pills. *Dose.* 1, as a dinner pill; or 2 to 3, twice a day in flatulent dyspepsia.

2. (Mr. Beasley.) *Aqueous extract of aloes*, 12 gr.; *extract of chamomile*, 36 gr.; *oil of chamomile*, 3 drops. For 12 pills. *Dose.* 2 at night, or twice a day; in dyspepsia, loss of appetite, &c. See *Norton's Pills.*

PILLS (Chapman's). *Prep. Mastic*, 12 gr.; *aloes*, 16 gr.; *rhubarb*, 24 gr. For 12 pills. An excellent stomachic aperient. *Dose.* 2 to 4.

PILLS (Chirayta). Syn. *Dr. Reece's Pills; Pilulæ Chiraytæ*,—Lat. *Prep.* From *chirayta*, 2 dr.; *dried carbonate of soda*, 20 gr.; *powdered ginger* (best), 15 gr.; divided into 36 pills. *Dose.* 2, twice a day. In acidity, flatulence, and dyspepsia, especially when complicated with gout or debility.

PILLS (Chloride of Barium). Syn. *Pilulæ Barii Chloridi*,—Lat. *Prep.* 1. (Pierquin.) *Chloride of barium*, 1 dr.; *resin of guaiacum*, 4 dr.; *conserve of fumitory*, q. s.; divided into 188 pills. *Dose.* 1 pill, morning and evening, afterwards increased to 2; in tape-worm, and in the rheumatism of scrofulous subjects.

2. (Walsh.) *Chloride of barium*, 15 gr.; *powdered marsh-mallow* or *liquorice root*, and *mucilage of tragacanth*, of each, q. s. to make 200 pills. *Dose.* 3, gradually increased to 10 or 12 daily; in cancer, scrofula, goiture, syphilis, &c.

PILLS (Chloride of Calcium). Syn. *Pilulæ Calcii Chloridi*,—Lat. *Prep.* 1. As the last.

2. (Gräfe.) *Chloride of calcium*, 1 dr.; *extract of opium*, 10 gr.; *mucilage*, q. s. For 54 pills. *Dose.* 1, every two or three hours, gradually increased until 10, or even 12 are taken every hour; in gonorrhœa, more especially when occurring in scrofulous subjects.

PILLS (Chloride of Gold). Syn. *Pilulæ Auri Chloridi*,—Lat. *Prep.* From *terchloride of gold*, 3 gr.; *powdered liquorice*, 1 dr.; *syrup*, q. s. For 48 pills. *Dose.* 1 pill, twice or thrice daily. (See *p.* 537.)

PILLS (Chloride of Gold and Sodium). Syn. *Pilulæ Auri et Sodii Chloridi, P. A. Sodio-chloridi*,—Lat. *Prep.* (Magendie.) *Soda-chloride* (soda-muriate) *of gold*, 1 gr.; *extract of mezereon*, 2 dr.; divide into 60 pills. (See *page* 537.)

PILLS (Chloride of Lime). Syn. *Pilulæ Calcis Hypochloritis, &c.*,—Lat. *Prep.* 1. *Chloride of lime*, 12 gr.; *starch-powder*, 24 gr.; *conserve of hips*, q. s.; divide into 36 pills.

2. (Dr. Copland.) *Chloride of lime*, 15 gr.; *compound powder of tragacanth*, 90 gr.; *syrup*, q. s. For 24 pills. *Dose.* 1 to 3, twice or thrice, daily; in various putrid affections, fevers, &c.

PILLS (Chloride of Mercury). See *Calomel Pills.*

PILLS (Chloride of Mercury,—Compound). Syn. *Plummer's Pills, Red do.; Pilulæ Plummeri; Pil. Hydrargyri Chloridi Composita*,—Ph. L. *Pil. H. Submuriatis Co.*,—Ph. L. 1824, and Ph. E. 1839. *Pil. H. Submuriatis*,—Ph. L. 1809. *Pil. Calomelanos Co.*,—Ph. E. & D. *Prep.* (Ph. L.) *Chloride of mercury* (calomel), and *oxysulphuret of antimony*, of each, 2 dr.; rub them together, add of *guaiacum* (in powder) and *treacle*, of each, 4 dr.; and form the whole into a pill-mass. An excellent alterative pill; very useful in lepra, in secondary syphilis affecting the skin, and in various other chronic cutaneous diseases; also in dyspepsia and liver complaints. *Dose.* 3 to 10 gr., night and morning. For the formulæ of the Ph. E. & D. see *Compound Calomel Pills.*

PILLS (Cholera). Syn. *Pilulæ Anticholericæ*,—Lat. *Prep.* 1. *Powdered camphor*, 15 gr.; *powdered capsicum* (pure), ½ dr.; *bicarbonate of soda*, 1 dr.; *conserve of roses*, q. s. For 36 pills. *Dose.* 2 to 4, every 15 minutes, washed down with a wineglassful of cold water containing half a teaspoonful of *ether;* repeated every 15 or 20 minutes, until reaction ensues. They should be freshly made.

2. (*Arabian Anticholera Pills.*) From *assafœtida, asclepias gigantea*, and *opium*, equal parts; divided into 4½-gr. pills. *Dose.* 1 pill, every 30 or 40 minutes, followed by a spoonful of strong brandy-and-water, until the symptoms abate. For other formulæ see *page* 251.

PILLS (Citrate of Iron and Quinine). Syn. *Pilulæ Ferri Citratis cum Quinâ*,—Lat. *Prep.* From *citrate of iron and quinine*, 1 dr.; *powdered citric acid*, 20 gr.; *conserve of hips*, q. s. For 36 pills. An excellent tonic in debility, chlorosis, &c. *Dose.* 1 to 3, twice or thrice daily.

PILLS (Dr. Clark's). See *Dinner Pills.*

PILLS (Coindet's). See *Pills of Protiodide of Mercury.*

PILLS (Colchicum). See *Gout Pills.*

PILLS (Colocynth). Syn. *Pilulæ è duobus; P. ex Colocynthide Simpliciores*,—Ph. L. 1746. *Prep.* (Ph. L. 1746.) *Colocynth* and *scammony*, of each, 2 oz.; *oil of cloves*, 2 dr.; *syrup of buckthorn*, q. s. An active hydragogue cathartic. *Dose.* 3 to 12 gr.

PILLS (Colocynth,—Compound). Syn. *Pill of Cochia; Pilulæ Cocciæ, P. Cochiæ; Pil. Colocynthidis Compositæ*,—Ph. L. & D. *Pil. Colocynthidis*,—Ph. E. *P. ex Colocynthide cum Aloë*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Extract of colocynth* (simple), 1 dr.; *powdered extract of aloes*, 6 dr.; *powdered scammony*, 2 dr.; *powdered cardamoms*, ½ dr.; *soft soap* (Ph. L.), 1½ dr.; mix, and beat them altogether, so that a mass may be formed. This is intended as a substitute for the *compound extract of colocynth* of the Ph. L. 1836.

2. (Ph. E.) *Socotrine* or *East Indian aloes* and *scammony*, of each, 8 parts; *sulphate of potassa*, 1 part; beat them together, add of *colocynth*, in fine powder, 4 parts; next add of *oil of cloves*, 1 part; and with the aid of a little *rectified spirit*, beat the whole to a mass, and divide this into 5-gr. pills.

3. (Ph. D.) *Colocynth pulp, scammony*, and *Castile soap*, of each (in powder), 1 *oz.; hepatic aloes*, 2 *oz.; treacle*, 10 dr.; *oil of cloves*, 1 fl. dr.; mix, and beat them into a mass of uniform consistence.

4. (Ph. L. 1746.) *Socotrine aloes* and *scammony*, of each, 2 oz.; *pulp of colocynth*, 1 oz.; *oil of cloves*, 2 dr.; *syrup of buckthorn*, q. s. to form a pill-mass. This is the original formulæ published by Galen for "*pilulæ cochiæ minores*," and under various slight modifications, it has continued in use ever since.

5. *Aloes*, 1½ *lb.; colocynth*, ¾ *lb.; jalap*, 6 *oz.;* (all in powder;) *oil of cloves*, 1½ *oz.; syrup* or *treacle*, q. s. to mix. *Prod.* About 4¾ *lb.* This forms the common "*pil cochiæ*" of the druggists. A few, more conscientious than the rest, add to the above, *scammony*, 6 *oz.* It is greatly inferior to the Ph. pill.

Obs. Compound colocynth pill is a cheap and excellent cathartic, more powerful than the other officinal aloetic pills, and well adapted to cases of habitual costiveness. It has long been extensively used by the poorer classes, and in domestic medicine generally. *Dose.* 5 to 15 gr.

PILLS (Colocynth and Henbane). Syn. *Pilulæ Colocynthidis et Hyoscyami*,—Ph. E. *Prep.* (Ph. E.) *Colocynth pill-mass*, 2 parts; *extract of henbane*, 1 part; beat them up with a few drops of *rectified spirit* (if necessary), and divide into 5-gr. pills. *Dose.* 1 to 3 pills; as an anodyne purgative, in irritable bowels.

PILLS (Copaiba). Syn. *Pilulæ Copaibæ*,—Lat. *Prep.* (Ph. U. S.) Pure *balsam of copaiba*, 2 oz.; recently prepared *calcined magnesia*, 1 dr.; mix thoroughly, then set the mixture aside until it acquires a pilular consistence, and, lastly, divide it into 200 pills.

Obs. Unless the magnesia has been very recently calcined, the copaiba hardens very slowly, or not at all. It is said that "lime produces the effect more completely and uniformly than magnesia," and that "specimens of copaiba which are old and contain the most resin," harden quickest. (Redwood.) For present use, the quantity of magnesia may be at least doubled. Dr. Pereira orders *copaiba*, 1 oz.; *magnesia*, 5 or 6 dr. *Dose.* 10 to 30 gr., frequently; in diseases of the mucous membranes of the urinary organs. Cubebs are often added.

PILLS (Dr. Copland's). See *Aperient* and *Pectoral Pills.*

PILLS (Corrosive Sublimate). See *Pills of Bichloride of Mercury.*

PILLS (Cough). See *Pectoral Pills, Expectorant do., &c.*

PILLS (Creasote). Syn. *Pilulæ Creasoti*,—Lat. *Prep.* 1. (Pitschaft.) *Creasote*, 6 gr.; *powdered henbane*, 24 gr.; *conserve of hips*, q. s. For 24 pills. *Dose.* 1, three times daily; in sea-sickness, the vomiting during pregnancy, &c.

2. (Rieche.) *Creasote*, 1 dr.; *extract of liquorice* and *gum galbanum*, of each, ½ dr.; *powdered mallow-root*, 2 dr.; to be divided into 2-gr. pills. *Dose.* 3 to 6, four times a day; in acute rheumatism, bronchitis, neuralgia, phthisis, &c.

PILLS (Crespigny's). See *Dinner Pills.*

PILLS (Croton Oil). Syn. *Pilulæ Crotonis, P. Tiglii*,—Lat. *Prep.* 1. *Croton oil*, 3 drops; *oil of cloves*, 4 drops; *breadcrumb*, q. s. For 3 pills, one of which is a dose.

2. (Dr. Copland.) *Croton oil*, 6 drops; *pill of aloes and myrrh*, 1½ dr.; *soap*, 20 gr.;

liquorice powder, q. s. For 30 pills. *Dose.* 2 to 4.

3. (Dr. Reece.) *Croton oil*, 6 drops; *Castile soap*, ½ dr.; *oil of caraway*, 8 drops; *liquorice powder*, q. s. For 12 pills. *Dose.* 1 to 3. In dropsy, visceral obstructions, &c. See *Croton Oil.*

4. (*With mercury,*—Dr. Neligan.) *Croton oil soap*, 3 gr.; *extract of henbane* and *mercurial pill*, of each, 24 gr.; *oil of pimento*, 12 drops; divide into 12 pills. *Dose.* 2 at bedtime. (See *above.*)

PILLS (Cyanide of Mercury). Syn. *Pilulæ Hydrargyri Cyanidi, P. H. Cyanureti*,—Lat. *Prep.* (Guibourt.) *Cyanuret of mercury*, 6 gr.; *opium*, 12 gr.; *bread-crumb*, 60 gr.; *honey* or *syrup*, q. s. For 96 pills. *Dose.* 1, night and morning; in syphilis, chronic inflammation of the viscera, &c.

PILLS (Cyanide of Potassium). Syn. *Pilulæ Potassii Cyanidi*,—Lat. *Prep.* (Golding Bird.) *Cyanide of potassium*, 2 gr.; *arrow root*, 20 gr.; *simple syrup*, q. s. For 18 pills. *Dose.* 1, twice or thrice a day; as a sedative, in hysteria, gastrodynia, extreme nervous excitability, &c. See *Draughts* and *Mixtures.*

PILLS (Dandelion). See *Pills of Taraxacum.*

PILLS (De Haen's). *Prep.* (St. Marie.) *Gum ammoniacum* and *pill aloes with myrrh*, of each, 1 dr.; *extract of hemlock* and *Castile soap*, of each, 1½ dr. For 3-gr. pills. *Dose.* 3 to 6 daily; in painful or obstructed menstruation, chlorosis, &c.

PILLS (Delphine). Syn. *Pilulæ Delphiniæ*, — Lat. *Prep.* (Dr. Turnbull.) *Delphine*, 1 gr.; *extracts of henbane* and *liquorice*, of each, 12 gr. For 12 pills. *Dose.* 1 to 3, twice a day; in dropsy, gout, rheumatism, &c., instead of veratria.

PILLS (Diaphoretic). Syn. *Pilulæ Diaphoreticæ*,—Lat. *Prep.* 1. *Antimonial powder*, ½ dr.; *opium*, 10 gr.; *calomel*, 5 gr.; *confection of opium*, q. s. to mix; divide into 10 pills. *Dose.* 1, at bedtime; in coughs and bronchial irritability, after an aperient.

2. *Guaiacum*, 10 gr.; *emetic tartar* and *opium*, of each, 1 gr.; *simple syrup*, q. s. to mix; divide into 3 pills. *Dose.* 1 or 2, in acute rheumatism, &c.

3. *Camphor* and *antimonial powder*, of each, ½ dr.; *opium*, 10 gr.; *aromatic confection*, q. s. to mix. For 12 pills. In fevers; and in some spasmodic diseases. *Dose.* 1 pill.

4. *Powdered guaiacum*, 10 gr.; *compound powder of ipecacuanha*, 5 gr.; *confection of roses*, q. s. to mix; for a dose. As a diaphoretic in inflammatory affections, and rheumatism.

PILLS (Diarrhœa). Syn. *Pilulæ Antidiarrhœales*,—Lat. *Prep.* (Trousseau & Reveil.) *Soft extract of opium*, 1½ gr.; *calomel* and *powdered ipecacuanha*, of each, 3 gr.; *conserve of hips*, q. s.; divide into 10 pills. *Dose.* 1, two or three times daily; in chronic and choleraic diarrhœa.

PILLS (Digestive). Under this head are generally classed all the stomachic and milder aperient pills. See *Bath Pills, Dinner Pills, &c.*

PILLS (Digitaline). Syn. *Pilulæ Digitalinæ*,—Lat. *Prep.* 1. *Digitaline*, 1 gr.; *powdered sugar*, ½ dr.; *thick mucilage*, q. s. For 24 pills. *Dose.* 1 to 4 daily, watching the effects; as a sedative to reduce the force of the circulation, in phthisis, enlargement of the heart, &c. See *Granules*, and *Foxglove Pills.*

PILLS (Dinner). Syn. *Grains de Santé; Pilulæ Dictæ Ante-cibum*,—Lat. *Prep.* 1. *Aloes*, 1 dr.; *rhubarb* and *extract of gentian*, of each, ½ dr.; *ipecacuanha* and *capsicum*, of each, 12 gr.; *syrup of ginger*, q. s. to mix. For 3½-gr. pills.

2. (Dr. Baillie's.) See *page* 981.

3. (*Bath Dinner Pills.*) See *page* 985.

4. (*Pills of Aloes and Mastic; Lady Crespigny's Pills, Lady Hesketh's do., Lady Webster's do., Digestive do., Stomach do.; Grains de Vie, Grains de Mesue; Pilulæ Aloës et Mastiches, P. A. cum Mastiche, P. Stomachicæ Mesues.*) From *aloes* (powdered), 6 dr.; *powdered mastic* and *petals of red-roses*, of each, 2 dr.; *syrup of wormwood*, q. s. to form a pill-mass. For 3-gr. pills. In small doses, they excite the appetite; in larger ones, they produce a bulky and copious evacuation. This is the formula of the *old Paris Codex.* Rhubarb is now frequently substituted for the rose petals. (*Med. Circ.*, ii, 208.)

5. (*Sir C. Bell's.*) From *sulphate of quinine*, 4 gr.; *mastic*, 6 gr.; *rhubarb*, 50 gr.; *syrup of orange peel*, q. s. to mix. For 12, or preferably 18 pills.

6. (*Sir Chas. Clarke's.*) From *extract of chamomile*, ½ dr.; *myrrh* and *rhubarb* (in powder), of each, 20 gr.; *powdered Socotrine aloes*, 10 gr.; *oil of chamomile*, 8 drops; *mucilage*, q. s. to form 20 pills. "These pills, which were originally prescribed by Sir Chas. Clarke, are much used in London." (Redwood.)

7. (*Frank's.*) From *aloes* and *jalap*, of each, 4 parts; *rhubarb*, 1 part; *syrup of wormwood*, q. s. For 3-gr. pills.

8. (P. Cod.) *Aloes*, 6 dr.; *extract of*

cinchona bark, 3 dr.; *cinnamon*, 1 dr.; *syrup of wormwood*, q. s.

The *dose* of the above is 3 to 5 gr., about an hour before dinner, to *promote the appetite;* or, as a *purgative*, 10 to 15 gr.

PILLS (Diuretic). Syn. *Pilulæ Diureticæ*,—Lat. *Prep.* 1. From *powdered foxglove*, 12 gr.; *calomel*, *powdered squills*, and *opium*, of each, 4 gr.; *conserve of hips*, q. s. For 12 pills.

2. (Dr. A. T. Thomson.) *Mercurial pill*, 1 dr.; *powdered squills*, 20 gr.; *confection of roses*, q. s.; divided into 20 pills. The *dose* of either of the above is 1 pill, twice or thrice daily; in dropsy, &c.

PILLS (Dixon's). According to Dr. Paris, these pills consist of *aloes*, *scammony*, *rhubarb*, and a little *tartar emetic*, beaten up with *syrup*. "The following formula produces a pill precisely similar to this nostrum:—Take of *compound extract of colocynth* (Ph. L. 1836), 4 dr.; *powdered rhubarb*, 2 dr.; *potassio-tartrate of antimony*, 8 gr.; *syrup of buckthorn*, q. s.; mix, and divide into 120 pills. Aperient and diaphoretic. *Dose.* 2 or 3, at bedtime." (*Anat. of Quackery.*) Although a nostrum, it is a really excellent medicine, adapted for numerous cases.

PILLS (Duchesne's). *Prep.* From *aloes* and *gum ammoniacum*, of each, 30 gr.; *mastic* and *myrrh*, 10 gr.; *carbonate of potassa* and *saffron*, of each, 3 gr.; *syrup*, q. s. In the dyspepsia of hysterical patients, in engorgements of the abdominal viscera following intermittent fevers, &c.

PILLS (Dysentery). Syn. *Pilulæ Dysentericæ*,—Lat. *Prep.* Pure *alumina* and *tannic acid*, of each, 20 gr.; *antimonial powder*, 15 gr.; *castor oil*, ½ dr. *Dose.* 5 to 10 gr., frequently.

PILLS (Elaterium). Syn. *Pilulæ Elaterii*,—Lat. *Prep.* (Radius.) *Elaterium*, 6 gr.; *extract of gentian* and *Castile soap*, of each, 9 gr.; mix, and divide into 12 pills. *Dose.* 1 to 4; in obstinate constipation, and as a purge in dropsy, &c.

PILLS (Emetic). Syn. *Pilulæ Emeticæ, P. Cupri Sulphatis Compositæ*,—Lat. *Prep.* (Swediaur.) *Sulphate of copper* and *ipecacuanha*, equal parts; *syrup* or *conserve of roses*, q. s. For 5-gr. pills. *Dose.* 1 pill, repeated every 15 minutes, until vomiting comes on. See *Emetics.*

PILLS (Epilepsy). Syn. *Pilulæ Antepilepticæ, P. ad Epilepsiam*,—Lat. *Prep.* 1. (Griffith.) *Powdered indigo*, 75 gr.; *assafœtida*, 15 gr.; *Russian castor*, 7 gr.; mix, and divide the mass into 20 pills. *Dose.* 1, every hour.

2. (Récamier.) *Oxide of zinc*, 9 gr.; *camphor* and *extract of belladonna*, of each, 6 gr. For 12 pills. *Dose.* 1 to 3, every 3 or 4 hours.

PILLS (Ergot of Rye). Syn. *Pilulæ Ergotæ, P. Secalis Cornuti*,—Lat. *Prep.* 1. (Dewees.) *Powdered ergot*, ½ dr.; *extract of gentian*, 1 dr.; divide into 15 pills. In obstructed and painful menstruation, hæmorrhages, &c. *Dose.* 1 pill, thrice daily.

2. (Lallemande.) *Aloes*, *ergot*, and *rue*, of each, 8 gr.; for 12 pills. As the last.

PILLS (Ergotine). Syn. *Pilulæ Ergotinæ*,—Lat. *Prep.* (Bonjean.) *Ergotine* (Bonjean's), 24 gr.; *liquorice powder*, 40 gr.; *syrup*, q. s. For 24 pills. *Dose.* 3 to 6, daily; as an internal hæmostatic, &c.

PILLS (Everlasting). Syn. *Perpetual Pills; Pilulæ Æternæ, P. Perpetuæ*,—Lat. Small spheres of *metallic antimony.* They possess the property of purging as often as swallowed, but have now long fallen into disuse.

PILLS (Expectorant). Syn. *Pilulæ Expectorantes*,—Lat. *Prep.* 1. *Myrrh*, 1½ dr.; *powdered squills*, ½ dr.; *extract of henbane*, 2 dr.; *syrup*, q. s.; divide into 30 pills. *Dose.* 2, night and morning.

2. (A. T. Thomson.) *Powdered squills* and *extract of hemlock*, of each, ½ dr.; *ammoniacum*, 1½ dr.; divide into 30 pills. *Dose.* 2, twice or thrice a day. In chronic coughs, asthma, &c., after an aperient. See *Pectoral Pills, &c.*

PILLS (Family Antibilious). Syn. *Aloe Pills; Aloës Rosata, Pilulæ Aloës Rosatæ*,—Lat. *Prep.* *Socotrine* or *hepatic aloes*, 4 *oz.; juice of roses*, 1 pint; dissolve by heat, strain through a piece of coarse flannel, evaporate to a proper consistence, and form it into pills. Purgative, in *doses* of 5 to 15 gr.

PILLS (Fever). Syn. *Pilulæ Febrifugæ*,—Lat. Of these, the principal are those containing *antimonials*, *bark*, *quinine*, and *salicine* (which see).

PILLS (Fordyce's). An active purgative, closely resembling in composition the *compound gamboge pill* of the Ph. L.

PILLS (Dr. Fothergill's). *Prep.* (Anat. of Quackery.) *Aloes*, 4 dr.; *extract of colocynth* and *scammony*, of each, 1 dr.; *diaphoretic antimony*, 30 gr.; *syrup*, q. s. For 3½-gr. pills. A diaphoretic aperient. *Dose.* 1 to 4 pills, at bedtime.

PILLS (Foxglove and Henbane). Syn. *Pilulæ Digitalis et Hyoscyami*,—Lat. *Prep.* (Dr. A. T. Thomson.) *Powdered foxglove*, 4 gr.; *powdered camphor*, 12 gr.; *extract of henbane*, 18 gr. For 6 pills. *Dose.* 1 or 2, at bedtime; as a sedative in maniacal and spasmodic affections, &c.

PILLS (Foxglove and Squills). Syn. *Pilulæ Digitalis et Scillæ,*—Ph. E. *Prep.* (Ph. E.) *Powdered foxglove* and *squills,* of each, 1 part; *aromatic electuary* (Ph. E.), 2 parts; *conserve of red-roses,* q. s.; divide into 4-gr. pills. A valuable diuretic in dropsies. *Dose.* 1 to 2 pills.

PILLS (Frank's). See *Dinner Pills.*

PILLS (Frankfort). These are the *pilules angeliques* noticed at page 950, formed into 2-gr. pills, and silvered.

PILLS (Fuligokali). Syn. *Pilulæ Fuligokali,*—Lat. *Prep.* (Deschamps.) *Fuligokali,* 5 dr.; *starch,* 2½ dr.; *powdered tragacanth,* 10 gr.; *syrup,* q. s. For 100 pills, which must be covered with 2 or 3 coats of *gum,* and preserved from the air. The pills of sulphuretted fuligokal (*pilulæ fuligokali sulphurati*) are prepared in a similar manner.

PILLS (Fuller's). Syn. *Bennet Pills; Pilulæ Benedictæ. Prep.* (Anat. of Quackery.) *Aloes* and *sulphate of iron,* of each, ½ dr.; *myrrh* and *senna,* of each, 20 gr.; *assafœtida* and *galbanum,* of each, 10 gr.; *mace* and *saffron,* of each, 6 gr.; *syrup,* q. s.; mix, and divide into 4-gr. pills. Antispasmodic, emmenagogue, and tonic, and slightly aperient. *Dose.* 1 to 4, according to the object in view.

PILLS (Gairthorn's Mild Provisional). *Prep.* (Anat. of Quackery.) *Compound gamboge pill,* 60 gr.; *aqueous extract of aloes,* 40 gr.; *sulphate of potassa* and *extract of senna,* 30 gr.; *compound scammony powder,* 15 gr.; *balsam of Peru,* 6 or 8 gr.; *emetic tartar,* 3 gr.; mix, and divide into 36 pills. Purgative. *Dose.* 1, 2, or more, when required.

PILLS (Galbanum,—Compound). Syn. *Pilula Galbani Composita,*—Ph. L. *P. è Gummi,*—Ph. L. 1788. *P. Gummosæ,*—Ph. L. 1746. *Pilulæ G. Compositæ,*—Ph. D. 1826. *P. Myrrhæ C.,*—Ph. D. 1807. *Prep.* 1. (Ph. L.) *Myrrh* and *prepared sagapenum,* of each, 3 dr.; *prepared galbanum* and *soft soap,* of each, 2 dr.; *prepared assafœtida,* 1 dr.; *treacle,* q. s. to form a pill-mass.

2. (Ph. L. 1836.) As the last, *omitting* the *soap.*

3. (Ph. D. 1826.) As the Ph. L., except that *treacle* is substituted for syrup.

Obs. These pills are stimulant, expectorant, antispasmodic, and emmenagogue. *Dose.* 10 to 20 gr.; in hysteria, chronic coughs, chlorosis, amenorrhœa, &c.

PILLS (Galbanum with Iron). Syn. *Pylulæ Galbani cum Ferro,*—Lat. *Prep.* (Guy's Hosp.) *Compound galbanum pill,* 2 parts; *precipitated sesquioxide of iron,* 1 part; *water,* q. s. to form a mass. For 4½-gr. pills. An excellent tonic emmenagogue. *Dose.* 10 to 20 gr.; in chlorosis, amenorrhœa, &c., when chalybeates are not contra-indicated.

PILLS (Gamboge,—Compound). Syn. *Gamboge Pills, Fordyce's do.; Pilula Cambogiæ Composita,*—Ph. L., and Ph. D. 1826. *P. Cambogiæ,*—Ph. E. *Prep.* 1. (Ph. L.) *Powdered Socotrine* or *hepatic aloes,* 3 dr.; *powdered gamboge,* 2 dr.; *powdered ginger,* 1 dr.; *soft soap* (Ph. L.), 4 dr.; mix, and beat them to a pill-mass. The formulæ of the Ph. L. 1836 and Ph. D. 1826 are precisely similar.

2. (Ph. E.) *Gamboge, East Indian* or *Barbadoes aloes,* and *aromatic powder,* of each (in powder), 1 part; *Castile soap,* 2 parts; *syrup,* q. s.

Obs. Both the above are active cathartics. *Dose.* 5 to 15 gr., at bedtime; in obstinate constipation, &c.

PILLS (Gentian,—Compound). Syn. *Pilulæ Gentianæ Compositæ,*—Lat. *Prep.* (W. Cooley.) *Extract of gentian,* 1 dr.; *powdered rhubarb* and *cardamoms,* of each, ½ dr.; *ipecacuanha,* 12 gr. For 3-gr. pills. Stomachic. *Dose.* 2 or 3, twice or thrice daily, to improve the appetite and digestion.

PILLS (Gout). Syn. *Pilulæ Antarthriticæ,*—Lat. *Prep.* 1. (Bouchardat.) *Extract of colchicum* and *compound extract of colocynth,* of each, 1 dr.; *aqueous extract of opium,* 3 gr.; mix, and divide into 3-gr. pills. *Dose.* 1 or 2, according to their purgative action, as required.

2. (*Sir H. Halford's.*) From *acetic extract of colchicum,* ½ dr.; *Dover's powder* and *compound extract of colocynth,* of each, 18 gr. For 12 pills. *Dose.* 1 pill.

3. (*Lartigue's.*) From *compound extract of colocynth,* 20 gr.; *alcoholic extract of colchicum seeds* and *alcoholic extract of digitalis,* of each, 1 gr. For 2-gr. pills. *Dose, &c.* As the last.

4. (St. George's Hosp.) *Acetic extract of colchicum,* 12 gr.; *Dover's powder,* 30 gr. For 12 pills. *Dose.* 2 pills.

5. (*Sir C. Scudamore's.*) From *acetic extract of colchici,* 1 dr.; *powdered marshmallow root,* q. s. to form a mass. For 40 pills. *Dose.* 1 to 3, or more, with caution, as required.

6. (Trousseau & Reveil.) *Powdered colchicum seeds,* ½ dr.; *powdered digitalis* and *sulphate of quinine,* of each, 15 gr.; *calomel* and *extract of colocynth,* of each, 8 gr.; *syrup,* q. s. For 20 pills. *Dose.* 1 to 4, during the day, at the commencement of an attack of gout. Other formulæ for *gout pills* will be found under the respective names.

PILLS (Dr. Griffitt's). *Powdered rhu-*

barb, 1½ dr.; *sulphate of iron*, ½ dr.; *Castile soap*, 40 gr.; *water*, q. s. to form a mass. For 48 pills. An excellent remedy in costiveness with loss of tone of the bowels. *Dose.* 2 to 4, at bedtime.

PILLS (Guaiacum,—Compound). Syn. *Pilulæ Guaiaci Compositæ*,—Lat. *Prep.* 1. *Powdered resin of guaiacum*, 1 dr.; *oxysulphuret of antimony*, 40 gr.; *oil of cajeput*, 12 drops; *extract of gentian*, q. s. to form a mass. For 4-gr. pills. *Dose.* 3 to 6, thrice daily; in gout, rheumatism, secondary syphilis, various obstinate cutaneous affections, &c.

2. (St. B. Hosp.) *Guaiacum*, 30 gr.; *ipecacuanha* and *opium*, of each, 3 gr.; *syrup*, q. s. For 12 pills. *Dose.* 1 to 3. As the last.

PILLS (Halford's). See *Gout Pills.*

PILLS (Dr. Hamilton's). The same as the *colocynth and henbane pill* of the Ph. E. The *compound pills of gamboge*, now vended under the title of "*Morison's No.* 2 *Pills*," were long known in Scotland as Dr. Hamilton's Pills.

PILLS (Headache). Syn. *Cephalic Pills; Pilulæ Cephalicæ, P. Anticephalalgicæ*,—Lat. *Prep.* 1. *Caffeine*, 15 gr.; *aloes*, 20 gr.; *conserve of hips*, q. s. For 12 pills. *Dose.* 1, occasionally; when only one side of the head is affected.

2. (Broussais.) *Extract of opium*, 6 gr.; *extracts of belladonna* and *henbane*, of each, 15 gr.; *extract of lettuce*, 30 gr.; *butter of cacao*, 4 dr. For 120 pills. *Dose.* 1, twice or thrice daily; in headache, accompanying spasmodic affections, &c.

3. (Dr. Wilson Philip.) *Powdered nutmeg* and *rhubarb*, of each, 30 gr.; *extract of chamomile*, 20 gr.; *oil of peppermint*, 10 or 12 drops. For 30 pills. *Dose.* 1 to 3, thrice daily; in nervous headaches.

PILLS (Helvetius's). Syn. *Pilulæ Aluminis Helvetii*,—Lat. *Prep. Alum*, 2 dr.; *dragon's blood*, 1 dr.; *honey of roses*, to mix. For 48 pills. Astringent.

PILLS (Hemlock,—Compound). Syn. *Pilula Conii Composita*, — Ph. L. *Prep.* (Ph. L.) *Extract of hemlock*, 5 dr.; *powdered ipecacuanha*, 1 dr.; *treacle*, q. s. Antispasmodic, expectorant, and narcotic. *Dose.* 4 to 8 gr., twice or thrice daily; in hooping-cough, bronchitis, incipient phthisis, &c.

PILLS (Henbane,—Compound). Syn. *Pilules de Meglin; Pilulæ Hyoscyami et Zinci*,—Lat. *Prep.* (P. Cod.) *Extracts of henbane* and *valerian*, and *oxide of zinc*, equal parts. For 3-gr. pills. *Dose.* 1 to 10; as an anodyne or sedative in neuralgia, nervous attacks, &c.

PILLS (Lady Hesketh's). See *Dinner Pills.*

PILLS (Hoffmann's). See *Pills of Bichloride of Mercury.*

PILLS (Holloway's). See *Patent Medicines.*

PILLS (Hooper's Female). *Prep.* 1. (Gray.) *Sulphate of iron* and *water*, of each, 8 *oz.;* dissolve, add *Barbadoes aloes*, 2½ *lb.; white canella*, 6 *oz.; myrrh*, 2 *oz.; opopanax*, ½ *oz.*

2. (Phil. Coll. of Pharm.) *Barbadoes aloes*, 8 oz.; *dried sulphate of iron*, 2¼ oz.; *myrrh, extract of black hellebore*, and *Castile soap*, of each, 2 oz.; *canella* and *ginger*, of each, 1 oz.; *water*, q. s.; divide the mass into 2½ or 3-gr. pills, and put 40 into each box. Cathartic and emmenagogue. *Dose.* 2, or more. "If we omit the soap, lessen the quantity of extract of hellebore, and increase that of the aloes, we think the form will be nearer that of the original." (*Anat. of Quackery.*)

PILLS (Humphrey's). See *Pectoral Pills.*

PILLS (Hunter's). See *Renal Pills.*

PILLS (Hydragogue). See *Bontius' Pills, &c.*

PILLS (Hydrophobia). Syn. *Pilulæ ad Rabiem*,—Lat. *Prep.* (Werlhoff.) *Cantharides* (in very fine powder), 2 gr.; *belladonna* and *calomel*, of each, 4 gr.; *camphor*, 8 gr.; *mucilage*, q. s. For 12 pills. *Dose.* 2 to 3, twice daily.

PILLS (Indian Hemp). Syn. *Pilulæ Cannabis Indicæ*,—Lat. *Prep.* From *alcoholic extract of Indian hemp*, ½ dr.; *sugar of milk*, 1 dr.; *mucilage*, q. s. For 48 pills. An excellent pill for soothing pain and quieting the system, acting without causing headache or constipation of the bowels. *Dose.* 1 pill, increased to 2 or more, as necessary. (See *pages* 434, &c.)

PILLS (Indigo). See *Pills for Epilepsy.*

PILLS (Iodide of Arsenic). Syn. *Pilulæ Arsenici Iodidi*, — Lat. *Prep.* 1. (Dr. Neligan.) *Iodide of arsenic*, 2 gr.; *manna*, 40 gr.; *mucilage*, q. s.; mix, and divide into 20 pills.

2. (Gardiner.) *Iodide of arsenic*, 1 gr.; *extract of hemlock*, 20 gr. For 12 pills. *Dose.* 1 pill, twice or thrice daily; in lepra, psoriasis, and some other scaly skin-diseases.

PILLS (Iodide of Iron). Syn. *Pilulæ Ferri Iodidi*,—Lat. *Prep.* 1. *Unoxidized iron filings* (recently levigated), 20 gr.; *iodine*, 40 gr.; *distilled water*, ½ dr.; mix in a *cold* wedgewood-ware mortar, and triturate them together until the red colour of the mixture has entirely disappeared; then add of *powdered gum*, 20 gr.; *powdered sugar*, 1 dr.; *liquorice powder*, q. s. to form a mass; and divide it into 48 pills. Each pill contains 1 gr. of dry iodide of iron. *Dose.* 1 to 6 pills, twice or thrice a day.

2. (Ph. U. S.) *Protosulphate of iron,* 60 gr.; *iodide of potassium,* 80 gr.; (both in fine powder;) mix, add of *powdered tragacanth,* 10 gr.; *powdered sugar,* 30 gr.; and form the whole into a mass with *syrup,* q. s. For 40 pills. Each pill contains nearly 2 gr. of the dry iodide, or about 2½ gr. of the common hydrated iodide of the shops. *Dose.* 1 to 3, as the last.

Obs. The above pills are reputed alterative, tonic, and emmenagogue, and are found peculiarly useful in indurations, scrofula, chlorosis, leucorrhœa, &c., when the administration of chalybeates is not contra-indicated.

PILLS (Iodide of Lead). Syn. *Pilulæ Plumbi Iodidi,*—Lat. *Prep.* From *iodide of lead,* 15 gr.; *powdered sugar,* 1½ dr.; *mucilage,* q. s. For 60 pills. *Dose.* 1 pill, gradually increased to 3, or more, twice a day; in scrofula, schirrus, &c. (See *p.* 681.)

PILLS (Iodide of Mercury). Syn. *Pilulæ Hydrargyri Iodidi,* — Ph. L. 1836. *Prep.* 1. (Ph. L. 1836.) *Iodide* or *protiodide of mercury* and *powdered ginger,* of each, 1 dr.; *conserve of hips,* 3 dr. *Dose.* 2 to 5 gr., twice or thrice daily; as an alterative in scrofula and scrofulous syphilis, &c.

2. (*Coindet's Pills.*) From *protiodide of mercury,* 1 gr.; *extract of liquorice,* 20 gr.; mix, and divide into 8 pills. *Dose.* 2 to 4, as the last. *Pills of biniodide* or *deuto-iodide of mercury* are made in the same way, but owing to its greater activity only *one fourth* of the above quantity of iodide must enter into their composition. (See *p.* 775.)

PILLS (Iodide of Potassium). Syn. *Pilulæ Potassii Iodidi, P. Potassæ Hydriodatis,*—Lat. *Prep.* 1. *Iodide of potassium* and *powdered starch,* of each, ½ dr.; *conserve of hips,* q. s. For 36 pills. *Dose.* 1 to 6, thrice daily; in glandular indurations and enlargements, goiture, scrofula, &c.

2. (Voght.) *Iodide of potassium,* 15 gr.; *burnt sponge* and *extract of dulcamara,* of each, 5 dr.; *water,* q. s. For 180 pills. *Dose.* 4 to 6, twice a day; as the last.

PILLS (Iodine). Syn. *Pilulæ Iodinii,* —Lat. *Prep.* (Radius.) *Iodine,* 6 gr.; *extract of gentian,* 1 dr.; *powdered gum,* q. s. For 24 pills. *Dose.* 1 to 3; in scrofula, &c.; also in mercurial and scorbutic salivation.

PILLS (Iodoform). Syn. *Pilulæ Iodoformi,*—Lat. *Prep.* (Bouchardat.) *Iodoform,* ½ dr.; *extract of wormwood* (or *gentian*), 1 dr.; mix, and divide into 36 pills. *Dose.* 1, twice or thrice daily; in scrofula, &c.

PILLS (Ipecacuanha, — Compound). Syn. *Pills of Ipecacuanha with Squills, P. of I. and Opium; Pilula Ipecacuanhæ cum Scillâ,*—Ph. L. *P. I. Compositæ,*—Ph. L. 1836. *P. Ipecacuanhæ et Opii,*—Ph. E. *Prep.* 1. (Ph. L.) *Compound powder of ipecacuanha* (Dover's powder), 3 dr.; *powdered ammoniacum* and *squills* (freshly powdered), of each, 1 dr.; *treacle,* q. s. to form a pill-mass. Anodyne, sudorific, and expectorant. *Dose.* 5 to 10 gr.; in chronic coughs and asthma, &c.

2. (Ph. E.) *Dover's powder,* 3 parts; *conserve of red-roses,* 1 part; mix, and divide into 4-gr. pills. Resembles *Dover's powder* in its effects. It is hence regarded by many as a useless preparation.

PILLS (Iron,—Compound). Syn. *Pilula Ferri Composita,* — Ph. L. *P. F. cum Myrrhâ,*—Ph. L. 1836. *Prep.* (Ph. L.) *Myrrh* (in powder), 2 dr.; *carbonate of soda,* 1 dr.; rub them together in a warm mortar, then add of *sulphate of iron,* 1 dr., and again triturate; lastly, add of *treacle,* 1 dr., and beat all together, to form a pill-mass. An excellent mild chalybeate tonic and emmenagogue, similar in its properties to "Griffith's mixture." *Dose.* 5 to 15 gr., two or three times a day.

PILLS (Italian Black). Syn. *Pilulæ Italicæ Nigræ, P. Aloeticæ Ferratæ,*—Lat. *Prep.* (Ph. Bor.) *Powdered aloes* and *dried sulphate of iron,* equal parts; beaten up with *rectified spirit,* q. s., and divided into 2 or 2½-gr. pills. See *Pills of Aloes and Iron.*

PILLS (Jalap). Syn. *Pilulæ Jalapæ,*—Lat. *Prep.* 1. (Ph. E. 1783.) *Extract of jalap,* 2 dr.; *aromatic powder,* 1 dr.; *syrup,* q. s.

2. (Ph. Bor.) *Soap of jalap,* 3 parts; *powdered jalap,* 1 part; beat them to a pill-mass. *Dose.* (Of either) 10 to 15 gr.

PILLS (James's Analeptic). *Prep.* 1. *Antimonial powder, guaiacum,* and *pill of aloes with myrrh,* equal parts; *syrup,* q. s.

2. (Anat. of Quackery.) *Antimonial powder* (James's), *pill aloes with myrrh,* and *compound aloes powder,* of each, 2 parts; *powdered ammoniacum,* 1 part; beaten up with *tincture of castor,* q. s., and divided into 3½-gr. pills. A diaphoretic purge. *Dose.* 2 to 4 pills.

PILLS (Dr. J. Johnson's). *Prep.* From *compound extract of colocynth,* 2 dr.; *calomel,* ½ dr.; *potassio-tartrate of antimony,* 2 gr.; *oil of cassia,* 12 drops. For 4 dozen pills. An excellent alterative and diaphoretic aperient. *Dose.* 1 to 3 pills.

PILLS (Kaye's). See *Worsdell's Pills.*

PILLS (Keyser's). *Prep.* (Guibourt.) *Red oxide of mercury,* 1½ oz.; *distilled vinegar* (dilute acetic acid), 1 pint; dissolve, add to the resulting solution, *manna*, 2 ℔, and triturate for a long time before the fire, until a proper consistence is attained; lastly, divide the mass into pills of 1½ gr. each.

Obs. Keyser's pills were once celebrated throughout Europe as a remedy possessing extraordinary virtue, and so highly were they prized, that the method of preparing them was purchased by the French Government for the benefit of the nation. Richard, who first published a full account of them, concludes by observing, that he considers this compound to be, without exception, the most effectual remedy for syphilis hitherto discovered. In this country, however, it has long sunk into comparative disuse with the faculty; probably from *pills* of *acetate of protoxide of mercury* being erroneously employed under the name, whereas, according to Robiquet, *acetate of peroxide of mercury* forms the basis of the original preparation. The *dose* is 1 to 2, night and morning, as an alterative; and 2 to 6, twice a day, as a sialogogue.

PILLS (King's). See *Patent Medicines* (*p.* 949).

PILLS (Kitchener's). Syn. *Dr. Kitchener's Peristaltic Persuaders; Pilulæ Rhæi et Carui*,—Lat. *Prep.* From *powdered Turkey rhubarb*, 2 dr.; *simple syrup*, 1 dr.; *oil of caraway*, 10 or 12 drops. For 40 pills. An admirable stomachic, dinner, or laxative pill, according to the quantity taken. *Dose.* 2 to 6. "From 2 to 4 will generally produce one additional motion within twelve hours. The best time to take them is early in the morning."

PILLS (Klein's). *Prep.* From *ammoniacum* and *extract of centaury*, of each, ½ dr.; *Castile soap*, 1 dr.; *oil of amber*, 3 drops. For 2-gr. pills. Stomachic, emmenagogue, and pectoral. *Dose.* 2 to 6 pills.

PILLS (Lactate of Iron). Syn. *Pilulæ Ferri Lactatis*,—Lat. *Prep.* (Cap.) *Lactate of protoxide of iron* and *powdered marsh-mallow root*, equal parts; *clarified honey*, q. s. For 3-gr. pills. One of the most valuable of the chalybeates. *Dose.* 1 to 2, three or four times a day.

PILLS (Lactucarium). Syn. *Pilulæ Lactucarii*,—Lat. *Prep.* 1. (Brera.) *Lactucarium*, 18 gr.; *conserve of elder-berries* and *extract of liquorice*, of each, q. s. For 12 pills. *Dose.* 1 to 2 pills, every three or four hours; in dry asthma, obstinate coughs without expectoration, &c.

2. (Dr. Duncan.) *Lactucarium*, 12 gr.; *liquorice powder*, 20 gr.; *simple syrup*, q. s. For 12 pills. *Dose.* 1 to 2 pills, every hour, as an anodyne, or to induce sleep.

PILLS (Lartigue's). See *Gout Pills.*

PILLS (Lead). See *Acetate of Lead* and *Opiated Lead Pills.*

PILLS (Lee's Antibilious). *Prep.* (Amer. Journ. of Pharm.) *Aloes*, 12 oz.; *scammony*, 6 oz.; *calomel*, 5 oz.; *gamboge*, 4 oz.; *jalap*, 3 oz.; *Castile soap* and *syrup of buckthorn*, of each, 1 oz.; *mucilage*, 7 oz.; beat them together, and divide the mass into 5-gr. pills. A powerful cathartic, and, from containing mercury, not adapted for frequent use. See *Wyndham's Pills.*

PILLS (Lewis's Alterative and Liver). These "for the most part resemble *Scott's Bilious and Liver Pills.* They are, however, of a more drastic and powerful character, and frequently operate with considerable violence." (*Med. Circ.*, ii, 493.)

PILLS (Lockstadt's). *Prep.* (Phœbus.) *Disulphate of quinine*, 3 gr.; *aromatic powder*, 10 gr.; *essential oil of almonds*, 1 drop; *extract of gentian*, q. s. For 10 pills. *Dose.* 1 to 2, thrice daily, as a stomachic tonic; or the whole at once, before an expected attack of an ague or intermittent.

PILLS (Lockyer's). *Prep.* From *panacea of antimony*, 6 gr.; *powdered white sugar*, 4 dr.; *mucilage*, q. s. For 48 pills. Cathartic and emetic. *Dose.* 1 to 4 pills.

PILLS (Dr. Lynn's). *Prep.* From *pill of aloes with myrrh* and *compound extract of colocynth*, of each, 1 dr.; *calomel*, ½ dr. For 4 dozen pills. Aperient and antibilious. *Dose.* 1 to 3; in costiveness, biliousness, &c.

PILLS (Manganese). These are chiefly prepared from the recently precipitated carbonate (*Pilulæ manganesii carbonatis*), the iodide (*P. m. iodidi*), the chloride (*P. m. chloridi*), the phosphate (*P. m. phosphatis*), the sulphate (*P. m. sulphatis*), and the double sulphate of manganese and iron (*P. m. et ferri sulphatis*). The best excipients are *conserve of roses* or *of hips*, and *liquorice powder.* See *Manganese* and its *Salts.*

PILLS (Martial). Syn. *Pills of Iron* and *Wormwood; Pilulæ Ferri cum Absinthio, P. Martiales*,—Lat. *Prep.* (Sydenham.) *Levigated iron filings*, 1 dr.; *extract of wormwood*, q. s. Tonic and hæmatinic. *Dose.* 5 to 10 gr., twice a day.

PILLS (Matthew's). Syn. *Pilulæ Matthæi, P. Pacificæ*,—Lat. *Prep.* 1. (Dr. Paris.) *Black hellebore, Castile soap, liquorice, opium, saffron*, and *turmeric*, equal parts; made into pills with *oil of turpentine.*

2. (Ph. E. 1744.) *Opium* and *saffron*, of each, 1 dr.; *castor*, 2 dr.; *soap of turpentine*, 3 dr.; *balsam of copaiba* (or oil of

turpentine), q. s. to form a mass. Alterative and anodyne. *Dose.* 3 to 10 gr.

PILLS (Baron McKinsey's). See *McKinsey's Katapotia* (*p.* 949).

PILLS (Meglin's). Syn. *Pilules de Meglin; Pilulæ Hyoscyami et Zinci Oxydi, P. Antineuralgicæ,*—Lat. See *Compound Henbane Pills.*

PILLS (Mercurial). Syn. *Blue Pill; Pilules Mercurielles,*—Fr. *Pilulæ Hydrargyri,*—Ph. L. *Pilulæ H.,*—Ph. E. & D., & Ph. L. 1836. *P. ex Hydrargyro,*—Ph. L. 1788. *P. Mercuriales,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Mercury,* 4 dr.; *confection of roses,* 6 dr.; rub them together until globules can no longer be seen; then add of *liquorice powder,* 2 dr., and beat the whole together, so that a proper mass may be formed.

2. (Ph. E.) As the last; afterwards dividing the mass into 5-gr. pills.

3. (Ph. D.) As the Ph. L. formula, but taking four times the quantity of the respective ingredients.

Obs. The remarks under "*mercurial ointment*" (*p.* 496), for the most part, also apply here. This pill, when properly prepared, presents no globules of mercury when moderately rubbed on a piece of white paper, and immediately communicates a white stain to a piece of bright gold or copper. It possesses considerable density, and has a dark blue or slate colour. It *contains* 1-3rd of its weight of mercury, which may be ascertained from its sp. gr.; or, more exactly, by an assay for the metal. It is the mildest and the most extensively used of all the mercurial preparations. *Dose.* As an *alterative,* 1 to 3 gr.; as a *purgative,* 10 to 15 gr.; and, as a *sialogogue,* 5 or 6 gr., or more, twice or thrice daily. To prevent it affecting the bowels, it is commonly combined with either rhubarb or opium. A blue pill taken over-night, and a black draught in the morning, is a popular remedy in bilious complaints. See *Abernethy Medicines.*

4. (Collier.) *Mercury,* 2 dr.; *sesquioxide of iron,* 1 dr.; *confection of red-roses,* 3 dr.; triturated, as before, until the globules disappear. An excellent extemporaneous substitute for the common mercurial pill. The addition of only a few gr. of the sesquioxide of iron to 1 *oz.* of conserve, renders the latter capable of rapidly killing a large quantity of quicksilver.

5. (Tyson.) *Blue oxide of mercury* (prepared by decomposing calomel with liquor of potassa to which a little liquor of ammonia has been added), 2 dr.; *confection of roses,* 6 dr.; *powdered chamomiles,* 1 dr.; mix. As a substitute for the College pill. (*Pharm. Journ.*)

6. (Pharm. Journ.) *Stearine,* 1 dr.; rub it in a warm mortar till it assumes the consistence of thick cream, then add of *mercury,* 4 dr.; and again triturate until the globules disappear; next further add of *confection of roses* and *wheaten flour,* of each, 3 dr.; *powdered gum,* 1 dr.; and form the whole into a pill-mass. As a substitute for the College pill.

7. (*Pilulæ Hydrargyrosæ,*— P. Cod.) *Mercury* and *honey,* of each, 6 dr.; triturate till the globules are extinguished, then add of *aloes,* 6 dr.; *rhubarb,* 3 dr.; *scammony,* 2 dr.; *black pepper,* 1 dr.; and make a pill-mass as before. Contains 1-4th part of quicksilver. Alterative and aperient. *Dose.* 5 to 10 gr. *Belloste's, Barbarossa's, Sèdillot's,* and *Morelot's pills,* and the *Pilulæ Hydrargyri Caxantes,*—Ph. E. 1744, and the *Pil. Mercuriales,*—Ph. L. 1746, are nearly similar compounds. See *Calomel Pills, &c.*

PILLS (Mercurial,—Arabic). Syn. *Pilulæ Mercuriales Arabicæ,*—Lat. *Prep.* Take of *quicksilver* and *corrosive sublimate,* of each, ½ dr., triturate them patiently together until the globules disappear, then add of *agaric, pellitory,* and *senna,* of each, 1 dr.; *honey,* q. s. to make a pill-mass. For 3½-gr. pills. *Dose.* 2 a day. Employed in the "*traitement arabique*" for the cure of obstinate cutaneous diseases (which see).

PILLS (Mitchell's). *Prep. Aloes,* ½ dr.; *rhubarb,* 1 dr.; *calomel,* 6 gr.; *emetic tartar,* 2 gr. For 36 pills. An alterative aperient. *Dose.* 2 to 4 pills.

PILLS (Moat's). Similar to Morison's Pills. (*Med. Circ.*, ii, 492.)

PILLS (Morison's). *Prep.*—*a.* (*No.* 1 *Pills.*) From *aloes* and *cream of tartar,* equal parts, made into a mass with either *syrup* or *mucilage.* A mild aperient.

b. (*No.* 2 *Pills.*) From *colocynth,* 1 part; *gamboge,* 2 parts; *aloes,* 3 parts; and *cream of tartar,* 4 parts; made into a mass with *syrup,* as the last. An active purgative, often acting with great violence. Both No. 1 and No. 2 are divided into 3-gr. pills, of which 4 dozen are put into each thirteen penny-halfpenny box. The proper *dose* of either is 1 to 3 or 4 pills; but they are often given by the Morison's in *doses* of 12, 20, 30, or even more daily. For the history of these pills and their proprietors, see *Anat. of Quackery,* or *Med. Circ.*, ii, 9-27.

PILLS (Morphia). Syn. *Pilulæ Morphiæ,*—Lat. *Prep.* (Magendie.) *Morphia,* 1 gr.: *conserve of roses* (stiff), q. s. For 6 (or better 8) pills. *Dose.* 1 pill; as an anodyne or soporific. (See *p.* 983.)

PILLS (Moseley's). *Prep.* Finest *Turkey rhubarb*, 60 gr.; *Jamaica ginger*, 30 gr.; *sugar*, 20 gr.; (all in powder;) *tincture of rhubarb*, q. s. to form a mass. For 4-gr. pills. A mild and excellent medicine, closely resembling *Kitchener's peristaltic persuaders.* (See *p.* 995.)

PILLS (Musk). Syn. *Pilulæ Moschi,*—Lat. *Prep.* (Dupuytren.) *Opium*, 2 gr.; *musk* (genuine), 8 gr.; *camphor* (in powder), 24 gr.; *syrup*, q. s. For 8 pills. Antispasmodic and stimulant. *Dose.* 1 to 3, thrice daily, in low nervous affections; or the whole during the day in hospital gangrene, &c.

PILLS (Myrrh). See *Pills of Aloes and Myrrh.*

PILLS (Napier's Neurotonic). Of these, like Morison's pills, there are No. 1, and No. 2. The *first* is a simple stomachic aperient; the *other*, a stimulant tonic. They both owe their sale and reputed virtues to extensive advertising. (Anat. of Quackery.)

PILLS (Napoleon's). See *Pectoral Pills.*

PILLS (Neuralgia). Syn. *Pilulæ Antineuralgicæ,*—Lat. *Prep.* 1. (Marchal De Calvi). *Aqueous extract of opium*, 4 gr.; *disulphate of quinine*, 16 gr.; *powdered cinnamon*, *powdered orange-leaves*, and *extract of valerian*, of each, 20 gr.; *syrup of belladonna*, q. s. For 3 dozen pills. *Dose.* 1, hourly.

2. (Trousseau & Reveil.) *Extracts of opium* and *stramonium*, of each, 8 gr.; *oxide of zinc*, 2 dr.; *syrup*, q. s. For 40 pills. *Dose.* 1, every two or three hours, gradually increased in frequency until there is some considerable disorder of vision, &c. Both of the above should be used with care. See *Meglin's Pills*, &c.

PILLS (Nitrate of Bismuth.) Syn. *Pilulæ Bismuthi Trisnitratis,*—Lat. *Prep.* From *trisnitrate of bismuth* and *powdered rhubarb*, equal parts; *syrup of orange-peel*, q. s. to form a mass. For 3-gr. pills. *Dose.* 1 to 2, every two hours; as a tonic, stomachic, and antispasmodic, in dyspepsia, debility, spasms, &c.

PILLS (Nitrate of Silver). Syn. *Pilulæ Argenti Nitratis,*—Lat. *Prep.* 1. (St. B. Hosp.) *Nitrate of silver* (crystallized), 12 gr.; *liquorice powder*, 24 gr.; *treacle*, q. s. For 12 pills. *Dose.* 1 pill, twice or thrice a day; in chronic epilepsy, and some other spasmodic disorders.

2. (Dr. A. T. Thomson.) *Nitrate of silver*, 6 gr.; *crumb of bread*, q. s. (say ½ dr.); mix, and divide into 12 pills. *Dose.* 1 every six hours.

Obs. To prevent the blue or slate-coloured tinge of the skin, so often produced by the continued use of the salts of silver, 8 drops of *diluted nitric acid* in 1 fl. oz. of *water*, should be taken after each pill.

PILLS (Norton's Chamomile). *Prep.* From *aqueous extract of aloes*, 1 dr.; *extract of gentian*, 3 dr.; mix, and drive off the excess of moisture by the heat of a water bath; then add of *essential oil of chamomile*, 20 drops; and divide the mass into 60 pills. To preserve their aromatic properties they should be kept in a dry glass bottle or a well-covered earthenware pot. *Dose.* 1, as a dinner pill; or 2, night and morning, as a stomachic tonic. (Anat. of Quackery.)

PILLS (Nux Vomica). Syn. *Pilulæ Nucis Vomicæ,*—Lat. *Prep.* 1. *Nux vomica* and *aloes* (both in powder), equal parts; *syrup*, q. s. For 3-gr. pills. *Dose.* 1 to 3, twice or thrice daily, carefully watching the effects; in nervous derangement, general debility, impotence, paralysis, &c.

2. *Alcoholic extract of nux vomica*, 1 part; *powdered sugar*, 2 parts; beaten up with *rectified spirit*, q. s. For 2½-gr. pills. *Dose* 1 to 2; as the last.

3. (Mondière.) *Alcoholic extract*, 6 gr.; *levigated black oxide of iron*, 1 dr.; *syrup*, q. s. In atonic incontinence of urine, amenorrhœa, &c.

PILLS (Odontalgic). Syn. *Pilulæ Odontalgicæ,* — Lat. *Prep.* (Ph. Bor.) *Powdered opium* and *extracts of belladonna* and *henbane*, of each, 10 gr.; *oil of cloves*, 20 drops; *powdered pellitory of Spain*, ½ dr.; beat them to a mass, and divide it into 1-gr. pills; keep these in a corked phial.

PILLS (Opiated Lead). Syn. *Pilulæ Plumbi Opiatæ,*—Ph. E. *Prep.* (Ph. E.) *Acetate of lead*, 6 parts; *opium*, 1 part; *conserve of red-roses*, about 1 part; beat them to a proper mass, and divide this into 4-gr. pills. "This pill may also be made with *twice* the quantity of opium." In hemorrhages, obstinate diarrhœa, dysentery, spitting of blood, and other cases demanding the use of a powerful astringent. It has also been highly extolled in cholera. *Dose.* 1 to 3 pills, twice or thrice daily, washed down with water soured with pure vinegar.

PILLS (Opium). Syn. *Anodyne Pills, Night do., Thebaic do.; Pilulæ Opii,*—Ph. U. S. *P. O.* or *Thebaicæ,*—Ph. E. *Prep.* 1. (Ph. E.) *Opium* and *conserve of red roses*, of each, 1 part; *sulphate of potash*, 3 parts; rub them together to a proper mass, and divide into 5-gr. pills. *Dose.* 1 to 2 pills, as an anodyne or soporific. Each pill contains 1 gr. of opium, or double the quantity in the same pill of the previous edition of the Ph. E.

2. (Ph. U. S.) *Powdered opium,* 1 dr.; *Castile soap,* 12 gr.; *water,* q. s. For 60 pills. As the last.

PILLS (Ox-Gall). Syn. *Bile Pills; Pilulæ Fellis Bovini, P. Bilis,*—Lat. *Prep.* 1. From *inspissated ox-gall* formed into pills by the addition of any *simple powder;* or the *harder extract* beaten up with a little *proof spirit.* Powdered rhubarb is frequently used for the purpose. For 3-gr. pills. *Dose.* 1 to 6; in constipation, flatulence, &c., arising from a deficiency of bile.

2. (Compound.) From *inspissated ox-gall,* 1 dr.; *powdered rhubarb,* ½ dr.; *powdered ipecacuanha* and *capsicum,* of each, 15 gr.; *oil of caraway,* 12 drops. For 48 pills. *Dose.* 1 to 4; in loss of appetite and dyspepsia, with torpor of the bowels, &c. See *Constipation, Gall,* &c.

PILLS (Oxide of Gold). Syn. *Pilulæ Auri Oxydi,*—Lat. *Prep.* (Magendie.) *Teroxide of gold,* 5 gr.; *extract of mezereon,* 2 dr.; mix, and divide into 60 pills. Each pill contains $\frac{1}{12}$ gr. of teroxide. *Dose.* 1 to 3; in scrofula, syphilis, malignant fevers, &c.

PILLS (Oxide of Mercury). Syn. *Pilulæ Hydrargyri Protoxydi,*—Lat. See *Mercurial Pills.*

PILLS (Oxide of Silver). Syn. *Pilulæ Argenti Oxydi,*—Lat. *Prep.* From *oxide of silver,* 6 gr.; *powdered rhubarb* and *extract of gentian,* of each, 12 gr. For 1 dozen pills. *Dose.* 1 pill, twice or thrice daily; in gastralgia, hæmorrhages, nervous affections, &c. Milder than the *pills of nitrate of silver.*

PILLS (Oxide of Zinc). Syn. *Pilulæ Zinci Oxydi,*—Lat. *Prep.* From *oxide of zinc, powdered cascarilla,* and *conserve of hips,* equal parts. For 3½-gr. pills. Tonic and antispasmodic. *Dose.* 1 to 3, thrice daily; in dyspepsia, gastric or spasmodic coughs, epilepsy, chorea, &c.

PILLS (Parr's Life). *Prep.* (Anat. of Quackery.) *Aloes, 7 lb.; rhubarb* and *jalap,* of each, 5 *lb.;* (all in powder;) *extract of gentian,* 3½ *lb.; soft soap,* ½ *lb.; liquorice powder, treacle,* and *moist sugar,* of each, 4½ *lb.; oil of cloves,* 10 *oz.; oil of caraway,* 3½ *oz.;* mix, and beat the whole to a proper mass with *syrup bottoms,* q. s., and divide it into 3½-gr. pills. "There are about 4 dozen in each 1*s.* 1½*d.* box, weighing (dry) barely 3 gr. each." A good stomachic and aperient pill, but possessing none of the extraordinary virtues ascribed to it by its proprietors. (Med. Circ., ii, 146, 167, &c.)

PILLS (Paullinia). Syn. *Guarana Pills; Pilulæ Guaranæ, P. Paulliniæ,*—Lat. *Prep.* 1. *Paullinia* mixed up with *syrup of orange peel,* and the mass divided into 2½-gr. pills. *Dose.* 2 to 8.

2. (Dr. Gavrelle.) *Extract of guarana,* 1 dr.; *liquorice powder,* q. s. For 40 pills. *Dose.* 3 to 6, daily.

Obs. These pills are highly esteemed on the Continent as a tonic and astringent, in diseases of the bowels and bladder, in chlorosis, debility, &c.

PILLS (Pectoral). Syn. *Breath Pills; Pilulæ Pectorales,*—Lat. *Prep.* 1. *Compound squill pill,* 1 dr.; *gum benzoin,* ½ dr.; *powdered ipecacuanha* and *extract of henbane,* of each, 15 gr.; *syrup,* q. s. For 3-gr. pills. *Dose.* 2 to 4, three or four times a day; in asthmas, chronic bronchial affections, coughs, &c.

2. (Dr. Copland.) *Camphor* (in powder), 10 gr.; *ipecacuanha,* 15 gr.; *extract of hemlock,* 1 dr. *Dose.* 3 to 6 gr.; in irritating and spasmodic coughs, &c.

3. (Haggart.) *Powdered ipecacuanha* and *squills,* of each, ½ dr.; *acetate of morphia,* 6 gr.; *Castile soap,* 3 dr.; mix, and divide into 72 pills. A most excellent medicine, at once soothing and expectorant. *Dose.* 1 to 2, thrice a day, or oftener.

4. (*Humphries' Cough Pills.*) From *powdered ipecacuanha,* 15 gr.; *compound squill-pill,* 1 dr.; *compound extract of colocynth,* ½ dr. For 3½-gr. pills. *Dose.* 2 pills, night and morning.

5. (Dr. Latham.) *Compound powder of ipecacuanha,* 1 dr.; *fresh squill* and *gum ammoniacum,* of each, 20 gr.; *calomel,* 4 gr. For 20 pills. A most valuable pectoral and expectorant. *Dose.* 1 pill, thrice daily; in bronchitis, coughs, &c., after the more active inflammatory symptoms have subsided.

6. (*Napoleon's.*) From *ipecacuanha,* 30 gr.; *squills* and *ammoniacum,* of each, 40 gr.; (all in powder;) *mucilage,* q. s. to mix. For 24 pills. It is said that this was a favorite remedy with the late Emperor of France for difficulty of breathing, bronchitis, and various affections of the organs of respiration. *Dose.* 2 pills, night and morning.

7. (Dr. Paris.) *Powdered squills,* ½ dr.; *powdered myrrh,* 1½ dr.; *extract of henbane,* 40 gr.; *water* (or *simple syrup*), q. s. to mix. For 4-gr. pills. *Dose.* 2 pills, night and morning. As No. 2.

8. (Ph. L. 1746). *Gum ammoniacum,* 4 dr.; *gum benzoin,* 3 dr.; *gum myrrh,* 2 dr.; *saffron,* 1 dr.; *anisated balsam of*

sulphur, ½ dr.; *syrup of tolu*, q. s. to mix. *Dose.* 5 to 15 gr.

9. (Richter.) *Assafœtida* and *valerian*, of each, ½ dr.; *castor*, 15 gr.; *powdered squills* and *sesquicarbonate of ammonia*, of each, 8 gr.; *extract of aconite* (alcoholic), 3 gr. For 4-gr. pills. *Dose.* 1 to 3 pills, night and morning; in spasmodic affections of the respiratory organs.

PILLS (Perpetual). See *Everlastiug Pills.*

PILLS (Peter's). *Prep.* (Anat. of Quackery.) *Aloes*, 3 dr.; *gamboge*, *jalap*, and *scammony*, of each, 2 dr.; (all in powder;) *calomel*, 1 dr.; beaten up with *rectified spirit*, q. s. A powerful cathartic. *Dose.* 1 to 3 pills.

PILLS (Piperine). Syn. *Pilulæ Piperinæ*, —Lat. *Prep.* From *piperine*, ½ dr.; *extract of cinchona*, q. s. For 30 pills. *Dose.* 1 pill, every two hours, during the intermission of an ague; also as an aphrodisiac, and a remedy in piles.

PILLS (Pitch). Syn. *Pilulæ Picis Nigræ*,—Lat. *Prep.* From *black pitch* and *powdered black pepper*, equal parts; beaten together in a warm mortar, and divided into 4-gr. pills. *Dose.* 2 pills, night and morning; in piles, &c.

PILLS (Pitschaft's Eccoprotic). *Prep.* From *strained aloes* and *disulphate of quinine*, equal parts; made into 2-gr. pills. A tonic and stomachic aperient. *Dose.* 2 to 4, at bedtime; in torpor of the large intestines, the dyspepsia of the debilitated, &c.

PILLS (Plummer's). See *Compound Pills of Chloride of Mercury.*

PILLS (Purgative). Syn. *Pilulæ Purgantes*,—Lat. *Prep.* 1. (Dr. Robinson.) *Aqueous extract of aloes*, 1 dr.; *powdered scammony*, ½ dr.; *balsam of Peru*, 10 or 12 gr.; *oil of caraway*, 9 or 10 drops; mix, and divide into 30 pills. A warm, stimulating aperient, highly recommended to excite the peristaltic action of the bowels of the aged, sedentary, and debilitated. *Dose.* 1 to 4 pills, as required.

2. (Trousseau & Reveil.) *Resin of jalap*, 1 dr.; *scammony*, ½ dr.; *extract of colocynth*, 6 gr.; *excipient*, as required. For 20 (or better, 24) pills. *Dose.* 1, "every two hours, in the morning, fasting, until they operate." For other formulæ see *Aperient* and *Cathartic Pills*, and *Pills of Aloes, Jalap, Colocynth, &c.*

PILLS (Quinine). See *page* 1003.

PILLS (Reece's). See *Chirayta Pills.*

PILLS (Renal). Syn. *Pilulæ Renales*, —Lat. *Prep.* 1. *Squills*, *myrrh*, and *digitalis*, of each (in powder), 10 gr.; *extract of rhubarb* and *mercurial pill*, of each, 15 gr.; *powdered nitre*, 20 gr.; *oil of juniper*, 10 or 12 drops. For 24 pills. Alterative, diuretic, and tonic. *Dose.* 3 to 6, thrice a day. Hunter's "*Renal purifying pills*" are similar, but omiting the mercurial pill. *De Roos'* "*Renal pills*" contain a preparation of copaiba.

PILLS (Rheumatism). Syn. *Pilulæ Anti-rheumaticæ*, — Lat. *Prep.* 1. *Gum guaiacum*, 1 dr.; *nitrate of potassa*, 1½ dr., (both in powder;) *soft soap* (Ph. L.), ½ dr.; *oil of cajeput*, 16 drops. For 4 dozen pills. *Dose.* 2 to 6, night and morning; in chronic rheumatism, and rheumatic gout. Their action is accelerated by the copious use of lemon juice during the day.

2. (Mr. Beasley.) *Extract of artichoke*, ½ dr.; *powdered sarsaparilla*, 20 gr.; *oil of sassafras*, 1 drop. For 12 pills. *Dose.* 1 pill, thrice daily.

PILLS (Rhubarb). Syn. *Pilulæ Rhei*,—Ph. E. *Prep.* 1. (Ph. E.) *Powdered rhubarb*, 9 parts; *acetate of potassa*, 1 part; *conserve of red-roses*, 5 parts; mix, and divide into 5-gr. pills. A stomachic and gentle aperient, particularly useful in atonic dyspepsia. *Dose.* 2 to 4 pills.

2. (Ph. U. S.) *Powdered rhubarb*, 6 dr.; *Castile soap*, 2 dr.; beaten up with *water*, q. s., and divided into 120 pills. As the last.

PILLS (Rhubarb,—Compound). Syn. *Aromatic Pills*, *Balsamic Laxative do.*, *Edinburgh do.*, *Stomachic do.*; *Pilula Rhei Composita*,—Ph. L. *Pilulæ R. Compositæ*, —Ph. E. & D. *P. Stomachicæ*,—Ph. E. 1744. *P. Aromaticæ, &c.* *Prep.* 1. (Ph. L.) *Powdered rhubarb*, 4 dr.; *powdered Socotrine aloes*, 3 dr.; *powdered myrrh*, 2 dr.; *soft soap* (Ph. L.), ½ dr.; *oil of caraway*, 15 drops; *treacle*, q. s. to form a mass.

2. (Ph. L. 1836.) *Powdered rhubarb* 1 oz.; *aloes*, 6 dr.; *myrrh*, 4 dr.; *Castile soap*, 1 dr.; *oil of caraway*, ½ fl. dr.; *syrup*, q. s.

3. (Ph. E.) *Powdered rhubarb*, 12 parts; *aloes*, 9 parts; *myrrh* and *Castile soap*, of each, 6 parts; *conserve of red-roses*, 5 parts; *oil of peppermint*, 1 part; mix, and divide into 5-gr. pills. The oil of peppermint may be omitted, when so preferred.

4. (Ph. D.) *Rhubarb*, 1½ *oz.*; *hepatic aloes*, 9 *dr.*; *myrrh* and *Castile soap*, of each, in fine powder, 6 *dr.*; *oil of peppermint*, 1 *fl. dr.*; *treacle*, 2 *oz.*; mix, and beat the whole to a uniform mass.

5. (Ph. U. S., & Ph. E. 1817.) *Rhubarb*, 8 dr.; *aloes*, 6 dr.; *myrrh*, 4 dr.; *oil of peppermint*, ½ fl. dr.; *syrup of orange peel*, q. s.; mix, and divide into 240 pills.

Obs. The above are tonic, stomachic, and gently laxative; extremely useful for obviating costiveness, and giving tone to the stomach and bowels. *Dose.* 6 or 8 to 20 gr. The London pill is not only the most agreeable, but it keeps the best.

PILLS (Rhubarb and Caraway). See *Kitchener's Pills.*

PILLS (Rhubarb and Chamomile). Syn. *Speediman's Pills; Pilulæ Rhei et Anthemidis*,—Lat. *Prep.* From *aloes, myrrh, rhubarb* (each in powder), and *extract of chamomile*, of each, 1 dr.; *essential oil of chamomile*, 10 or 12 drops. For 4-gr. pills. An excellent tonic and stomachic aperient, particularly useful in the dyspepsia and loss of appetite of hard drinkers. *Dose.* 1 to 3 pills, either before dinner, or at bedtime.

PILLS (Rhubarb and Copaiba). Syn. *Pilulæ Rhei et Copaibæ, P. R. Balsamicæ*,—Lat. *Prep.* (Swediaur.) *Powdered rhubarb* and *gum*, equal parts; *balsam of copaiba*, q. s.

PILLS (Rhubarb and Ginger). Syn. *Stomach Pills; Pilulæ Rhei et Zingiberis*,—Lat. *Prep.* From *powdered rhubarb*, 1 dr.; *powdered ginger*, ½ dr.; *Castile soap*, 20 gr.; *tincture* or *essence of ginger*, q. s. to form a mass. For 30 pills. *Dose.* 1 to 6.

PILLS (Rhubarb and Ipecacuanha). Syn. *Pilulæ Rhei et Ipecacuanhæ*,—Lat. *Prep.* From *rhubarb*, ½ dr.; *ipecacuanha*, 15 gr.; *opium*, 5 gr.; (each in powder;) *oil of cinnamon*, 6 drops; *syrup*, q. s. For 18 pills. *Dose.* In loss of appetite and spasmodic dyspepsia, 1 to 3 pills, twice a day; in dysentery, diarrhœa, &c., to relieve tormina and tenesmus, 1, every two hours.

PILLS (Rhubarb and Iron). Syn. *Pilulæ Rhei et Ferri*,—Ph. E. *Prep.* (Ph. E.) *Dried sulphate of iron*, 4 parts; *extract of rhubarb*, 10 parts; *conserve of red-roses*, 5 parts; beat them to a proper mass, and divide this into 5-gr. pills. *Dose.* 2 to 4 pills; in the atonic dyspepsia of debilitated subjects; in chlorosis, &c.

PILLS (Rhubarb and Ox-gall). Syn. *Pilulæ Rhei et Fellis Bovini*,—Lat. *Prep.* From *powdered rhubarb, gum ammoniacum*, and *inspissated ox-gall*, equal parts; beaten up with a little *tincture of ginger* or *proof spirit*, and the mass divided into 2½-gr. pills. In dyspepsia and constipation dependent on a torpid action of the liver. *Dose.* 2 to 6 pills.

PILLS (Rhubarb and Soda). Syn. *Pilulæ Rhei et Sodæ, P. R. Comp. cum Sodâ*,—Lat. *Prep.* (Guy's Hosp.) *Dried carbonate of soda, powdered rhubarb*, and *extract of gentian*, equal parts. For 4½-gr. pills. *Dose.* 2 to 4 pills; in acidity, heartburn, diarrhœa, loss of appetite, &c.

PILLS (Richter's). See *Pectoral Pills.*

PILLS (Dr. Robinson's). See *Purgative Pills.*

PILLS (Roper's Bath). See *Roper's Bath Plasters.*

PILLS (Rudius's). Syn. *Rudius's Extract; Pilulæ Rudii, Extractum Rudii*,—Lat. *Prep.* 1. *Colocynth pulp*, 6 dr.; *agaric, black hellebore*, and *turpethum root*, of each, 4 dr.; *cinnamon, mace*, and *cloves*, of each, 40 gr.; *rectified spirit*, ½ pint; digest for 4 days, express the tincture, and evaporate it to a proper consistence for making pills. Formerly esteemed one of the most safe and certain cathartics, in troublesome constipation. *Dose.* 5 to 20 gr.

2. (Ph. E. 1783.) *Black hellebore* and *colocynth*, of each, 2 oz.; *water*, 4 pints (o. w. m.); boil to a quart, strain, evaporate to the consistence of honey, and add of *aloes*, 2 oz.; *scammony* (powdered), 1 oz.; next remove the vessel from the fire, and further add of *sulphate of potassa*, 2 dr.; *oil of cloves*, 1 dr.; and form the whole into a pill-mass. Resembles the last (nearly).

PILLS (Rufus'). See *Pills of Aloes with Myrrh.*

PILLS (Saffron). Syn. *Pilulæ Croci*,—Lat. *Prep.* From *hay saffron*, 1 dr.; *myrrh*, ½ dr.; *oil of cajeput*, 6 drops; *syrup of saffron*, q. s. For 36 pills. *Dose.* 1 to 3 or 4, occasionally; as a stimulant in low spirits, hypochondriasis, &c.

2. (Phœbus.) *Saffron, myrrh*, and *sulphur*, equal parts; *inspissated bile*, q. s. For 2-gr. pills. *Dose.* 2 to 12 daily; as an emmenagogue.

PILLS (Sagapenum,—Compound). Syn. *Pilulæ Sagapeni Compositæ. Prep.* (Ph. L. 1836.) *Sagapenum*, 1 oz.; *aloes*, ½ dr.; *syrup of ginger*, q. s. *Dose.* 5 to 20 gr.; as a stimulant antispasmodic laxative, in dyspepsia with flatulence, flatulent colic, &c.

PILLS (Salicine). Syn. *Pilulæ Salicinæ*,—Lat. *Prep.* From *salicine*, ½ dr.; *powdered rhubarb*, 20 gr.; *extract of gentian*, q. s. to mix. For 4-gr. pills. *Dose.* 2 to 4, every three hours, during the apyrexia of intermittents.

PILLS (Scammony,—Compound). Syn. *Pilulæ Scammonii Compositæ*,—Lat. *Prep.* (St. B. Hosp.) *Scammony*, 24 gr.; *ginger*, 20 gr.; *aloes* and *gamboge*, of each, 12 gr.; *treacle*, q. s.; mix, and divide into 12 pills. A powerful cathartic and vermifuge. *Dose.* 1 to 3 pills.

PILLS (Scot's). *Prep.* From *aloes*, 9 *lb.; jalap*, 3 *lb.; gamboge* and *ginger*, of each,

¼ *lb.;* beaten up with *treacle* q. s. See *Anderson's Scot's Pills.*

PILLS (Dr. Scott's Bilious and Liver). *Prep.* (Anat. of Quackery.) *Compound extract of colocynth* (Ph. L. 1836), 8 oz.; *powdered rhubarb*, 4 oz.; *powdered myrrh*, 2 oz.; *soft soap*, ½ oz.; *oil of caraway*, 2½ dr.; strong *syrup of saffron*, q. s. to form a pill-mass. "There are twenty-five 3½-gr. pills in each 1*s.* 1½*d.* box." "It has been stated that these pills contain a minute portion of antimony."

PILLS (Sedative). Syn. *Pilulæ Sedativæ,*—Lat. *Prep.* 1. *Hydrochlorate of morphia,* 6 gr.; *powdered sumbul,* 20 gr.; *alcoholic extract of Indian hemp,* ½ dr. For 2-gr. pills. *Dose.* 1 to 3, twice or thrice daily; in excessive nervous irritability, painful menstruation, &c.

2. (U. C. Hosp.) *Camphor,* 1 dr.; reduce it to powder by means of *rectified spirit,* 3 or 4 drops; add of *extract of henbane,* 20 gr., and divide the mass into 20 pills. To allay pain and excitement, &c. *Dose.* 1 to 2 pills.

3. To either of the above, add of *powdered rhubarb* and *extract of gentian,* of each, 20 gr.; and divide the mass into 4-gr. pills. *Dose.* 1 to 4 pills; when, besides the other symptoms, the stomach and bowels are disordered.

PILLS (Sèdillot's Febrifuge). *Prep.* From *powdered opium,* 3 gr.; *disulphate of quinine,* 12 gr.; *confection of opium,* 10 gr., or q. s. For 12 pills. *Dose.* 1 to 2, every second hour, during the intermission of an ague.

PILLS (Senna). Syn. *Pilulæ Sennæ, P. S. Compositæ,*—Lat. *Prep.* 1. *Powdered senna,* 1 dr.; *extract of rhubarb,* ½ dr.; *powdered capsicum,* 4 gr.; *oil of juniper,* 6 or 8 drops. For 3-gr. pills. An aperient well suited for females. *Dose.* 5 to 8 pills.

2. (Hufeland.) *Powdered senna,* 1 dr.; *extract of dandelion,* q. s. to mix. For 30 pills. As the last.

PILLS (Smith's). *Prep.* From *powdered aloes,* 4 dr.; *jalap,* 2 dr.; *ginger* and *soft soap,* of each, 1 dr.; *oil of juniper,* ½ dr.; *emetic tartar,* 6 gr. For 120 pills. Laxative and diuretic. *Dose.* 1 to 4, at bedtime, or early in the morning.

PILLS (Dr. Hugh Smith's). See *Stomach Pills.*

PILLS (Soap). Syn. *Pilulæ Saponis, P. cum Sapone,*—Lat. *Prep.* (P. Cod.) *White Castile soap,* 32 parts; *powdered marsh-mallow root,* 4 parts; *powdered nitrate of potassa,* 1 part; beat them to a mass, and divide this into 4-gr. pills. In habitual costiveness, calculary affections, &c. *Dose.* 1 to 6 pills, twice or thrice a day.

PILLS (Soap,—Compound). Syn. *Pills of Soap and Opium, Laudanum Pills; Pilula Saponis Composita,*—Ph. L. *Pilulæ Saponis cum Opio,*—Ph. L. 1824. *P. Opii,*—Ph. L. 1788 edit. alt. *P. ex Opio,*—Ph. L. 1788 edit. prim. *P. Saponaceæ,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Opium* and *liquorice,* of each (in powder), 2 dr.; *soft soap* (Ph. L.), 6 dr.; beat them to a uniform mass.

2. (Ph. D., & Ph. U. S.) *Opium* (in fine powder), ½ *oz.; Castile soap,* 2 *oz.; distilled water,* ½ fl. dr., or q. s.; reduce the soap to powder, mix it with the other ingredients, and beat the whole together, as before.

Obs. The above pills contain 1-5th part of their weight in dry opium. The *dose* is 3 to 10 gr., in the usual cases in which the administration of opium is indicated. Mr. Skey, the eminent surgeon of St. Bartholomew's Hospital, has recently shown the great value of this pill in promoting the healing of obstinate ulcers, more especially those of the legs. (See *p.* 911.)

PILLS (Soda). Syn. *Pilulæ Sodæ Carbonatis; P. S. Subcarbonatis,*—Ph. E. 1817. *Prep.* (Ph. E. 1817.) *Exsiccated subcarbonate of soda,* 4 parts; *Castile soap,* 3 parts; *syrup,* q. s. to form a mass. Antacid, and slightly laxative. *Dose.* 10 to 20 gr. This pill was a great favorite of the once celebrated Dr. Beddoes.

PILLS (Speediman's). *Prep.* (Anat. of Quackery.) *Aloes,* 3 dr.; *rhubarb, myrrh,* (all in powder,) and *extract of chamomile,* of each, 1 dr.; *oil of chamomile,* 20 drops. For 4-gr. pills. An excellent aperient, tonic, and stomachic. *Dose.* 2 to 4 pills, as a purgative; 1, as a stomachic or dinner pill. (See *p.* 990.)

PILLS (Splenetic). Syn. *Pilulæ Antisplenetícæ,*—Lat. *Prep.* (Saunders.) *Strained aloes* and *gum ammoniacum,* of each, 3 dr.; *myrrh* and *bryony,* of each, ½ dr. For 4-gr. pills. *Dose.* 3 to 5. "Extolled in amenorrhœa and hypochondriasis." (Dr. R. E. Griffith.)

PILLS (Squill,—Compound). Syn. *Cough Pills, Pills of Squills and Ginger; Pilula Scillæ Composita,*—Ph. L. *Pilulæ Scillæ Compositæ,*—Ph. D. *P. Scillæ,*—Ph. E. *P. Scilliticæ,*—Ph. E. 1817. *P. è Scilla,*—Ph. L. 1788. *P. S. cum Zingibere,*—Ph. D. 1807. *Prep.* 1. (Ph. L.) *Freshly powdered squills,* 1 dr.; *powdered ginger* and *powdered ammoniacum,* of each, 2 dr.; mix, add of *soft soap* (Ph. L.), 3 dr.; *treacle,* 1 dr.; and beat the whole together, so that a mass may be formed.

2. (Ph. E.) *Squills,* 5 parts; *ammoniacum, ginger,* (all in fine powder,) and *Spanish*

soap, of each, 4 parts; *conserve of red-roses,* 2 parts; mix, as before, and divide the mass into 5-gr. pills.

3. (Ph. D.) *Squills* (in fine powder), 2½*dr.; ammoniacum, ginger,* and *Castile soap,* of each (in fine powder), 2 *dr.; treacle,* ½ *oz.*

Obs. Compound squill pill is a most useful expectorant, in chronic coughs, asthmas, bronchial affections, difficulty of breathing, &c.; and, combined with *calomel* and *foxglove,* and, occasionally, with *croton oil,* as a diuretic, &c., in dropsies. Unfortunately, however, it soon spoils; and, therefore, to be effective as a remedy, it must be recently prepared. As an expectorant, it should not be administered until the inflammatory symptoms have been subdued by purgatives or bleeding. A little *powdered opium,* or *extract of henbane,* is occasionally *added,* to allay irritation. *Dose.* 5 to 20 gr., twice or thrice a day, accompanied by an occasional aperient.

PILLS (Stahl's). See *Aperient Pills.*

PILLS (Starkey's). *Prep.* (Original Formula.) *Extract of opium,* 4 oz.; *mineral bezoar* and *nutmeg,* of each, 2 oz.; *saffron* and *Virginian snake-root,* of each, 1 oz.; *Starkey's soap,* ½ ℔; *oil of sassafras,* ½ oz.; *tincture of antimony* (Old Ph.), 2 fl. oz. Anodyne, diaphoretic, &c. *Dose.* 3 to 10 gr. The formula already given under *Matthew's Pills* is erroneously assigned to this pill by some writers.

PILLS (Mrs. Stephen's). This once celebrated remedy for stone, was prepared from the *calcined shells of eggs* and *snails,* made into 3-gr. pills with *soft soap.* Its active ingredients were, consequently, lime and potash.

PILLS (Stimulant). Syn. *Pilulæ Stimulantes,*—Lat. *Prep.* 1. *Capsicum,* ½ dr.; *nitrate of silver,* 2 gr.; *conserve of hips,* q. s. For 12 pills. *Dose.* 2 to 4, washed down with a spoonful of warm spirit-and-water, and repeated hourly, until reaction ensues; in cholera, &c.

2. (A. T. Thomson.) *Strychnia,* 1 gr.; *acetic acid,* 1 drop; *crumb of bread,* 20 gr.; mix *very carefully,* and divide the mass into 10 pills. *Dose.* 1, every six hours; in paralysis arising from lead.

PILLS (Stoerck's). Syn. *Pilulæ Conii, P. Cicutæ,*—Lat. *Prep.* From *extract of hemlock,* 1 dr.; *powdered hemlock,* q. s. to make a mass. For 2-gr. pills. *Dose.* 1 to 4, twice a day; in various glandular and visceral enlargements, pulmonary affections, cancer, scrofula, neuralgia, &c.

PILLS (Stomach). Syn. *Pilulæ Stomachicæ,*—Lat. *Prep.* 1. *Ipecacuanha,* 10 gr.; *sumbul* and *extract of rhubarb,* of each, 30 gr.; *powdered quassia,* 20 gr.; *oil of sassafras,* 6 drops; beaten up with *essence of ginger* (strongest), q. s. For 3-gr. pills. *Dose.* 1 to 3, thrice daily; in loss of appetite, flatulence, dyspepsia, &c.

2. (*Dr. Hugh Smith's.*) From *aloes, rhubarb, ginger,* (all powdered,) and *sagapenum,* of each, 1 dr.; *oils of peppermint* and *cloves,* of each, 10 drops; *balsam of Peru,* q. s. to mix. For 5-gr. pills. *Dose.* 2 or 3, nightly; or 1 to 2, before dinner. For other formulæ, see *Dinner Pills, Aperient do., Compound Rhubarb do., Aloes and Mastic do.,* &c., &c.

PILLS (Storax,—Compound). Syn. *Storax Pills; Pilula Styracis Composita,*—Ph. L. *Pilulæ Styracis,*—Ph. E., & Ph. D. 1826. *Prep.* 1. (Ph. L.) *Prepared storax,* 6 dr.; *saffron* and *powdered opium,* of each, 2 dr.; beat them together to a uniform mass. Contains 1-5th of its weight of opium.

2. (Ph. E.) *Opium* and *saffron,* of each, 1 part; *extract of styrax,* 2 parts; beat them to a uniform mass, and divide this into 4-gr. pills. Contains 1-4th part of opium.

Obs. The storax is here chiefly employed to disguise the odour and taste of the opium. The name of the preparation has been chosen so that the word "*opium*" may not appear in the prescription; a point highly necessary with certain patients. *Dose.* 3 to 10 gr.; as compound soap pill, and as an anodyne and expectorant in chronic coughs, &c.

PILLS (Stramonium). Syn. *Pilulæ Stramonii,*—Lat. *Prep.* 1. *Stramonium seeds* (in powder), 12 gr. (or *leaves,* 25 gr.); *powdered camphor* and *extract of seneka root,* of each, 1 dr.; *powdered savine,* 1½ dr.; *oil of cajeput,* 15 drops. For 2½-gr. pills. *Dose.* 2 to 4, thrice daily; in rheumatism, &c.

2. (Sir H. Halford.) *Extract of stramonium* and *liquorice powder,* of each, 1 dr.; *powdered Castile soap,* 2 dr.; *mucilage,* q. s. to mix. For 60 pills. *Dose.* 1, night and morning; in asthmas, &c.

PILLS (Strychnine). Syn. *Pilulæ Strychniæ,*—Lat. *Prep.* (Magendie.) *Strychnine,* 2 gr.; *conserve of hips,* 36 gr.; (*liquorice powder,* q. s.;) mix *very carefully,* divide the mass into 24 pills, and silver them. *Dose.* 1 pill, night and morning; in amaurosis, impotence, paralysis, &c.

PILLS (Sulphate of Iron). Syn. *Pilulæ Ferri Sulphatis,*—Ph. E. *P. F. S. Compositæ,*—Ph. E. 1817. *Prep.* 1. (Ph. E.) *Dried sulphate of iron* and *conserve of red-roses,* of each, 2 parts; *extract of dandelion,* 5 parts. For 5-gr. pills. A useful chalybeate tonic. *Dose.* 1 to 2, twice or thrice daily; in dyspepsia, chlorosis, amenorrhœa, &c.

2. (Ph. E. 1817.) *Sulphate of iron* (dried), 1 oz.; *extract of chamomile*, 1½ oz.; *oil of peppermint*, 1 dr.; *syrup*, q. s. As the last.

3. (Ph. U. S.) As No. 1, but substituting *extract of gentian* for extract of dandelion. For *other formulæ* see *Hooper's Pills, &c.*

PILLS (Sulphate of Quinine). Syn. *Pilulæ Quiniæ Sulphatis, P. Q. Disulphatis,*—Lat. *Prep.* 1. *Disulphate of quinine*, 20 gr.; *extract of gentian*, 40 gr. For 20 pills.

2. (Ph. U. S.) *Disulphate of quinine*, 2 dr.; *powdered gum*, ½ dr.; *strained honey*, q. s. For 120 pills. Each pill contains 1 gr. of the sulphate or disulphate of quinine. *Dose.* 1 or 2, twice a day, as a tonic and stomachic; 6 to 12, every two or three hours, during the remissions of agues.

Obs. Various additions are often made to the above formulæ, according to the indications, by which numerous other useful pills are produced. Thus, *potassio-tartrate of antimony* is frequently added in obstinate intermittents; *iodide of potassium*, in scrofulous affections; *foxglove*, in the hectic fever of phthisis; *bitter tonics* and *aromatics*, in dyspepsia, flatulence, &c.; *carbonate of soda* or *magnesia*, in acidity and heartburn; *calomel*, *mercurial pill*, in bilious affections; *rhubarb* and *aloes*, in bowelly affections; *sulphate of iron* and *other chalybeates*, in debility, amenorrhœa, and chlorosis; *calomel*, as an alterative; &c., &c.

PILLS (Sulphate of Zinc). Syn. *Pilulæ Zinci Sulphatis, P. Z. S. Compositæ,*—Lat. *Prep.* 1. *Sulphate of zinc*, 12 gr.; *extract of gentian*, ½ dr.; *liquorice powder*, q. s. For 20 pills. In dyspepsia, epilepsy, and various convulsive diseases.

2. (Dr. Paris.) *Sulphate of zinc*, 10 gr.; *powdered myrrh*, 1½ dr.; *conserve of roses*, q. s. For 30 pills. *Dose.* 1 to 2, twice or thrice daily; in hooping-cough, &c.

PILLS (Syphilis). Syn. *Pilulæ Antisyphiliticæ,*—Lat. See the various pills of *mercury, gold, &c.* The *pills of bichloride of mercury* commonly pass under this name.

PILLS (Tangore). See *Arsenical Pills.*

PILLS (Tannic Acid). Syn. *Pilulæ Tannini, P. Acidi Tannici,*—Lat. *Prep.* From *tannic acid* or *tannin* and *powdered sugar*, of each, ½ dr.; *conserve of roses*, q. s. For 24 pills. *Dose.* 1 or 2 pills, thrice daily, in diarrhœa; or 2, every three hours, in internal hæmorrhages, spitting of blood, &c.

PILLS (Tar). Syn. *Pilulæ Picis Liquidæ,*—Lat. *Prep.* From *tar*, 1 dr.; *powdered gentian*, ½ dr., or q. s. For 24 pills. Stimulant, diuretic, and sudorific. *Dose.* 1 to 4, thrice a day; in dropsies, worms, ichthyosis, and several other skin diseases, &c.

PILLS (Taraxacum). Syn. *Pilulæ Taraxaci,*—Lat. *Prep.* 1. *Extract of dandelion*, 1 dr.; *powdered rhubarb*, q. s.; divide into 3½-gr. pills In dyspepsia, &c., complicated with congestion of the liver.

2. (St. Marie.) *Extract of dandelion* and *Castile soap*, equal parts; *liquid acetate of potassa*, q. s. to mix. For 4-gr. pills. As a diuretic in dropsy.

3. *Extract of dandelion*, 1 dr.; *mercurial pill*, 20 gr.; *powdered digitalis*, 15 gr.; *liquorice powder*, q. s. For 24 pills. *Dose.* 1, afterwards increased to 2 or 3; in dropsy connected with liver disease.

PILLS (Thomson's Stomach and Liver). *Prep.* From *extract of dandelion*, 1 dr.; *scammony and rhubarb*, of each, 15 gr. For 24 pills. *Dose.* 2 pills, night and morning; in hysteria, hypochondriasis, and chronic inflammation of the liver or kidneys.

PILLS (Tonic). Syn. *Pilulæ Tonicæ,*—Lat. *Prep.* 1. *Sulphate of iron*, *ginger*, and *myrrh*, (all in powder,) equal parts; *conserve of roses*, q. s.; mix, and divide into 4-gr. pills. *Dose.* 1, twice a day; in debility, chlorosis, &c.

2. *Powdered myrrh* and *sulphate of iron*, of each, 1 dr.; *disulphate of quinine*, ½ dr.; *powdered capsicum*, 15 gr.; *conserve of roses*, q. s. to mix. For 60 pills. *Dose.* 1 or 2, twice or thrice a day; in debility, dyspepsia, ague, &c.

3. (Dr. Collier.) *Tartrate of iron* and *extract of gentian*, of each, 1 dr.; *oil of cinnamon*, 2 drops. For 30 pills. *Dose.* 3 to 6, three or four times a day. A good stomachic tonic.

4. (Dr. Collier.) *Oxide of zinc*, ½ dr. (or *sulphate of zinc*, 20 gr.); *myrrh*, 2 dr.; *camphor*, 20 gr.; *confection of hips*, to mix. For 40 pills. *Dose.* 1 or 2 pills, three times a day; in epilepsy, chorea, and other nervous disorders, debility, &c.

5. (Dr. A. T. Thomson.) *Rhubarb* and *ginger*, of each, ½ dr.; *extract of chamomile*, 1 dr.; divide into 30 pills. *Dose.* 2 or 3, twice a day; in dyspepsia and chlorosis.

6. (Dr. A. T. Thomson.) *Sesquioxide of iron* and *extract of hemlock*, of each, 1 dr.; mix, and divide into 20 pills. *Dose.* 1 or 2, twice a day; in fluor albus, scrofula, &c. Several other formulæ for tonic pills will be

found under the names of the leading ingredients, &c. (See *above.*)

PILLS (Valerian, — Compound). Syn. *Pilulæ Valerianæ Compositæ,*—Lat. *Prep.* (Dupuytren.) *Powdered valerian,* ½ dr.; *castor* and *white oxide of zinc,* of each, 20 gr.; *syrup,* q. s. to mix. For 18 pills. *Dose.* 2 or 3, thrice daily; in hysteria, hypochondriasis, chlorosis, hemicrania, &c.

PILLS (Valerianate of Zinc). Syn. *Pilulæ Valerianas,*—Lat. *Prep.* From *valerianate of zinc* and *powdered gum,* of each, 15 gr.; *conserve of hips,* q. s. to form a mass. For 18 pills. *Dose.* 1 pill, twice daily; in nervous headache, neuralgia, hysteria, &c.

PILLS (Vallet's). See *page* 987.

PILLS (Vance's). See *Aperient Pills.*

PILLS (Veratrine). Syn. *Pilulæ Veratriæ,*—Lat. *Prep.* 1. (Magendie.) *Veratriæ,* ½ gr.; *powdered gum arabic* and *syrup of gum,* of each, q. s. to form 6 pills. (See *below.*)

2. (Turnbull.) *Veratria,* 1 gr.; *extract of henbane* and *liquorice powder,* of each, 12 gr.; mix, and divide into 12 pills. *Dose.* 1 pill, every 3 hours; in dropsy, epilepsy, hysteria, paralysis, nervous palpitations, &c. This should be prepared and used with great caution.

PILLS (Ward's Red). Syn. *Ward's Antimonial Pills. Prep.* From *glass of antimony* (finely levigated), 4 oz.; *dragon's blood,* 1 oz.; *mountain wine,* q. s. to form a mass. For 1½-gr. pills. Emetic. "They are recommended in obstinate rheumatic affections, in foulness of the stomach and bowels, &c. Their action is often of a very unpleasant character." (*Anat. of Quackery.*)

PILLS (Lady Webster's). See *Dinner Pills.*

PILLS (Whitehead's Essence of Mustard). *Balsam of tolu,* with *resin.* (Dr. Paris.)

PILLS (Whytt's). *Prep.* (Radius.) *Aloes, chloride of iron,* and *extract of horehound,* of each, ½ dr.; *assafœtida,* 1½ dr. For 2-gr. pills. *Dose.* 2 to 5, thrice daily; in leucorrhœa, chlorosis, hysteria, &c., with constipation.

PILLS (Worm). Syn. *Pilulæ Anthelminticæ, P. Vermifugæ,*—Lat. *Prep.* 1. *Calomel,* 1 oz.; *sugar,* 1½ oz.; *mucilage,* q. s.; mix, and divide into 240 pills. *Dose.* 1 to 2, over-night, followed by a strong dose of castor oil early the next morning.

2. *Gamboge,* 6 gr.; *calomel,* 5 gr.; *mucilage,* q. s.; divide into 3 pills. For a morning's dose, fasting.

3. *Extract of wormwood, calomel,* and *powdered scammony,* equal parts. For 4-gr. pills. *Dose.* 2 to 4, as the last. For ascarides, and other small worms.

4. (Bresmer.) *Powdered aloes* and *tansy seed,* of each, ½ dr.; *oil of rue,* 9 or 10 drops. For 12 pills. *Dose.* 3 to 6, in the morning, fasting, and repeated in two or three hours.

5. (Phœbus.) *Iron filings,* ½ dr.; *assafœtida,* 1½ dr.; *essential oil of tansy,* 10 or 12 drops; *extract of wormwood,* q. s.; mix, and divide into 80 pills. *Dose.* 6 pills, thrice daily.

6. (Peschier.) *Ethereal extract of male-fern,* 30 drops; *extract of dandelion,* 1 dr.; *powdered rhizomes of male-fern,* q. s. to mix. For 30 pills. In tape-worm. *Dose.* 6 to 15, at bedtime; the dose being repeated in the morning, and then followed in an hour by a strong dose of castor oil.

PILLS (Worsdell's, — Kaye's). *Prep.* (Anat. of Quackery.) *Powdered aloes, gamboge,* and *ginger,* equal parts; together with a very small quantity of *diaphoretic antimony,* beaten into a mass with either *syrup* or *treacle,* and divided into 2½-gr. pills. "There are about 4½ dozen pills in each 1*s.* 1½*d.* box." "The *dose,* as given in the directions, is from 2 to 8 pills (or even 10 to 12) daily." They frequently operate with great violence.

PILLS (Wyndham's, — Lee's). *Prep.* (Anat. of Quackery.) *Aloes* and *gamboge,* of each (in powder), 3 oz.; *Castile soap* and *extract of cow-parsnip,* of each, 1 oz.; *nitre,* ½ oz. For 5-gr. pills. A powerful drastic cathartic. *Dose.* 1 to 3 pills.

PILLS (Zinc). See *Pills of Oxide, Sulphate,* and *Valerianate of Zinc, &c.*

PIMARIC ACID. First obtained by Laurent from the turpentine of *pinus maritima* (Bordeaux turpentine), by the action of *hot alcohol.* By dry distillation, in vacuo, it yields *pyropimaric acid;* and by a like distillation, under ordinary pressure, an oily fluid called *pimarone.* By the action of nitric acid it yields *azomaric acid.*

PIMELIC ACID. One of the products of the action of *nitric acid* on *fatty bodies.*

PIMENTIC ACID. The heavier and least volatile portion of *oil of pimento.*

PIMENTO. Syn. *Allspice, Clove Pepper, Jamaica do., Pimenta Berries; Pimenta,*—Ph. L. E. & D. *Piper Caryophyllatum, P. Jamaicense, P. Odoratum, Pimentæ Baccæ,*—Lat. var. "The immature fruit" of "*Eugenia pimenta* (myrtus pimenta, *Linn.*),"— Ph. L. It possesses a mixed odour of cinnamon, cloves, and nutmegs, which, with its other properties, it for the most part yields to alcohol, ether, and water. It is stimulant and tonic, and is much esteemed as an adjuvant in medicines prescribed in dyspepsia, flatulence, gout, hysteria, &c.; and also to cover the taste of disagreeable medicines. *Dose.* 5 to 30 gr., bruised or in powder. See *Essences, Oils* (Volatile), *Spirits*, and *Waters.*

PIMPLES. See *Eruptions* (Papular).

PINCHBECK. A gold-like alloy of copper and zinc. See *Brass* and *Mosaic Gold.*

PINE APPLE. Syn. *Ananas.* The fruit of *bromelia ananas.* It is astringent, esculent, and possesses a rich flavour and odour. In Europe it is chiefly used as a delicacy for the table; but in tropical climates it is said to be valuable in renal diseases. See *Essences, &c.*

PINEY TALLOW. From the *fruit* of *valeria indica,* a tree common in Malabar, by boiling it with water. It is intermediate between fat and wax, makes good soap, and excellent candles. It melts at 98° Fahr. Sp. gr. 0·9250 to 0·9265.

PINIC ACID. The portion of *common resin* or *colophony* which is soluble in *cold alcohol* of sp. gr. 0·833.

PINK. A well-known shade of light-red. The name is also applied to several pigments, consisting of *whiting* stained with *liquid dyes.* See *Rose Pink, Yellow Pigments, &c.*

PINK DYE. *Prep.* From *washed safflowers,* 2 *oz.; salt of tartar,* ½ *oz.; cold water,* 1 quart; digest for 3 hours, express the liquor, and strain it. *Used* as a cosmetic, and to dye silk stockings, &c., of a rose-colour. The colour is brought out by afterwards applying to, or passing the articles through, *water* soured with *lemon juice.* See *Pink Saucers.*

PIPERINE. Syn. *Piperina, Piperinum,*—Lat. (P. Cod.) *Alcoholic extract of black pepper* is treated with a weak *solution of caustic potassa* (1 to 100), and the residuum, after being washed with *cold water* is dissolved in *alcohol;* the solution is next agitated with a little *animal charcoal,* and the filtrate is allowed to evaporate spontaneously; the product may be purified by re-solution in alcohol, and re-crystallization.

Prop., &c. Colourless, or only slightly yellow; tasteless; inodorous; fusible; and crystallizable; insoluble in water; freely soluble in strong spirit, and in the acids; very feebly basic; (a few definite compounds have, however, been obtained with difficulty;) reddened by oil of vitriol. It has been much employed in Italy and on the Continent as a febrifuge. *Dose.* 2 to 10 gr., frequently repeated, during the apyrexia of intermittents.

Obs. An assay for its piperine is the only certain method of testing the quality of either *black* or *white pepper.* For this purpose a *weighed quantity* of the *sample* is reduced to powder, and is exhausted with *alcohol* of the sp. gr. 0·833; the mixed tinctures are then evaporated to an extract, which is treated as above. (See *p.* 954.)

PIPES. (In Confectionery.) These are formed from any of the common *lozenge-masses,* by rolling them into cylinders of about the thickness of a goose quill. They are frequently medicated.

PISASPHALTUM. Mineral pitch.

PISTACHIA NUTS. Syn. *Pistachio Nuts; Nuces Pistachiæ,*—Lat. The *kernels* of the fruit of *pistachia vera* (Linn.); a species of turpentine tree, common to some parts of Europe and the East. They closely resemble almonds, but are sweeter, and form a green emulsion with water. *Used* in confectionery and perfumery, and also as a dessert fruit.

PITCH. Syn. *Black Pitch, Boiled do., Stone do., Wood do.; Pix,*—Ph. L. *Pix Nigra,*—Ph. L. 1836. *Pix Arida,*—Ph. L. 1788. *P. Atra, P. Navalis, P. Sicca,*—Obs. var. "A dry bitumen prepared from liquid pitch." (Ph. L.) The residuum from boiling tar in an open iron pot, or in a still, until the volatile and liquid portion is driven off. The volatile products principally consist of *crude pyroligneous acid* and *oil of tar.* Pitch is chiefly employed in ship-building. As a *medicine,* it is stimulant and tonic, and has been used internally in some skin diseases, and in piles. An *ointment* made of it is also extensively used in cutaneous affections of the scalp. *Dose.* 10 gr. to ½ dr.

PITCH (Burgundy). Syn. *White Pitch; Burgundy Pine Resin; Pix Burgundica,*—Ph. L. E. & D. *Pix Abietina,*—Ph. L. 1836. *Pix Arida,*—Ph. L. 1809. *P. Alba, P. Humida,*—Obs. var. "Impure resin prepared from the turpentine of *abies excelsa*" or Norway spruce fir. (Ph. L.) "A concrete resinous exudation, probably, in a great measure, from *abies excelsa.*" (Ph. E.) It is chiefly used in plasters.

Obs. The importation of this substance has for some years past been gradually lessening in amount, in consequence of the substitution for it of a factitious pitch, made by melting *common resin* with *linseed oil,* and colouring the mass with *annotta* or *palm oil.* The physiological action of the two articles is, however, considerably different, since Burgundy pitch acts upon the skin as a powerful local irritant, exciting a slight degree of inflammation, and not unfrequently producing a pimply eruption, and an exudation of purulent matter. It is celebrated for its effects when employed as a plaster in all cases where warmth, support, and long adhesion to the skin are desirable; and in the latter quality no substance equals it. The factitious Burgundy pitch has similar properties, but in an *immensely* less degree.

Prepared Burgundy Pitch ("Pix Burgundica Præparata,"—*Ph. L.*) is ordered to be obtained in the same way as that adopted for *strained ammoniacum.* (See *p.* 174.) This plan is, however, seldom, if ever, adopted in trade.

PITCH (Burgundy,—Factitious). Syn. *Pix Burgundica Factitia*,—Lat. *Prep.* By melting good *yellow resin*, 1 cwt., with *linseed oil*, 1 gall., and *palm oil* (bright), q. s., to colour. The mixture is allowed to cool considerably, and is then pulled with the hands in the same way as lead plaster is treated; after which it is placed in "*bladders*" or "*stands*" for sale.

Obs. The product of the above formula is the *Burgundy pitch* of the shops. The "pulling" or "working" destroys the translucency of the resin, and imparts to it the peculiar semi-opacity of foreign Burgundy pitch. Cold water is commonly employed to cool it down. *Annotta* is often substituted for palm oil as a colouring substance. The addition of some of the "droppings" or "bottoms" of *Canada balsam*, *Chio turpentine*, *oil of juniper*, *&c.*, renders this article nearly equal to foreign pitch; but in commerce this is never attempted, the aim being only the production of a *lively colour* with *moderate toughness.* A common melting-pan and fire (if clean and carefully managed) will succeed sufficiently; but, both for safety and convenience, steam is preferable, and, on the *large scale*, almost indispensable. A good workman can pull and put into stands or casks about 5 cwt. daily; or from 1½ cwt. to 3 cwt. in bladders, the latter quantity depending on the size of the bladders. (See *above.*)

PITCH (Canada). Similar to Burgundy pitch; but from the *pinus Canadensis*, or *hemlock spruce fir.* It is also called *hemlock gum* and *hemlock pitch.*

PITCH (Jews'). See *Asphaltum.*

PITCH (Mineral). Indurated mineral bitumen. See *Asphaltum*, *Bitumen*, *&c.*

PITCOAL. This article has been truly described as the most valuable of all those mineral substances from which Great Britain derives its prosperity, and the one which may be regarded as the main support of the whole system of British production. "It fuses the metals, it produces the steam which sets our machinery in motion, and, in short, it may be said to render all the resources of this country available for use."

The two *principal varieties* of coal are "*hard coal*" or "*anthracite*," and "*soft*" or "*bituminous coal.*" The first has been already noticed. (See *p.* 69.) The second is the well-known fuel of our domestic fires. The finer *qualities* of this variety are furnished by the coal fields of Northumberland, Durham, and Yorkshire; but, more especially, by the first of these. This coal is rich in bitumen, kindles easily, softens, swells, and cakes together as it becomes heated, and throws out streams of gas which burst into jets of vivid flames. It furnishes light, porous, deep-coloured cinders, and very little ash.

The *quality of coal* may be ascertained by either directly testing its heating power, or by chemical analysis. In the investigations undertaken at the Museum of Economic Geology, under the directions of Sir H. De la Beche, and which furnished the materials for the celebrated "*Admiralty reports*," three different methods were adopted for this purpose. These consisted in—the *determination* of the *quantity of water* which a *given weight of the coal* was capable of *converting into steam*, — the *quantity of litharge* which it was capable of *reducing* to the *metallic state*, and, lastly,—its *ultimate analysis* by *peroxide of copper.* (See *p.* 915.) "The evaporative (heating) value of a bituminous coal," says the report just referred to, "is expressed by the *evaporative value of its coke*, the heat of combustion of its volatile products proving, in practice, little more than that necessary to volatilize them." "It is easy from analysis to determine whether the duty performed by the coal is to be attributed to its fixed ingredients or coke, by estimating the work which the latter is capable of performing. This may be done by *subtracting the ashes in the coal* from its *amount of coke*, and *estimating the remainder* as *carbon;* this carbon, *multiplied* by its *heating power*, 13268, and *divided* by 965·7, or the latent heat of steam, *indicates* the *number of pounds of water* which the coke by itself would evaporate, without the aid of the volatile combustible ingredients of the coal." The results thus obtained, "placed in juxtaposition with the *actual work* done by the coal, show, on the whole, that the work capable of being performed by the coke alone, is actually greater than that obtained by experiments with the original coal." This statement is, however, questioned by Dr. Ure, who asserts, that "so far from finding that the 'evaporative value of a coal is expressed by the evaporative value of its coke,'" his own experiments "clearly prove that the evaporative power of a bituminous coal is an immense deal *greater* than its coke; indeed, almost double; and that the volatile ingredients of coal evolve in burning relatively a much greater proportion of heat than the fixed constituents. This is precisely what might have been expected from the well-known calorific power of hydrogen, which is three times greater than that of carbon." On this it must be remarked, that the words of the report had especial reference to the principal Welsh coals, commonly known as "*steam coal;*" whilst Dr. Ure's assertion was probably based on experiments performed with some other varieties of bituminous coal. The Admiralty report is undoubtedly very near the truth with reference to furnaces that do not burn their own smoke.

It is found that "a relative *excess of carbon* constitutes a coal best adapted for *furnaces* of various kinds; while a relative *excess of hydrogen* forms the best coal for *common grates* and *gas-works*."

The *quantity* of *sulphur* in *coal* is another matter of importance that may be determined by chemical analysis. (See *Sulphur*.) The presence of more than 1% of sulphur renders coal unfit for the economical production of good light-gas, and more than 2% of sulphur renders it objectionable for use as domestic fuel. In like manner, coal containing *mineral ingredients* in excess, are to be avoided, not merely on account of the quantity of ashes left by them, but for their tendency to vitrify upon the bars of the furnace, and to produce what is technically called "clinkers." The presence of much *silica* or *alumina*, and more particularly of any of the *salts of lime* in "steam coal," is, on this account, highly objectionable.

The following particulars are given as examples:—

Blackley Hurst Coal of Lancashire, an excellent coal for the production of gas and for domestic use;—*Gaseous products* (combustible gases) from a luted crucible, 41·5%; *coke*, 58·5%; *sulphur*, 1%; *ashes*, 1·2 to 2%. Sp. gr. 1·26. (Dict. Arts, Manuf., and Mines, ii, 426.)

Llangennech Coal, an excellent, powerful, and well-known "steam coal," yielding a very intense heat, with little smoke;—*Combustible gases*, 17%; *coke*, 83%; *sulphur*, ½%; *ashes*, 3 to 3·5%. Sp. gr. 1·337. (Dict. A. M. & M., ii, 427.)

(For some further information connected with this subject, see *Anthracite*, *Chimneys*, *Coke*, *Ebullition*, *Evaporation*, *Fuel*, *Furnace*, *Gas*, *Heat*, *Organic Substances*, *Smoke*, *Steam*, *Stoking*, *Sulphur*, *&c.*)

PITTACAL. A peculiar substance, obtained by Reichenbach from a certain portion of the *oil of tar*, by the action of *baryta*. In appearance, it closely resembles indigo, and might easily be mistaken for it, were it not that on the slightest friction it assumes a resplendent metallic lustre. It is insoluble in water, although very diffusible in it; insoluble in alkaline lyes; soluble in sulphuric acid to a green solution, turning on the crimson; and in hydrochloric acid and acetic acid, forming a reddish blue solution. It gives a *fast blue dye* to cotton cloth previously mordanted with *solution of tin* or *alum*.

PITYRIASIS. See *Tetters*.

PLAGUE. Syn. *Pestis*,—Lat. "A typhus fever, eminently contagious, and attended by excessive debility; at an uncertain period of the disease carbuncles or buboes ensue." (Cullen.) The *premonitory symptoms* are those common to fevers; followed by nausea, the vomiting of dark bilious matter, violent headache, delirium, and the other symptoms just referred to. The medical art has hitherto been unable to arrest or control the progress of this disease. It is said that when it is unattended by buboes its runs its course more rapidly, and is more generally fatal, than when early accompanied by such inflammations. "When they proceed kindly to suppuration, they always prove critical, and ensure the patient's recovery." See *Fevers*, *Pestilential Diseases*, *&c.*

PLAICE. The *pleuronectes platessa*, a well-known flat fish, common to both the English and Dutch coasts. Its flesh is good, and easy of digestion, but more watery than that of the flounder.

PLASMA. Syn. *Liquor Sanguinis*,—Lat. The fluid of the blood in which the red globules are suspended. It consists of serum holding some fibrine in solution.

PLASTER. See *Mortar*.

PLASTER. Syn. *Emplastrum*,—Lat. Plasters (*emplastra*) are external applications that possess sufficient consistence not to adhere to the fingers when cold, but which become soft and adhesive at the temperature of the human body.

Plasters are chiefly *composed* of *unctuous substances* united to *metallic oxides*, or to *powders, wax,* or *resin.* They are usually formed, whilst warm, into ½-*lb.* rolls, about 8 or 9 inches long, and wrapped in paper. When required for *use,* a little is melted off the roll by means of a heated iron spatula, and spread upon leather, linen, or silk. The *less adhesive plasters,* when spread, are usually surrounded with a margin of resin plaster, to cause them to adhere.

In the *preparation* of *plasters,* the heat of a water-bath, or of steam, should *alone* be employed. On the *large scale,* well-cleaned and polished copper, or tinned copper pans, surrounded with iron jackets, supplied with high-pressure steam, are used for this purpose. The *resins* and *gum resins* that enter into their composition, are previously purified by straining. After the ingredients are mixed, and the mass has acquired sufficient consistence by cooling, portions of it are taken in the hands anointed with a little olive oil, and well pulled or worked until it becomes solid enough to admit of being formed into rolls. To promote the cooling of the plaster it is usual to plunge it into cold water, and to expose it to the action of the fluid by working it about under the surface, after which it is well pulled in the hands to remove the superfluous water; but this process must not on any account be practised on *compound plasters,* containing *odorous substances,* or substances *soluble in water.* These should be suffered to cool on an oiled marble slab, until sufficiently "stiff" to be formed into rolls. Many plasters, as those of *lead* and *resin,* derive much of their whiteness and beauty from the treatment just referred to. *White plasters* are not, however, always the best; but they are those which are most admired, and the most sought after in trade.

Plasters are *preserved* by enveloping the rolls with paper, to exclude the air as much as possible, and by keeping them in a cool situation. A few, as those of *belladonna* and *ammoniacum with mercury,* are commonly placed in pots. When kept for any length of time, they are all more or less apt to become hard and brittle, and to lose their colour. When this is the case, they should be re-melted by a gentle heat, and sufficient oil added to the mass to restore it to a proper consistence.

The operation of *spreading plasters* for use, requires skill and experience on the part of the operator. Various textures are employed for the purpose, of which *linen* or *cotton cloth,* or *leather,* are those most generally employed. *Silk* and *satin* are used for "*court plaster.*" The *shape* and *size* must be regulated by the part to which they are to be applied.

On the *large scale,* plasters are spread by means of a "spreading machine."

Compound plasters are now much less frequently employed in medicine than formerly. Those principally in use are such as afford protection to sores and abraded surfaces, and give support to the parts. A few, however, which contain acrid, stimulating, and narcotic substances, and operate as rubefacients, blisters, or anodynes, are still retained in the pharmacopœias.

PLASTER (Aconite). Syn. *Emplastrum Aconiti,*—Lat. *Prep.* (Curtis.) Gently evaporate *tincture of aconite* to the consistence of a soft extract, then spread a very small portion over the surface of a common adhesive plaster, on either calico or leather. Mr. Curtis, of Camden Town, has strongly recommended this plaster in neuralgia. A little of the alcoholic extract may be employed instead of that obtained fresh from the tincture.

PLASTER (Adherent). See *Compound Soap Plaster.*

PLASTER (Adhesive). See *Resin Plaster, Court do., &c.*

PLASTER (Ali Ahmed's). See *Patent Medicines* (*p.* 946).

PLASTER (Ammoniacal). Syn. *Dr. Kirkland's Volatile Plaster; Emplastrum Ammoniæ, E. A. Hydrochloratis,* — Lat. *Prep.* Take of *lead plaster,* 1 oz.; *white soap* (shaved fine), ½ oz.; melt them together, and when nearly cold, add of *sal ammoniac* (in fine powder), 1 dr. Stimulant and rubefacient. Dr. Paris, who highly recommends it in pulmonary affections, employs double the above proportion of sal ammoniac. Its efficacy depends on the gradual extrication of free ammonia by the decomposition of the hydrochlorate, on which account it is proper to renew the application of it every 24 hours.

PLASTER (Ammoniacum). Syn. *Emplastrum Ammoniaci,*—Ph. L. E. & D. *Prep.* 1. (Ph. L. & E.) *Ammoniacum* (strained), 5 oz.; *dilute acetic acid* (distilled vinegar), 8 fl. oz. (9 fl. oz.,—Ph. E.); dissolve, and, frequently stirring, evaporate by a gentle heat, to a proper consistence.

2. (Ph. D.) *Gum ammoniacum* (in coarse powder), 4 *oz.; proof spirit,* 4 *fl. oz.;* dissolve by the aid of a gentle heat, and evaporate, as before.

Obs. This plaster is adhesive, stimulant, and resolvent, and is employed in scrofulous and indolent tumours, white swellings, &c. In the Ph. D. 1826, *vinegar of squills* was ordered instead of distilled vinegar.

PLASTER (Ammoniacum with Hemlock). Syn. *Emplastrum Ammoniaci cum Cicutâ,*—Lat. *Prep.* (Ph. E. 1744.) *Gum ammoniacum,* 8 oz.; *vinegar of squills,* q. s. to dissolve; *hemlock juice,* 4 oz.; gently evaporate, as before. In cancerous and other painful tumours. A better plan is to add 1 dr. of *extract of hemlock* to 1¼ oz. of *strained ammoniacum* (previously reduced to a proper consistence with a little *distilled vinegar*), melted by a very gentle heat.

PLASTER (Ammoniacum with Mercury). Syn. *Emplastrum Ammoniaci cum Hydrargyro,*—Ph. L. E. & D. *Prep.* 1. (Ph. L. & E.) *Olive oil,* 1 dr.; heat it in a mortar, add of *sulphur,* 8 gr.; triturate, further add of *mercury,* 3 oz.; again triturate, and when the globules are extinguished, add it to *ammoniacum* (strained), 1 ℔, previously melted by a gentle heat, and mix them well together.

2. (Ph. D.) From *ammoniacum plaster,* 4 *oz.; mercurial plaster,* 8 *oz.;* melted together by a gentle heat, and then stirred constantly until nearly cold.

3. (*Wholesale.*) Take of *mercury,* 38 *oz.; prepared sevum,* 5 *oz.;* triturate, as last, and add the mixture to *strained ammoniacum,* 10 *lb.,* previously sufficiently softened by a gentle heat. Possesses a fine blue colour, and is quickly made.

Obs. This plaster cannot be rolled till considerably cooled; and, neither this nor the simple plaster, must be put into water. It is powerfully discutient, and is applied to indurated glands, indolent tumours, &c.

PLASTER (Anodyne). See *Opium Plaster, Belladonna do., &c.*

PLASTER (Antimonial). Syn. *Emplastrum Antimoniale, E. Antimonii Potassio-tartratis,*—Lat. *Prep.* (U. C. Hosp.) By sprinkling *tartar emetic,* in very fine powder, on the surface of a *spread Burgundy pitch* (or common adhesive) *plaster.* It has been successfully applied to the nape of the neck, in the scarlatina of children; also to the chest, in phthisis; and, with the addition of a little *opium,* in rheumatic affections of the joints.

PLASTER (Aromatic). Syn. *Stomach Plaster; Emplastrum Aromaticum,*—Lat. *Prep.* (Ph. D. 1826.) *Strained frankincense* (thus), 3 oz.; *bees' wax,* ½ oz.; melt them together, and when the mass has considerably cooled, add of *powdered cinnamon,* 6 dr.; *oils of allspice* and *lemons,* of each, 2 dr. Stimulant; applied over the stomach in dyspepsia, spasms, nausea, flatulence, &c. *Camphor,* 1 dr., is commonly added.

PLASTER (Assafœtida). Syn. *Antihysteric Plaster, Antispasmodic do.; Emplastrum Assafœtidæ,*—Ph. E. *E. Antihystericum, &c.* *Prep.* (Ph. E.) From *lead plaster* and *strained assafœtida,* of each, 2 oz.; *strained galbanum* and *bees'-wax,* of each, 1 oz.; melted together. Antispasmodic; applied to the stomach or abdomen in spasms, hysteria, &c.; and to the chest in hooping-cough.

PLASTER (Baynton's Adhesive). *Prep.* From *yellow resin,* 1 *oz.; lead plaster,* 1 *lb.;* melted together. Recommended for bad legs, and other like sores.

PLASTER (Belladonna). Syn. *Emplastrum Belladonnæ,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Soap plaster,* 3 oz.; melt it by the heat of a water-bath, add of *extract of belladonna* (deadly nightshade), 3 oz.; and keep constantly stirring the mixture until it acquires a proper consistence.

2. (Ph. E.) *Resin plaster,* 3 oz.; *extract of belladonna,* 1½ oz.; as the last.

3. (Ph. D.) *Resin plaster,* 2 *oz.; extract of belladonna,* 1 *oz.*

Uses, &c. As a powerful anodyne and antispasmodic; in neuralgia and rheumatic pains, and as an application to painful tumours. The plaster of the shops is usually deficient in extract. The following formula is in common use in the wholesale trade:—*Lead plaster* and *resin plaster,* of each, 2½ *lb.; extract of belladonna,* 1¾ *lb.* This plaster must not be "pulled" in water.

PLASTER (M. Berg's Antirheumatic). Syn. *Gout Paper; Emplastum Antirheumaticum, Charta Antirheumatica,*— Lat. *Prep.* By digesting *euphorbium,* 2 parts; and *cantharides,* 1 part; (both in powder;) in *rectified spirit,* 10 parts, for eight days; adding to the strained liquid, *black resin* and *Venetian turpentine,* of each, 4 parts; assisting the mixture by a gentle heat. Two or three coats of the product are successively spread over the surface of thin paper. *Used* in gout and rheumatism. (*Anat. of Quackery.*)

PLASTER (Black Diachylon). See *Court Plaster.*

PLASTER (Black Pitch). Syn. *Emplastrum Picis Nigræ,* — Lat. *Prep.* (Ph. Wirtem.) *Black pitch, black resin,* and *bees' wax,* of each, 8 parts; *suet,* 1 part; melted together. Rubefacient and stimulant.

PLASTER (Blistering). See *Cantharides Plaster.*

PLASTER (Bree's Antiasthmatic). *Prep.* From *lead plaster,* 1 oz.; *olive oil,* 1 dr.; melted together, and, when somewhat cooled, mixed with *powdered camphor,* 2 dr.; *powdered opium*, 1 dr.; and at once spread on leather.

PLASTER (Brown). Syn. *Brown Cerate; Emplastrum Fuscum, Ceratum F.; Onguent de la Mère.* This is noticed at *page* 908. The *butter, lard, oil, suet*, and *wax*, should be first melted together, and the heat gradually increased until they begin to smoke; the *litharge* is then to be sifted in, and the stirring and heat continued until the mixture assumes a brown colour; the *pitch* is next added, and the whole stirred for some time longer.

PLASTER (Brown Diachylon). See *Galbanum Plaster.*

PLASTER (Burgundy Pitch). Syn. *Cephalic Plaster, Breath do.; Emplastrum Picis*,—Ph. L. & E. *E. P. Compositum*,—Ph. L. 1824. *E. P. Burgundicæ*, —Ph. L. 1788. *E. Cephalicum*,—Ph, L. 1745. *Prep.* 1. (Ph. L.) *Prepared* (strained) *Burgundy pitch*, 2 ℔; *prepared frankincense* (thus), 1 ℔; *yellow resin* and *bees' wax*, of each, 4 oz.; melt them together, then add, *olive oil* and *water*, of each, 2 fl. oz.; *expressed oil of nutmeg* (mace), 1 oz.; and, constantly stirring, evaporate to a proper consistence.

2. (Ph. E.) *Burgundy pitch*, 1 ℔; *resin* and *bees' wax*, of each, 2 oz.; *olive oil* and *water*, of each, 1 fl. oz.; *oil of mace*, ½ oz.; as the last.

Uses, &c. Burgundy-pitch plaster is stimulant, rubefacient, and counter-irritant. It is a common application to the chest in pulmonary affections, to the joints in rheumatism, and to the loins in lumbago. Spread on leather, it forms a good *warm plaster* to wear on the chest during the winter. "When it produces a serous exudation, it should be frequently renewed."

The *Burgundy-pitch plaster* of *the shops* is commonly made as follows:—*Factitious Burgundy pitch* (bright coloured), 42 *lb.; palm oil* (bright), ¾ *lb.; bees' wax* (bright), 5 *lb.;* melt, and when nearly cold, add of *oil of mace*, 6 *oz.; oil of nutmeg*, 1 *oz.*

PLASTER (Calefacient). Syn. *Warm Plaster; Emplastrum Calefaciens*,—Ph. D. *Prep.* (Ph. D.) *Plaster of cantharides*, ½ *lb.* (1 part); *Burgundy pitch*, 5½ *lb.* (11 parts); melt them together by a gentle heat, and stir the mixture as it cools until it stiffens. Stimulant, rubefacient, and counter-irritant; in a variety of affections. In some persons, when long applied, it blisters or produces a running sore.

PLASTER (Cancer). Syn. *Emplastrum Anticancrosum*,—Lat. *Prep.* 1. *Wax plaster*, 1 oz.; *extract of hemlock*, 1 dr.; *levigated arsenious acid*, ½ dr.

2. (Richter.) *Extract of hemlock*, 1 oz.; *extract of henbane*, ½ oz.; *powdered belladonna*, 1 dr.; *acetate of ammonia*, q. s. to form a plaster. Both the above must be used with great caution. See *Cancer, &c.*

PLASTER (Cantharides). Syn. *Blistering Plaster, Vesicant do.; Plaster of Spanish Flies; Emplastrum Cantharidis*,—Ph. L. E. & D. *E. C. Vesicatoriæ*,—Ph. E. 1817. *E. Lyttæ*,—Ph. L. 1809. *E. Vesicatorium, E. Meloës Vesicatoriæ*,—Obs. var. *Prep.* 1. (Ph. L.) *Yellow wax* and *suet*, of each, 7½ oz.; *lard*, 6 oz.; *resin*, 3 oz.; melt them together, remove the vessel from the fire, and a little before they concrete, sprinkle in of *cantharides* (in very fine powder), 1 ℔; and mix.

2. (Ph. E.) *Cantharides, bees' wax, resin*, and *suet*, equal parts; as the last.

3. (Ph. D.) *Spanish flies*, 6 *oz.; prepared lard, resin*, and *yellow wax*, of each, 4 *oz.;* proceed as before, and "stir the mixture constantly until the plaster is cool."

4. (*Wholesale.*) From *bees' wax* and *good lard*, of each, 4 *lb.; flies* and *yellow resin*, of each, 6 *lb.; suet*, 10 *lb.* A commonly used formula, the product of which is, however, greatly inferior to that of the Pharmacopœia.

Obs. All the above are used to raise blisters. The plaster is spread on *white leather* with a cold knife, and is surrounded with a margin of *resin plaster* to make it adhere. A piece of *thin muslin* or *tissue paper* is usually placed between the plaster and the skin to prevent *absorption.* A little *powdered camphor* is sometimes sprinkled on the surface of the spread plaster, to prevent strangury. A better mode of obviating the action on the urinary organs is by the copious use of diluents. This plaster should be rolled in *starch powder*, and not with oil.

PLASTER (Cantharides,—Compound). Syn. *Emplastrum Cantharidis Compositum*, —Lat. *Prep.* (Ph. E.) *Venice turpentine*, 4½ oz.; *cantharides* and *Burgundy pitch*, of each, 3 oz.; *bees' wax*, 1 oz.; *verdigris* (in fine powder), ½ oz.; *powdered mustard* and *black pepper*, of each, 2 dr.; mix at a heat under 212° Fahr. Stronger than the last, and quicker in its action; but it causes more pain, and is much more apt to occasion troublesome ulcerations. *Used* in gout, spasms of the stomach, &c.

PLASTER (Capuchin). See *Euphorbium Plaster.*

PLASTER (Carbonate of Lead). Syn. *Emplastrum Plumbi Carbonatis, E. Cerussæ*,—Lat. *Prep.* (P. Cod.) *Carbonate of lead*, 1 *lb.; olive oil* and *water*, of each, 2 *lb.;* boil them together until they combine and form a plaster; lastly, remelt this with *white wax*, 3½ *oz.* Its properties resemble those of ordinary lead plaster. An excellent emollient and defensive plaster. See *Mahy's Plaster.*

PLASTER (Cephalic). Syn. *Ladanum Plaster: Emplastrum Cephalicum, E. Ladani,*—Ph. L. 1788. *Prep.* (Ph. L. 1788.) *Ladanum*, 3 oz.; *frankincense* (thus), 1 oz.; melt, and add to the mixture when nearly cold, *powdered cinnamon* and *expressed oil of mace*, of each, ½ oz.; *oil of mint*, 1 dr. Applied to the forehead or temples, in headache; to the stomach, in colds, &c. See *Burgundy Pitch Plaster, &c.*

PLASTER (Cheselden's Sticking). Syn. *Emplastrum Plumbi cum Pice,* — Lat. *Prep.* From *lead plaster*, 2 ℔; *Burgundy pitch* (genuine), 1 oz.; melted together.

PLASTER (Corn). Syn. *Emplastrum ad Clavos,*—Lat. *Prep.* 1. *Resin plaster*, 5 parts; melt, stir in of *sal ammoniac* (in fine powder), 1 part; and at once spread it on linen or soft leather.

2. (*Kennedy's.*) From *bees' wax*, 1 *lb.; Venice turpentine*, 5 *oz.; verdigris* (in fine powder), 1½ *oz.;* mixed by a gentle heat, and spread on cloth. It is cut into pieces, and polished, and of these 1 dozen are put into each box.

3. (Le Foret.) *Galbanum plaster*, 2 oz.; melt by a very gentle heat, add *sal ammoniac* and *saffron*, of each, ½ oz.; *powdered camphor*, 2 oz.; and when nearly cold, stir in of *liquor of ammonia*, 2 oz. Applied, spread on leather, to the corn only, as it will blister the thinner skin surrounding its base.

4. (Ph. Sax.) *Galbanum plaster*, 1 oz.; *pitch*, ½ oz.; *lead plaster*, 2 dr.; melt them together, and add *verdigris* and *sal ammoniac* (in fine powder), of each, 1 dr. For other formulæ see *Verdigris Plaster* and *Corns.*

PLASTER (Court). Syn. *Sticking Plaster, Isinglass do.; Emplastrum Ichthyocollæ, E. Adhesivum Anglicum,* — Lat. *Prep.* 1. *Isinglass*, 1 part; *water*, 10 parts; dissolve, strain the solution, and gradually add to it of *tincture of benzoin*, 2 parts; apply this mixture, gently warmed, by means of a camel-hair brush, to the surface of silk or sarcenet, stretched on a frame, and allow each coating to dry before applying the next one, the application being repeated as often as necessary; lastly, give the *prepared* surface a coating of *tincture of benzoin* or *tincture of balsam of Peru.* Some parties apply this to the *unprepared* side of the plaster, and others add to the tincture a few drops of *essence of ambergris* or *essence of musk.*

2. (*Deschamps'.*) A piece of *fine muslin, linen*, or *silk*, is fastened to a flat board, and a thin coating of smooth, strained *flour paste* is given to it; over this, when dry, two coats of colourless gelatine, made into *size* with *water*, q.s., are applied warm. Said to be superior to the ordinary court plaster.

3. (*Liston's.*) Soak *isinglass*, 1 *oz.*, in *water*, 2½ fl. oz., until it becomes swollen and quite soft, then add of *proof spirit*, 3½ fl. oz., and expose the mixture to the heat of hot water, frequently stirring, until the union is complete; lastly, apply four coats of the solution to the surface of *oiled silk* nailed to a board, by means of a soft brush.

4. (Dr. Paris.) *Black silk* or *sarcenet* is strained and brushed over 10 or 12 times with the following composition:—*Gum benzoin*, ½ oz.; *rectified spirit*, 6 oz.; dissolve. In a separate vessel dissolve of *isinglass*, 1 oz., in as little water as possible; strain each solution, mix them, decant the clear portion, and apply it *warm.* When the last coating is *quite dry*, a finishing coat is given with a solution of *Chio turpentine*, 4 oz., in *tincture of benzoin*, 6 oz.

Obs. The common "*Court plaster*" of the shops, is generally prepared without using spirit, and with merely sufficient tincture of benzoin, or other aromatic, to give it an agreeable odour. Formerly, *black silk* or *sarcenet* was exclusively employed as the basis of the plaster, but at the present time *checkered silk* is also in much favour. "*Flesh-coloured Court plaster*" is likewise fashionable. "*Transparent Court plaster*" is prepared on *oiled silk.* "*Waterproof Court plaster*" is simply the common plaster which has received a thin coating of *pale drying oil* on its exposed surface. The *finest Court plaster* of the West-end houses, is now prepared on *gold-beaters' skin* (or the prepared membrane of the cæcum of the ox), one side of which is coated with the *isinglass solution*, as above, and the other with *pale drying oil* or a *solution* of either *gutta percha* or *caoutchouc* in *chloroform*, or in *bisulphuret of carbon.*

PLASTER (Croton Oil). Syn. *Emplastrum Crotonis, E. Olei Tiglii,*—Lat. *Prep.* (Bouchardat).) To *lead plaster*, 4 parts, melted by a very gentle heat, add of *croton oil*, 1 part. A powerful counter-irritant; it also generally acts powerfully on the bowels.

PLASTER (Cumin). Syn. *Emplastrum Cumini,*—Ph. L. *E. Cymini, E. è Cymino,*—Obs. var. *Prep.* 1. (Ph. L.) *Burgundy pitch*, 3 ℔; *bees' wax*, 3 oz.; melt, add of *cumin* *seed, caraways*, and *bay-berries*, of each (in powder), 3 oz.; next add of *olive oil* and *water*, of each, 1½ fl. oz., and evaporate to a proper consistence.

2. (*Wholesale.*) From *yellow resin, 7 lb.; bees' wax* and *linseed oil*, of each, ½ *lb.; powdered cumin* and *caraway seeds*, of each, *7 oz.;* mix.

Obs. This is a mere revival of the formula of the Ph. L. 1724. In that of the Ph. L. 1788 no water was ordered, and the powders simply stirred into the melted mass shortly before it cools; the common practice in all laboratories.

Cumin plaster is carminative, stimulant, and discutient. It is applied over the regions of the stomach and bowels in colic, dyspepsia, and flatulence, and is also applied to indolent tumours. It has long been a favorite remedy with the lower classes.

PLASTER (Delacroix's Agglutinative). Syn. *Emplâtre d'André de la Croix*,—Fr. *Emplastrum Glutinans Santi Andreæ à Cruce, E. Picis cum Elemi*,— Lat. *Prep.* (P. Cod.) From *Burgundy pitch*, 25 parts; *gum elemi*, 6 parts; *Venice turpentine* and *oil of bays*, of each, 3 parts; melted together, and strained.

PLASTER (Diachylon). See *Lead Plaster.*

PLASTER (Diapalma). See *Palm Plaster.*

PLASTER (Elemi). Syn. *Emplastrum Elemi*,— Lat. *Prep.* From *wax plaster*, 3 parts; *gum elemi*, 1 part; melted together by a gentle heat. Stimulant and discutient. *Used* for issues, &c.

PLASTER (Euphorbium) Syn. *Emplastrum Euphorbii*,—Lat. *Prep.* 1. (Guy's Hosp.) *Burgundy pitch plaster*, 8 oz.; melt, and add of *euphorbium* (in powder), 1 dr.

2. (*Capuchin Plaster*,—Ph. Wirt.) *Burgundy pitch* and *bees' wax*, of each, 3 oz.; *Venice turpentine*, 1 oz.; melt them together, add *gum ammoniacum, olibanum, mastic*, and *lapis calaminaris*, of each, 1 oz.; *euphorbium, pyrethrum*, and *common salt*, of each (in powder), 2 oz.; and stir until the mass concretes. Both of the above are stimulant, rubefacient and counter-irritant.

PLASTER (Fayard's). See *Papier Fayard* (*p.* 931.)

PLASTER (Flower of Ointments). Syn. *Emplastrum Flos Unguentorum Dictum*, — Ph. L. 1720. *Prep.* From *frankincense* (thus), *yellow resin, suet*, and *bees' wax*, of each, 1 ℔; *olibanum*, ½ ℔; *Venice turpentine*, 5 oz.; *gum myrrh*, 2 oz.; *white wine*, 16 fl. oz.; boil to a plaster, adding before the mass cools, of *camphor*, ½ oz. Calefacient and stimulant.

PLASTER (Frankincense). Syn. *Strengthening Plaster; Emplastrum Thuris, E. Roborans*,—Lat. *Prep.* (Ph. L. 1788.) To *lead plaster*, 2 ℔, melted by a gentle heat, add of *frankincense* (thus), ½ ℔; *dragon's blood* (in powder), 3 oz.; and stir well. In muscular relaxations, weak joints, &c. Mr. Redwood says that a "better-looking plaster is produced by melting the *frankincense* and *dragon's blood* together, and straining them through a cloth, then mixing these with the lead plaster previously melted." See *Oxide of Iron Plaster.*

PLASTER (Galbanum). Syn. *Compound Galbanum Plaster; Yellow Diachylon, Gum Plaster, Diachylon with the Gums; Emplastrum Galbani*,—Ph. L., & Ph. D. 1826. *E. G. Compositum*,—Ph. L. 1824. *E. Gummosum*,—Ph. E. *Prep.* 1. (Ph. L.) Take of *strained galbanum*, 8 oz.; *common turpentine*, 1 oz.; melt them together, then add of *prepared frankincense* (thus), 3 oz.; and next, of *lead plaster*, 3 ℔, previously melted over a slow fire.

2. (Ph. E.) *Gum ammoniacum* and *galbanum*, of each, ½ oz.; melt them together, strain, and add of *litharge plaster*, 4 oz.; *bees' wax*, ½ oz.; (both previously melted;) and mix the whole thoroughly.

3. (*Wholesale.*) From *lead plaster*, 42 *lb.; yellow resin*, 12 *lb.; strained galbanum*, 3 *lb.; strained assafœtida*, 1 *oz.*

Obs. Galbanum plaster is stimulant and resolvent, and is much used in indolent, scrofulous, and other tumours, painful gouty and rheumatic joints, in rickets, &c.

PLASTER (Gaulthier's). *Prep.* (Guibourt.) *Palm plaster*, 12 parts; *olive oil* and *white wax*, of each, 1 part; melt, and add of *Venice turpentine*, 2 parts. More adhesive than the simple "palm plaster."

PLASTER (Ginger). Syn. *Emplastrum Zingiberis*,—Lat. See *Ginger.*

PLASTER (Gout). Syn. *Emplastrum Antarthriticum*, — Lat. See *Galbanum Plaster, Pitch do., Gout Paper, &c.*

PLASTER (Gum). See *Galbanum Plaster.*

PLASTER (Hemlock). Syn. *Emplastrum Conii, E. Cicutæ*,—Lat. *Prep.* 1. *Wax*, 1 part; *Burgundy pitch*, 9 parts; melt them together, and add of *extract of hemlock*, 3 parts.

2. (Ph. Bat.) *Lead plaster* and *bees' wax*, of each, 1 ℔; *olive oil*, 6 fl. oz.; melt, and add of *powdered hemlock* (recent), 1 ℔.

Obs. Hemlock plaster is occasionally used as an application to painful and malignant ulcers and tumours, painful joints, &c. A spread plaster of it, with 6 or 8 gr. of *tartar emetic* (in very fine powder) sprinkled over its surface, has been highly extolled as a counter-irritant in hooping-cough, phthisis, &c.

PLASTER (Henbane). Syn. *Emplastrum Hyoscyami,*—Lat. *Prep.* As the last, but using *henbane* instead of hemlock. As an anodyne, in various external affections.

PLASTER (Iodide of Potassium). Syn. *Emplastrum Potassæ Hydriodatis; E. Potassii Iodidi,*—Ph. L. *Prep.* (Ph. L.) *Iodide of potassium,* 1 oz.; *olive oil,* 2 fl. dr.; triturate them together, then add of *strained frankincense* (thus), 6 oz.; *wax,* 6 dr.; and stir constantly until the mass cools. "This plaster is to be spread on linen, rather than on leather." *Used* as a discutient or resolvent; more particularly as an application to scrofulous tumours and indurations.

PLASTER (Iodine). Syn. *Emplastrum Iodinii,*—Lat. *Prep.* Triturate *iodine,* 1 dr., in a warm mortar, with *olive oil,* 1 oz.; then add of *bees' wax,* 1 oz.; *yellow resin,* ½ oz.; previously melted together, and stir the whole until it concretes. It should be, preferably, spread at once on leather, and applied shortly after being prepared. *Used* as the last.

PLASTER (Iodine,—Compound). Syn. *Emplastrum Iodinii Compositum,*— Lat. *Prep.* 1. *Iodine,* 1 dr.; *iodide of potassium,* 2 dr.; rub them to a fine powder, add this to *lead plaster,* 2 oz.; *Burgundy pitch,* 1 oz.; previously melted together, and just about to concrete. More active than either of the preceding.

2. (*Emp. Iod. cum Belladonnâ.*) To *belladonna plaster,* 2 oz., melted by a very gentle heat, add *iodine* and *iodide of potassium* (in fine powder), of each, 1 dr., and stir the mixture until nearly cold. Powerfully resolvent and anodyne. *Used* in the same cases as the preceding, when there is much pain.

PLASTER (Iron). See *p.* 1015.

PLASTER (Isinglass). See *Court Plaster.*

PLASTER (Issue). Syn. *Emplastrum ad Fonticulos, Sparadrapum pro Fonticulis,* —Lat. *Prep.* 1. From *bees' wax,* ½ *lb.; Burgundy pitch* and *Chio turpentine,* of each, 4 oz.; *vermilion* and *orris powder,* of each, 1 oz.; *musk,* 4 gr.; melted together, and spread upon linen. This is afterwards polished with a smooth piece of glass moistened with water, and cut into pieces.

2. (Ph. Austr.) *Yellow wax,* 6 oz.; *mutton suet,* 2 oz.; *lard,* 1½ oz.; melt, add of *turpentine,* 1½ oz., and afterwards, of *red lead,* 4 oz.; dip pieces of *linen* into the melted mixture, pass these between rollers, and when cold, polish them, as before, and cut them into squares. The Issue plaster (*Issue paper; Charta ad fonticulos*) of the Ph. Suecica is a nearly similar compound, with the addition of about 1-48th part of *verdigris,* in very fine powder, and being spread upon paper.

PLASTER (Kennedy's). See *Corn Plasters.*

PLASTER (Kirkland's). See *Ammoniacal Plaster.*

PLASTER (Ladanum). See *Cephalic Plaster.*

PLASTER (Lead). Syn. *Litharge Plaster, Common do.; Diachylon, Simple Diachylon, White do.; Emplastrum Plumbi,*—Ph. L. *E. Lythargyri,*—Ph. E. & D., and Ph. L. 1788. *E. Commune,* —Ph. L. 1745. *Diachylon Simplex,* Ph. L. 1720. *Emp. Diapalma,*—Ph. E. 1744. *Prep.* 1. (Ph. L.) *Oxide of lead* (litharge), in very fine powder, 6 ℔; *olive oil,* 1 gall.; *water,* 1 quart; boil them over a slow fire, constantly stirring, to the consistence of a plaster, adding a little *boiling water,* if nearly the whole of that used in the beginning should be consumed before the end of the process.

2. (Ph. E.) *Litharge,* 5 oz.; *olive oil,* 12 fl. oz.; *water,* 8 fl. oz.; as the last.

3. (Ph. D.) *Litharge,* 5 *lb.; olive oil,* 1 gall.; *water,* 1 quart.

4. (Otto Kohnke.) For each ℔ of *litharge* employed, add ¼ pint of *colourless vinegar* (each *fl. oz.* of which is capable of saturating ½ dr. of carbonate of potassa); add the *oil,* boil until all moisture is evaporated, and until only a few striæ of litharge rise to the surface, then remove the vessel from the heat, add gradually ⅓ to ½ as much *vinegar* as before, and boil the mixture to a proper consistence.

5. (*Wholesale.*) From *Genoa oil,* 7 gall. (or 65 *lb.*); *litharge* (perfectly free from copper), 28 *lb.; water,* 2½ gall.; boil to a plaster, as before.

Obs. The London College orders too little oil. The second, fourth, and fifth formulæ produce beautiful plasters, that keep well; those of the others, although very white, get hard and brittle much more rapidly. The *proper proportion* of *oil* is fully 2⅓ times the weight of the litharge,—2½ times appears the best quantity; and without this is used, the plaster speedily gets hard and non-adhesive. The process consists in putting the *water* and the *litharge* into a perfectly clean and well-polished tinned-copper or copper pan, mixing them well together with a spatula, adding the oil, and boiling, with *constant stirring,* until the plaster is sufficiently hard, when *thoroughly* cold. This process usually occupies from 4 to 5 hours, but by adopting the fourth formula, an excellent plaster may be made in from 20 to 30 minutes. This plaster is generally cooled by immersion in *cold water;* and to render it *very white*, a quality highly prized in the trade, it is usual to submit it to laborious "pulling," in the manner already noticed.

Use. As a simple defensive plaster or strapping; but principally as a basis for other plasters.

PLASTER (Liston's). See *Court Plaster.*

PLASTER (Mahy's). Syn. *Emplastrum Plumbi Carbonatis, E. P. C. Compositum,*—Lat. *Prep.* (Ph. U. S.) *Carbonate of lead* (pure white lead), 1 ℔; *olive oil*, 32 fl. oz.; *water*, q. s.; boil them together, constantly stirring until perfectly incorporated, then add of *yellow wax*, 4 oz.; *lead plaster*, 1½ ℔; and when these are melted, and the mass somewhat cooled, stir in of *powdered orris root*, 9 oz. A favorite application in the United States of America to inflamed and excoriated surfaces, bed-sores, burns, &c.

PLASTER (Melilot). Syn. *Emplastrum Meliloti, E. è Meliloto,*—Lat. *Prep.* 1. (Ph. E. 1744.) *Fresh melilot*, chopped small, 6 ℔; *suet*, 3 ℔; boil until crisp, strain with pressure, and add of *yellow resin*, 8 ℔; *bees' wax*, 4 ℔; and boil to a plaster. Stimulant. *Used* to dress blisters, &c. The greater portion of this plaster in the shops is made without the herb, and is coloured with verdigris. (See the *next formula.*)

2. (*Wholesale.*) Take of *yellow resin*, 18 *lb.; green ointment*, 4½ *lb.; yellow wax*, 3 *lb.; finely-powdered verdigris*, q. s. to give a deep-green colour.

PLASTER (Mercurial). Syn. *Emplastrum Mercuriale; E. Hydrargyri,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) Add, gradually, of *sulphur*, 8 gr., to heated *olive oil*, 1 fl. dr., and stir the mixture constantly with a spatula until they unite; next add of *mercury*, 3 oz., and triturate until globules are no longer visible; lastly, gradually add of *lead plaster* (melted over a slow fire), 1 ℔; and mix them all well together. (About 1 fl. dr. of *balsam of sulphur* may be substituted for the oil and sulphur ordered above.)

2. (Ph. E.) *Resin*, 1 oz.; *olive oil*, 9 fl. dr.; mix by heat, cool, add of *mercury*, 3 oz., and triturate until its globules disappear; then add of *litharge plaster*, 6 oz. (previously liquefied), and mix the whole thoroughly.

3. (Ph. D.) *Oil of turpentine*, 1 *fl. oz.; resin*, 2 *oz.;* dissolve, with the aid of heat; add of *mercury*, 6 *oz.;* triturate until the globules disappear, and the mixture assumes a dark-gray colour, then add of *litharge plaster* (previously melted), 12 *oz.*, and stir the whole until it stiffens on cooling.

4. (*Wholesale.*) Take of *mercury*, 7 *lb.; prepared sevum*, ½ *lb.;* triturate until the globules disappear, and add the mixture to *lead plaster* (melted by a gentle heat), 36 *lb.*; stir them well together, and until they concrete. Very fine bluish-slate or lead colour.

Obs. Mercurial plaster is *used* as a discutient in glandular enlargements, and other swellings; and is also applied over the hepatic regions in liver complaints.

PLASTER (Mercurial,—with Belladonna). Syn. *Emplastrum Hydrargyri cum Belladonnâ,*—Lat. *Prep.* From *mercurial plaster*, 6 dr.; *extract of belladonna*, 2 dr.; *olive oil*, 1 dr.; mixed by a gentle heat. One of our most useful anodyne and discutient applications, in painful schirrous, scrofulous, and syphilitic tumours. The Medico-Chirurgical Pharm. orders ½ fl. dr. of *hydrocyanic acid* to be added to every 2 oz. of the above.

PLASTER (Minium). Syn. *Emplastrum Minii, E. è Minio, E. Plumbi Oxydi Rubri,*—Lat. *Prep.* (Ph. L. 1746.) *Olive oil*, 4 ℔; *minium* (red lead), in fine powder, 2½ ℔; *water*, q. s.; proceed as for lead plaster (which it closely resembles).

Obs. To ensure a good colour and the quality of keeping well, the quantity of oil should be increased about 1-3rd. When discoloured by heat it forms the "Brown Minium Plaster" (*Emp. è minio fuscum*) of old pharmacy. Lead plaster, either alone or with the addition of a little red lead, is usually sold for it.

PLASTER (Minium,—Compound). Syn. *Nuremberg Plaster; Emplâtre de Nuremberg; Emplastrum Minii Compositum,*—Lat. *Prep.* (Soubeiran.) *Red lead*, 12 parts; *olive oil*, 8 parts; grind them together on a porphyry slab, and add the mixture to *lead plaster*, 50 parts; *bees' wax*, 24 parts; melted together; lastly, when nearly cold, stir in of *camphor*, 1 part.

PLASTER (Morrison's Adhesive). Syn. *Morrison's Adhesive Paste.* From *wheaten flour*, 2 *oz.; mild ale*, ½ pint; stir them together, and heat the mixture to the boiling point; when cold, add of *powdered resin*, 3 *oz.;* and, constantly stirring, again heat them to boiling. *Used* as a depilatory in ring-worm, &c.

PLASTER (Mucilage). Syn. *Diachylon*

Compositum, Emplastrum è Mucilaginibus,—Lat. *Prep.* (Ph. L. 1746.) *Bees' wax,* 20 oz.; *oil of mucilages,* 4 oz.; melt, and add them to *strained ammoniacum,* 3 oz.; *common turpentine,* 1 oz.; previously melted together. Stimulant and emollient.

PLASTER (Mustard). Syn. *Emplastrum Sinapis,*—Lat. This is always an extemporaneous preparation. *Flour of mustard* is made into a stiff paste with *lukewarm water,* or with *vinegar,* and is then spread on a piece of *calico* or *linen* (folded two or three times); over the surface of the mustard is placed a piece of *gauze* or *thin muslin,* and the plaster is then applied to the part of the body it is intended to medicate. Its action is that of a powerful rubefacient and counter-irritant; but its application should not be continued long, unless in extreme cases. Its effects are often apparently wonderful. We have seen very severe cases of facial neuralgia, sore-throat, painful joints, rheumatic pains, &c., relieved in a few minutes by means of a *mustard plaster* or *poultice.*

PLASTER (Nuremberg). See *Compound Minium Plaster.*

PLASTER (Opium). Syn. *Emplastrum Anodynum; E. Opii,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Lead plaster,* 8 oz.; melt, and add of *frankincense* (thus), 2 oz.; next, add of *extract of opium,* 1 oz.; previously dissolved in *boiling water,* 1 fl. oz.; and, constantly stirring, evaporate the mixture over a slow fire to a proper consistence. This plaster is much stronger than that of the Ph. L. 1836, and of the other British Colleges.

2. (Ph. L. 1836.) *Lead plaster,* 1 ℔; melt, add of powdered *thus,* 3 oz.; mix, and further add of *powdered opium,* ½ oz.; *water,* 8 fl. oz.; and boil to a proper consistence.

3. (Ph. E.) *Litharge plaster,* 12 oz.; *Burgundy pitch,* 3 oz.; liquefy by heat, then add, by degrees, of *powdered opium,* ½ oz.; and mix them thoroughly. This and the preceding contains only 1-3rd part of the opium ordered in the present Ph. L. & D.

4. (Ph. D.) *Resin plaster,* 9 *oz.; opium,* in fine powder, 1 *oz.;* as the last.

Obs. The above plaster is reputed anodyne, and useful in various local pains; but its virtues in this way have been greatly exaggerated. The formulæ of the new Pharm. have not yet come into general use in the wholesale laboratory; that of the Ph. L. 1836, from being less costly, being still employed. The following is commonly used: —*Lead plaster,* 14 *lb.; yellow resin,* 2 *lb.; powdered opium,* ½ *lb.*

PLASTER (Oxide of Iron). Syn. *Iron Plaster, Frankincense do.; Strengthening do.; Emplastrum Roborans; Emp. Ferri,*—Ph. L. E. & D. *Emp. Thuris,*—Ph. D. 1826. *E. Ferri Oxydi Rubri,*—Ph. E. 1817. *Prep.* 1. (Ph. L.) *Lead plaster,* 8 oz.; *frankincense* (thus), 2 oz.; melt them together over a slow fire, sprinkle into the mixture, *sesquioxide of iron,* 1 oz.; and mix the whole well together.

2. (Ph. E.) *Litharge plaster,* 3 oz.; *yellow resin,* 6 dr.; *bees' wax,* 3 dr.; melt them together, then add of *red oxide of iron,* 1 oz.; previously triturated with *olive oil,* 3½ fl. dr.

3. (Ph. D.) *Litharge plaster,* 8 *oz.; Burgundy pitch,* 2 *oz.; peroxide of iron,* in fine powder, 1 *oz.;* as No. 1.

4. (*Wholesale.*) From *lead plaster* (quite dry), 84 *lb.; powdered yellow resin,* 14 *lb.; crocus martis* (lively coloured), 14 *lb.; olive oil,* 3 pints; as No. 2.

Obs. Iron plaster is reputed strengthening and stimulant. It is employed as a *mechanical* support in muscular relaxation, weakness of the joints, &c., especially by public dancers. Its tonic action is probably wholly imaginary. No. 4 is the "*emplastrum roborans*" of the shops, at the present time.

PLASTER (Oxycroceum). Syn. *Emplastrum Oxycroceum,*—Lat. *Prep.* 1. (Ph. E. 1744.) *Bees' wax,* 1 ℔; *black pitch* and *strained galbanum,* of each, ½ ℔; melt, and add of *Venice turpentine, powdered myrrh,* and *olibanum,* of each, 3 oz.; *powdered saffron,* 2 oz.

2. (*Wholesale.*) From *black pitch,* 9 *lb.; black resin,* 11 *lb.; bees' wax* and *lard,* of each, 2½ *lb.;* melted together. Warm; discutient. Still popular with the lower orders. The saffron of the original formula never finds its way into the *oxycroceum plaster* of the druggists.

PLASTER (Palm). Syn. *Diapalme, Emplâtre Diapalme,*—Fr. *Emplastrum Diapalmum,*—Lat. *Prep.* (P. Cod.) *Lead plaster,* 32 parts; *yellow wax,* 2 parts; melt them together, add of *sulphate of zinc,* 1 part, dissolve in a *little water,* and continue the heat, with constant agitation until all the water is evaporated.

Obs. This plaster originally contained palm oil, and this ingredient is still ordered in the formulæ of Plenck and Reuss. Soubeiran directs *white wax* to be employed.

PLASTER (Paracelsus'). Syn. *Emplastrum Paracelsi, E. Stypticum,*—Lat. *Prep.* From *lead plaster,* 28 *lb.; galbanum plaster,* 2 *lb.; powdered white canella* and *gum thus,* of each, 1½ *lb.;* melted together. The original formula, as well as that of the Ph. L.

1721, were similar, although much more complicated.

PLASTER (Pitch). Syn. *Poor-man's Plaster, Gout do., Anti-rheumatic do.; Emplastrum Pauperis, E. Antirheumaticum, E. Antarthriticum, E. Picis Commune,*—Lat. This has been already noticed under the head of *Resin Paper.* It is also, but less frequently, spread on cloth and leather. (See *p.* 932.)

PLASTER (Prestat's Adhesive). *Prep.* From *lead plaster,* 2½ *lb.; yellow resin,* 5 *oz.*; *Venice turpentine,* 4 *oz.*; *gum ammoniacum,* and *mastic,* of each, 1¼ *oz.;* made into a plaster, and spread on linen or calico.

PLASTER (Red Lead). See *page* 1014.

PLASTER (Resin). Syn. *Adhesive Plaster, Resinous do.; Emplastrum Adhesivum; Emp. Resinæ,*—Ph. L. & D. *E. Resinosum,*—Ph. E. *E. Lythargyri cum Resinâ,*—Ph. D. 1826. *Prep.* 1. (Ph. L.) To *lead plaster,* 3 ℔; melted by a gentle heat, add of *resin,* ½ ℔, also liquefied by heat, and mix. The formula of the Ph. U. S. is similar.

2. (Ph. E.) *Litharge plaster,* 5 oz.; *resin,* 1 oz.; mix with a moderate heat.

3. (Ph. D.) To *litharge plaster,* 2 *lb.,* melted by a gentle heat, add of *powdered resin,* 4 *oz.; Castile soap,* in powder, 2 *oz.;* and mix them intimately.

4. (*Wholesale.*) Pale *lead plaster* (from a previous batch, and quite dry), 72 *lb.; olive oil* (Genoa), 3 *lb.;* melt them together in a bright and perfectly clean copper pan, and sift in of *pale yellow resin* (in powder), 12 *lb.;* stirring all the while. The mixture is to be cooled, and "pulled" or "worked," after the manner of lead plaster.

Obs. Resin plaster, spread upon calico, forms the well-known "*Strapping*" or "*Adhesive plaster,*" so extensively used to protect raw surfaces, support parts, and for dressing ulcers, retaining the lips of recent cuts and wounds in contact, &c. It is gently stimulant, and is thought to assist the healing process. It is also employed as a basis for other plasters. The "*Hospital plaster,*" of certain houses, is of this kind. See *Compound Soap Plaster.*

PLASTER (Resolvent). Syn. *Emplastrum Resolvens, E. ex Mixtis Quatuor,*—Lat. var. *Prep.* (P. Cod.) *Galbanum, hemlock, mercurial,* and *soap plasters,* equal parts, melted together.

PLASTER (Roper's Royal Bath). *Prep.* (Anat. of Quackery.) *Strained black pitch,* 16 *oz.; Burgundy pitch,* 10 *oz.; tar* and *bees' wax,* of each, 1 *oz.;* melt, and when considerably cooled, add of *expressed oil of mace,* 2 *dr.; croton oil,* 1 dr.; and spread the mixture upon heart-shaped pieces of white sheep-skin, without remelting it. Stimulant and counter-irritant; recommended by its proprietor as a cure for *all* human ailments. It generally acts upon the bowels. The "*Bath-plaster Pills,*" also prepared by Mr. Roper, resemble several others already noticed. (See *Med. Circ.,* iii, 419.)

PLASTER (Scott's). *Prep.* From *lead plaster,* 14 oz.; *olive oil* and *white resin,* of each, 1 oz.; melted together, and spread on calico.

PLASTER (Sharp's Black). *Prep.* From *olive oil,* 5 parts; *carbonate of lead,* 4 parts; *bees' wax,* 1 part; boiled to a plaster.

PLASTER (Simple). See *Wax Plaster.*

PLASTER (Soap). Syn. *Emplastrum è Sapone; E. Saponis,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) To *lead plaster,* 3 ℔, melted by a slow heat, add of *Castile soap,* sliced, ½ ℔; *resin,* 1 oz.; both (also) liquefied by heat, and constantly stirring, evaporate to a proper consistence.

2. (Ph. E.) To *litharge plaster,* 4 oz.; *gum plaster,* 2 oz.; melted together, add of *Castile soap,* in shavings, 1 oz.; and boil a little.

3. (Ph. D.) To *litharge plaster,* 2½ *lb.,* melted over a gentle fire, add of *Castile soap,* in powder, 4 *oz.;* and heat them together (constantly stirring), until they combine.

Obs. Care must be taken to evaporate all the moisture from the above compounds, as, if any is left in the plaster, it turns out crumbly, and does not keep well. Much heat discolours it. (See *below.*)

Soap plaster is emollient and resolvent, and is used in abrasions and excoriations, and as a dressing to soft corns, lymphatic tumours, &c.

PLASTER (Soap,—Compound). Syn. *Emplastrum Saponis Compositum,* or *E. Adhærens,*—Ph. D. 1826. *Prep.* (Ph. D. 1826.) *Resin plaster,* 3 oz.; *soap plaster,* 2 oz.; melted together.

Obs. Less emollient, but more stimulant than the simple plaster. The *Emplastrum è Minio cum Sapone,* Ph. E. 1744, was made by melting 1 part of *soap* with 5 parts of *minium plaster.* Neither of the above must be put into water. See *Resin Plaster,* Ph. D.

PLASTER (Soap-Cerate). Syn. *Emplastrum Cerati Saponis,*—Lat. *Prep.* From *soap cerate,* heated by means of a water bath until all the moisture is evaporated. Sometimes 2 or 3 dr. each of *powdered mastic* and *gum ammoniacum* are added for each pound of *cerate.* The product is generally spread whilst still warm. Said to be suppurative, resolvent, cooling, and desiccative. See *Soap Cerate.*

PLASTER (St. Andrew's). *Prep.* From

yellow resin, 8 oz.; *gum elemi*, 2 oz.; *Bordeaux turpentine* and *oil of the bay-laurel*, of each, 1 oz.; melted together by a gentle heat. A stimulant, resolvent, and adhesive plaster, once supposed to possess extraordinary virtues.

PLASTER (Sticking). See *Court Plaster*, *Resin Plaster*, *&c.*

PLASTER (Stomach). See *Aromatic Plaster*, *&c.*

PLASTER (Strengthening). See *Plasters of Frankincense* and *Oxide of Iron.*

PLASTER (Styptic). See *Oxide of Iron Plaster*, *Paracelsus' do.*, *&c.*

PLASTER (Sulphate of Quinine). Syn. *Emplastrum Quiniæ*, *E. Q. Disulphatis*,—Lat. *Prep.* 1. *Disulphate of quinine*, 1 dr.; *resin plaster*, 1 oz. Applied to the abdomen in intermittents.

2. *Disulphate of quinine*, 1 dr.; *mercurial plaster*, 2 oz. In affections of the liver or spleen, following intermittents, applied over the regions of those viscera.

3. *Resin plaster*, 9 dr.; *disulphate of quinine*, 1 dr.; *camphor* and *oil of cajeput*, of each, ½ dr. Applied over the epigastrium as a prophylactic of cholera.

PLASTER (Thus). See *Frankincense Plaster.*

PLASTER (Verdigris). Syn. *Emplastrum Æruginis*, *E. Cupri Subacetatis*,—Lat. *Prep.* (P. Cod.) *Bees' wax*, 4 parts; *Burgundy pitch*, 2 parts; melt, add of *Venice turpentine* and *prepared verdigris* (in powder), of each, 1 part; and stir until the mass is nearly cold. For other formulæ see *Corn Plasters*, *&c.*

PLASTER (Vermifuge). Syn. *Emplastrum Vermifugum*, *E. Anthelminticum*,—Lat. *Prep.* From *powdered aloes*, 1 dr.; *oil of chamomile*, 10 drops; *croton oil*, 2 drops; *oil of turpentine*, q. s.

PLASTER (Vigo's). Syn. *Emplastrum Vigonis*,—Lat. *Prep.* (P. Cod.) *Lead plaster*, 40 oz.; *mercury*, 12 oz.; *liquid styrax*, 6 oz.; *bees' wax*, *turpentine*, and *resin*, of each, 2 oz.; *ammoniacum*, *bdellium*, *myrrh*, and *olibanum*, of each, 5 dr.; *saffron*, 3 dr.; *oil of lavender*, 2 dr.; made into a plaster *s. a.*

PLASTER (Warm). See *Calefacient Plaster*, *Burgundy Pitch do.*, *&c.*

PLASTER (Wax). Syn. *Simple Plaster*; *Emplastrum Attrahens*; *E. Simplex*,—Ph. E. *E. Ceræ*,—Ph. L. 1836. *Prep.* 1. (Ph. E.) *Bees' wax*, 3 oz.; *suet* and *yellow resin*, of each, 2 oz.; melt them together, and stir the mixture briskly until it concretes by cooling.

2. (Ph. L. 1836.) *Yellow wax* and *suet*, of each, 3 ℔; *yellow resin*, 1 ℔; as the last. Intended to be employed as a simple dressing, especially to blistered surfaces. It is now seldom used.

PLASTER (White Diachylon). See *Lead Plaster.*

PLASTER (Yellow Diachylon). See *Galbanum Plaster.*

PLASTER (Zinco-lead). Syn. *Emplastrum Zinco-plumbicum*, *E. Diapompholygos*,—Lat. var. *Prep.* (Ph. Suec.) *Bees' wax*, 1 ℔; *olive oil* and *graphite* (black lead), of each, 6 oz.; *carbonate of lead*, 4 oz.; *oxide of zinc* (impure), 3 oz.; *olibanum*, 1½ oz.; boil to a plaster. Astringent and desiccant. Other forms substitute an equal weight of *litharge* for the graphite.

PLASTER OF PARIS. See *Alabaster* and *Gypsum.*

PLATE. The name commonly given to gold and silver wrought into instruments or utensils for domestic use.

The *cleaning* of *plate* is an important operation in a large establishment, as its durability, and much of its beauty, depend on this being properly done. The common practice of using *mercurial plate-powder* is destructive to both of these, as mercury not only rapidly erodes the surface of silver, but renders it softer, and, in extreme cases, even brittle. The only *powder* that may be *safely used* for *silver* is *prepared chalk*, of the best quality; or, better still, *calcined hartshorn*, finely pulverized. For *gold*, the form of red oxide of iron known as *jeweller's rouge*, is the most useful and appropriate. *Chamois leather*, a *plate-brush*, or *very soft woollen rags* should alone be used to apply them; and their application should be gentle and long continued, rather than the reverse. *Dirty plate*, after being cleaned with *boiling water*, may be restored by boiling it in *water*, each quart of which contains a few grains of *carbonate of soda*, and about an ounce of *prepared chalk*, *calcined hartshorn*, or *cuttle-fish bone*, in very fine powder. The ebullition sets up a gentle friction, which effects its purpose admirably. The boiled plate, after being dried, is best "finished off" with a piece of *soft* leather or woollen cloth which has been dipped into the cold mixture of chalk and water, and then dried. The same method answers admirably with *German silver*, *brass*, *pewter*, and all the softer metals. See *Plate Powder*, *&c.*

PLATINA. See *Platinum.*

PLATING. The art of covering copper and other metals with either silver or gold.

Plating is performed in various ways. Sometimes the silver is fluxed on to the surface of the copper by means of a solution of borax, and subsequent exposure in the "plating furnace," and the compound ingot is then rolled to the requisite thinness between cylinders of polished steel. The common thickness of the silver plate before rolling, is equal to about the 1-40th of that of the compound ingot. Sometimes the nobler metal is precipitated from its solutions upon the copper by the action of chemical affinity, or by the agency of electro-chemical decomposition.

The metal employed for plating is a mixture of copper and brass, annealed or hardened, as the case may require. See *Gilding, Platinizing, Silvering, &c.*

PLATINIZING. *Metals* may be *coated* with *platinum* by nearly similar processes to those already referred to under *Plating.* In the "*moist way,*" vessels of *brass, copper,* and *silver,* are conveniently platinized in the following manner:—Solid *chloride of platinum,* 1 part, is dissolved in *water,* 100 parts, and to this solution is added of *common salt,* 8 parts; or still better, 1 part of *platino-chloride of ammonium,* and 8 parts of *hydrochlorate of ammonia,* are placed in a suitable porcelain vessel, with about 40 parts of *water,* and the whole is heated to ebullition; the vessels or utensils, previously made perfectly bright, are then immersed in the boiling liquid. In a few *seconds* they generally acquire a brilliant and firmly adhering layer of platinum.

Silver plates for *galvanic batteries* are commonly platinized by immersing them for a few seconds in a mixture of *saturated solution* of *bichloride of platinum,* 1 part; *dilute sulphuric acid,* 3 parts; *water,* 4 to 6 parts. *Platinum battery-plates* are covered with a pulverulent deposit of platinum by means of the electrotype.

Platinized asbestos is *prepared* by dipping *asbestos* into a *solution* of *bichloride of platinum,* or of one of the double chlorides of that metal, and then gradually heating it to redness. It is *used* as a substitute for spongy platinum. See *Voltaic Platinizing.*

PLATINO-CHLORIDES. See *below.*

PLATINUM. Syn. *Platina, White Gold; Platinum,*—Lat. A heavy, grayish-white metal, chiefly imported from South America, but also found in the Ural Mountains of Russia, in Ceylon, and in a few other places. It occurs in nature under the form of grains and small rolled masses, associated with palladium, rhodium, iridium, and iron. It has only been known in Europe since 1748.

Prep. The native alloy of this metal (*crude platinum*) is acted upon, as far as possible, by *nitro-hydrochloric acid,* containing an *excess* of *hydrochloric acid,* and slightly diluted with *water,* in order to dissolve as small a quantity of iridium as possible; to the deep yellowish-red and highly acid solution thus produced *sal ammoniac* is added, by which nearly the whole of the *platinum* is thrown down in the state of *ammonio-chloride.* This substance, after being washed with a little *cold water,* is dried and heated to redness; the product is *spongy metallic platinum.* This is made into a thin uniform paste with water, introduced into a slightly conical mould of brass, and subjected to a graduated pressure, by which the water is squeezed out, and the mass rendered at length sufficiently solid to bear handling. It is next dried, very carefully heated to whiteness, and hammered, or subjected to powerful pressure by suitable means, whilst in the heated state. It will now bear forging into a bar, and may afterwards be rolled into plates, or drawn into wire, at pleasure.

Prop., &c. Platinum is the heaviest substance known; its sp. gr. being fully 21·00, which may be raised by forging to about 21·5. It is whiter than iron, harder than silver, infusible in the strongest heat of our furnaces, and melts only before the oxy-hydrogen blowpipe. It is unaffected by air, water, and all the pure acids, and even its polish is uninjured by the strongest heat of a smith's forge; chlorine and aqua regia, however, dissolve it, though with much more difficulty than gold; it is also superficially oxidized by fused hydrate of potassa. *Spongy platinum, powdered platinum,* and even perfectly clean *platinum foil,* possess the remarkable property of causing the union of oxygen and hydrogen gases, with more or less elevation of temperature. (See *Lamps.*) *Platinum* is precipitated from its solutions by de-oxidizing substances under the form of a black powder, which has the power of absorbing oxygen, and again imparting it to combustible substances, and thus causing their oxidation. In this way alcohol and pyroxilic spirit may be converted into the acetic and formic acids, &c. See *Acetic Acid.*

Tests. 1. Sulphuretted hydrogen throws down from neutral and acid solutions of the per-salts of platinum, a blackish-brown precipitate, which is only formed after a time in the cold, but immediately, on heating the liquid.—2. Hydrosulphuret of ammonia also gives a blackish-brown precipitate, which completely redissolves in a large excess of the precipitant, provided the latter contains an excess of sulphur.—3. Sal ammoniac and chloride of potassium give yellow crystalline precipitates, insoluble in acids, but soluble in excess of the precipitant, upon the application of heat, and decomposable by heat, with production of spongy platinum.—4. Ammonia and potassa also give similar precipitates in solutions previously acidulated with hydrochloric acid.

Estim. This may be effected by throwing down the metal under the form of *ammonio-chloride* or *potassio-chloride*, which, after being washed on a filter with a little weak spirit to which a little of the precipitant has been added, and afterwards with the spirit alone, may be carefully dried at 212° Fahr., and weighed. Or, the precipitate may be ignited in a platinum crucible, and weighed under the form of spongy platinum. The ignited mass from the potassio-chloride should be well edulcorated with water, and ignited a second time, before weighing it. 193·25 gr. of the *ammonio-chloride*, and 244·25 gr. of the *potassio-chloride* are equivalent to 98·75 gr. of METALLIC PLATINUM. See *Assaying.*

Uses. Platinum is valuable for the formation of crucibles, capsules, and other utensils or instruments intended to be exposed to a strong heat, or to the action of acids. Bichloride and sodio-chloride of platinum are much used in chemical analysis. Both of these are also used in medicine with the same intentions, and in the same doses, as the corresponding salts of gold. These compounds are *poisonous.* The *antidotes* and *treatment* are similar to those described under *Gold.* (See *p.* 536.)

PLATINUM (Ammonio-chloride of). Syn. *Platino-bichloride of Ammonium; Platini Ammonio-chloridum,*—Lat. *Prep.* A *solution* of *sal ammoniac* is added to a *strong solution* of *bichloride of platinum,* avoiding excess, and the precipitate is collected on a filter, washed with a little *weak alcohol,* and dried at a heat not exceeding 180° Fahr.

Prop., &c. Minute, transparent, yellow, octahedral crystals; very feebly soluble in water, less so in dilute alcohol, and insoluble in acids; heat converts it into spongy platinum.

PLATINUM (Chlorides of). Of these two are known:—

1. *Protochloride of Platinum.* Formed by exposing for some time the dried and powdered *bichloride* to a temperature of 400° to 450° Fahr. A greenish-gray powder, insoluble in water, but soluble in hydrochloric acid.

2. *Bichloride of Platinum, Perchloride of do.; Platini Bichloridum,*— Ph. L. Formed by dissolving *platinum* in *nitro-hydrochloric acid,* and evaporating the solution to dryness at a gentle heat. Reddish-brown, deliquescent, and very soluble in both water and alcohol, yielding orange-coloured solutions. *Used* as a test in chemical analysis, and as an alterative in secondary syphilis, &c. *Dose.* $\frac{1}{16}$ to $\frac{1}{4}$ gr., dissolved in distilled water, or made into a pill with syrup and liquorice powder. Some parties prescribe much larger doses; but unsafely. Hoefer recommends an *ointment* made with it as an application to indolent ulcers. In doses of 5 gr. and upwards it acts as a violent caustic poison. This last salt is the "*chloride of platinum*" of the shops, and the one used in the arts and medicine. It forms one of the *tests* included in the "*Appendix*" to the Ph. L.

PLATINUM (Iodides of). Of these there are two:—

1. *Protiodide of Platinum.* Formed by digesting the *protochloride* in a *solution of iodide of potassium.* Black.

2. *Biniodide of Platinum, Periodide of do.* Formed by the action of *iodide of potassium* on a *weak solution* of the *bichloride.* Black. (Lassaigne.)

PLATINUM (Oxides of). Three of these compounds are noticed by chemists:—

1. *Oxide of Platinum, Protoxide of do.* Obtained by digesting *protochloride of platinum* in a *solution of pure potassa.* It is soluble in excess of alkali, and freely so in the acids, forming brown solutions of the *protosalts of platinum.* These are distinguished from solutions of the salts of the binoxide by not being precipitated by sal ammoniac. *Oxalate of the protoxide of platinum,* in fine copper-coloured needles, may be obtained by heating the *binoxide* in a *solution of oxalic acid.*

2. *Binoxide of platinum, Deutoxide of do., Peroxide of do.; Platinic Acid; Platini Binoxydum,*—Lat. Formed by exactly decomposing the *sulphate of the binoxide* with *nitrate of baryta,* and adding *pure soda* to the filtered solution, so as to precipitate only half the oxide. (Berzelius.) Or, by boiling *bichloride of platinum* with *caustic soda,* in considerable excess, and then adding *acetic acid.*

Prop., &c. In the hydrated form it is a bulky brownish powder; this, when gently heated, becomes black and anhydrous. It forms salts with the acids, and combines with some of the bases, like an acid. These compounds have a red or yellow colour. It is remarkable for its tendency to form double salts with the salts of the alkalies and earths.

3. *Sesquioxide of Platinum.* Formed by heating *fulminating platinum* in *nitrous acid.* (E. Davy.) All the oxides of platinum are reduced to the metallic state on ignition.

PLATINUM (Potassio-bichloride of). Syn. *Platino-bichloride of Potassium.* A bright yellow, crystalline precipitate, formed whenever *solutions* of the *chlorides of platinum* and of *potassium* are mixed; or a *salt of potassa,* acidulated with a little *hydrochloric acid,* is added to *bichloride of platinum.* In appearance, solubility, &c., it closely resembles ammonio-bichloride of platinum.

PLATINUM (Sodio-bichloride of). Syn. *Chloride of Platinum and Sodium, Platino-bichloride of Sodium; Platini et Sodii Chloridum, Platini Sodio-chloridum, &c.,*—Lat. *Prep.* (Redwood.) *Bichloride of platinum,* 17 parts; *chloride of sodium,* 6 parts; dissolve the two salts separately in *water,* q. s., mix the solutions, and evaporate, that crystals may form. *Dose.* $\frac{1}{12}$ to $\frac{1}{2}$ gr.; in the same cases, as the bichloride. (See *above.*)

The *platino-protochlorides of ammonium, sodium,* and *potassium,* are obtained from the proto-compounds in a similar manner to that adopted for the respective double bichlorides.

PLATINUM (Sulphate of). Syn. *Platini Sulphas,*—Lat. *Prepared* by acting on *bisulphuret of platinum* with strong *nitric acid.*

PLATINUM (Sulphurets of). The *protosulphuret* is prepared by heating the *yellow ammoniacal chloride* with $\frac{1}{2}$ its weight of *sulphur* in a retort;—the *bisulphuret,* by dropping a solution of the *bichloride* into a *solution of sulphuret of potassium.* Neither of them possess any practical importance.

PLATINUM-BASES. This name has been applied to a number of extraordinary compounds derived from the *protochloride of platinum,* or from the *green salt of Magnus,* noticed at page 544. As they have not, however, received any practical application, their consideration belongs to pure chemistry.

PLATINUM-BLACK. Syn. *Oxyphorus; Platina-mohr.* This is platinum in a finely divided state.

Prep. 1. A *solution* of *bichloride of platinum,* to which an excess of *carbonate of soda* and a quantity of *sugar* have been added, is boiled until the precipitate which forms after a little time becomes perfectly black, and the supernatant liquid colourless; the black powder is then collected on a filter, washed, and dried by gentle heat.

2. (M. Boetger.) *Ammonio-chloride* or *potassio-chloride of platinum,* reduced to very fine powder, is moistened with *strong sulphuric acid,* and a *small piece* of *zinc* is thrust into the mixture; after the whole is reduced to a black powder, it is washed, first with *hydrochloric acid,* and then with *pure water,* and is, lastly, dried.

3. (Descotils.) *Platinum ore,* or *crude platinum,* is melted with twice its weight of *zinc,* and after powdering the resulting alloy, it is digested, first in *dilute sulphuric acid,* and next in *dilute nitric acid,* to remove the zinc, the action of the menstruum being assisted by heat; it is then digested in a *weak solution of potassa,* and lastly in *pure water,* after which it is carefully dried.

Prop., &c. Platinum-black possesses the property of condensing gases, more especially oxygen, into its pores, and afterwards giving it out to various oxidizable substances. When placed in contact with a *solution of formic acid,* it converts it, with copious effervescence, into *carbonic acid; alcohol,* dropped upon it, becomes changed by oxidation into *acetic acid,* the rise of temperature being often sufficient to cause inflammation; exposed to a red-heat, it shrinks in volume, assumes the appearance of common spongy platinum, and, for the most part, loses these peculiarities. That prepared with zinc explodes, when heated, like gunpowder. "When platina-mohr, prepared by means of zinc, is moistened with alcohol, it becomes incandescent, and emits *osmic acid;* but if it be mixed with alcohol into a paste, and spread upon a watch-glass, nothing but *acetic acid* will be disengaged; affording an elegant means of diffusing the odour of vinegar in an apartment." (Berzelius.) See *Acetic Acid.*

PLATINUM (Spongy). *Prep.* 1. By heating *ammonio-chloride of platinum* to redness.

2. *Crude bichloride of platinum* and *hydrochlorate of ammonia* are separately dissolved in *proof spirit,* and the one solution added to the other as long as a precipitate forms; this is collected, and, whilst still moist, formed into little balls or pieces, which are then dried, and gradually heated to redness.

Prop., &c. These have been noticed above. (See p. 1018.) Small balls of spongy platinum are used for the "hydrogen instantaneous-light lamp;" but they are apt to absorb moisture from the atmosphere, and then lose their power of inflaming hydrogen, until they are re-dried and heated.

PLETHORA. A redundancy of blood in the system. "Plethora may arise from a highly entonic state of the arterial system, and a thick crasis of the blood, with a large quantity of colouring matter; and it is then called *sanguine plethora;* or it may arise from a lax and weak state of the arterial system, with a redundancy of serum in the blood; in which case it is called *serous plethora* or *atonic plethora.*" The *treatment* should be directed to the removal of the primary affection on which it depends. When it results from excessive or improper feeding, a due attention to the diet, exercise, &c., will generally effect a cure.

PLEURISY. Syn. *Pleuritis.* Inflammation of the pleura or membrane which lines the cavity of the chest and covers the surface of the lungs.

The *common causes* are exposure to cold, sudden changes of temperature, or a damp or impure atmosphere, and also all those circumstances which usually give rise to other inflammatory affections.

Amongst the most marked of the *early symptoms of pleurisy*, are fever, cough, pain in the side, and a peculiar hard and strong pulse, followed by painful and difficult respiration, and other alarming symptoms, rapidly increasing in their severity and dangerous character.

The *treatment* of the *acute forms* of *pleurisy* must be prompt and decided. Bleeding freely, blisters, diaphoretics, and active purgatives, must be at once had recourse to; and in the *after treatment*, great care must be taken against "an insidious and local form of the disease, which often extends to the lungs." *Chronic pleurisy* is an affection which is little under the control of medicine.

Pleurisy chiefly attacks persons of a vigorous constitution and plethoric habit; but it also extends its ravages, though less frequently, to others. See *Phthisis* and *Pneumonia.*

PLICA. Syn. *Plaited Hair; Plica Polonica.* A disease of the hairs in which they are distended with a reddish-coloured fluid, and the scalp is so exquisitely sensitive that much pain is occasioned by the trifling movement which accompanies the cutting of the hair. During the disease, a quantity of fluid exudes from the hair tubes, and agglutinates into a repulsive mass of inextricable tangles. It is confined to Poland, Lithuania, and Tartary.

PLICIDENTINE. A peculiar modification of *dentine* found in the basal part of the teeth of the wolf-fish, and of a few other animals.

PLUGGING. The introduction of a mass of lint, sponge, or other suitable material, into a wound or cavity, with the intention of arresting hæmorrhage. It is now seldom adopted, except in cases of bleeding from the nose, and that only after more approved methods have failed.

PLUM. A name applied to several varieties of the *prunus domestica* (Linn.) or *wild plum.* Among the cultivated varieties, the *damson, green gage, French plum, magnum bonum* or *Mogul do., mirabelle do., Orleans do.*, and *prune*, are those best known. *Grocer's plums* are raisins or dried grapes.

PLUMBAGINE. Syn. *Plumbagina,*—Lat. A crystallizable principle found by M. Dulong in the roots of *plumbago Europæa* (Linn.), or *tooth-wort.*

Prep. The *etherial tincture* of the *root-bark of tooth-wort* is mixed with six times its weight of *water*, and the ether removed by distillation; the residual liquor is boiled a few minutes, filtered whilst hot, concentrated by evaporation, and then set aside to crystallize. It may be purified by re-crystallization in hot alcohol.

Prop., &c. It is acrid and irritant; in small doses, emetic; in larger ones, poisonous. It is soluble in alcohol and ether; and, less freely, in water.

PLUMBAGO. Syn. *Black Lead, Graphite; Percarburet of Iron?* The finest *plumbago* or *black lead* comes from Borrowdale, in Cumberland, and is used for making pencils for artists. The *coarser sorts* are employed to impart a metallic lustre to other bodies, and mixed with grease to diminish friction. Plumbago is also used to cover the face of articles on which it is desired to deposit a coating of copper by the electrotype. It has been used, with apparent advantage, in herpes, and in several chronic skin diseases, in the form of an ointment, made with four times its weight of lard; and, *internally*, made into pills.

The sp. gr. of plumbago varies from 2·075 to 2·45. The iron found in it is believed to be merely an accidental contamination, and not to be chemically combined with the carbon in it.

Pur., &c. The *black lead* of *commerce* is almost always *adulterated.* Crude sulphuret of antimony, micaceous iron ore, Eastern glimmer, and an inferior variety of lamp-black, are the substances mostly employed for this purpose. The *packet black-lead*, especially that sold under the name of "*Servant's Friend,*" generally contains from 50% to 70% of such admixture. A pure sample of plumbago digested in hydrochloric acid, and then washed, dried, and exposed to a cherry-red heat in a platinum crucible, with constant stirring, as long as it loses weight, suffers a loss equal to from 8% to 9%, and never more than 12% of its weight.

PLUMBIC ACID. Peroxide of lead; on account of its combining with some of the bases to form compounds which have been called *plumbates.*

PLUMBUM CORNEUM. See *Chloride of Lead.*

PLUMOSE ALUM. The old name of the silky amianthine crystals of the *double sulphate of alumina and iron* occasionally found on alum slate. *Asbestos* has also been so called.

PLUNKET'S CANCER REMEDY. See *Plunket's Caustic.*

PNEUMONIA. Syn. *Pneumony, Peripneumony; Pneumonitis, Peripneumonia.* Inflammation of the lungs.

Causes. Undue exposure of the body to cold, wet, &c.; suppressed perspiration; inordinate exertion of the lungs, in singing, speaking, or playing on wind instruments, &c.; and other circumstances inducing a determination of blood to the lungs, or an unnatural action of them. Hence the robust and plethoric are the most subject to attacks of pneumonia.

Symp. Feverishness; difficulty of breathing; pain in the side or chest; cough; a strong, hard, and quick pulse, afterwards becoming weak, soft, and irregular. As the inflammation increases, there is delirium, and threatened suffocation; the vessels of the neck become turgid and swollen, the colour of the face changes to a purple, an effusion of blood takes place into the cellular substance of the lungs, its functional action becomes impeded, and the patient rapidly sinks, and dies. At other times it proves fatal by inducing suppuration and gangrene. Abundant expectoration, perspiration, or diarrhœa, are held to be favorable symptoms.

Treat. This is similar to that noticed under *pleurisy;* to which mercurials, and small doses of morphia, opium, or henbane, may be added, to quiet the cough, and procure sleep. In the severer forms of this disease, prompt and skilful medical assistance is the only means of affording the patient a chance of recovery.

POACHING. Amongst cooks, a peculiar method of cooking small articles by a slight boiling or stewing process.

Poached Eggs are prepared by breaking them into a small saucepan or stewpan containing about ½ a pint of *boiling water,* to which a tea-spoonful of *common salt,* and, occasionally, a *little vinegar* is added, and gently simmering them for 3 to 4 minutes, or until sufficiently firm to bear removal with a spoon or "slice." *Another method* is to employ *melted butter,* instead of water, and to dress them either with, or without stirring.

Poached eggs are commonly served on *toast,* or with *fried ham* or *bacon,* with *spice* or *vegetable seasoning,* at will. They form an excellent breakfast, or "make-shift dinner."

PODOPHYLLINE. Obtained from the *root* of the *podophyllum peltatum* (Linn.) or *may apple,* a substance officinal in the Ph. U. S.

Prep. The *alcoholic extract of may apple* is digested in *cold ether,* to remove fatty matter, and is then dissolved in *rectified spirit;* the solution is decoloured with a little *animal charcoal,* and filtered; it is, lastly, allowed to evaporate spontaneously.

Prop., &c. An amorphous, grayish-white mass, soluble in alcohol, and slightly soluble in water. It is a safe and certain cathartic, superior in activity to resin of jalap. *Dose,* ½ to 3 gr.

POISON. Syn. *Toxicum, Venenum,*—Lat. Any substance which, when swallowed, or applied in any particular way to the living body, disturbs, suspends, or destroys one or more of the vital functions. In sufficient quantity, or in small doses long continued, the common result of the administration of deleterious substances is either impaired vitality or death.

Poisons are classified by Orfila under four heads:—

1. *Irritant poisons,* or such as inflame or corrode the parts with which they come in contact. Their chief effects are upon the alimentary canal, with, sometimes, ulceration of the tongue, fauces, and œsophagus. Nausea, vomiting, stomachic and intestinal pains, extreme anxiety and anguish, quick and feeble pulse, cold and clammy skin, and mucous, bilious, or bloody diarrhœa, are among the common leading symptoms. Arsenic, blue vitriol, verdigris, strong acids and alkalies, drastic purgatives, and numerous other substances, belong to this class.

2. *Narcotic* or *Stupefying poisons,* or such as paralyse the functions of the nervous system, and produce headache, vertigo, confused vision, delirium, stupor, convulsions, coma, &c. It includes morphia, opium, henbane, oil of bitter almonds, prussic acid, &c.

3. *Narcotico-acrid poisons,* which produce at the same time narcotism, and irritation

of the parts which they touch. Alcohol, belladonna, coal gas, choke damp, cocculus Indicus, colchicum, foxglove, hemlock, poisonous fungi, strychnine, tobacco, veratria, &c., are of this kind.

4. *Septic* or *Putrefiant poisons*, including all those which alter, liquefy, or cause the putrescence of the fluids of the body; as sulphuretted hydrogen, the gas from sewers and cess-pools, putrefying organic matter, miasmata, &c.

The *treatment* of *cases of poisoning*, varies with the substance occasioning it; and, with the proper *antidotes*, will be found noticed under the names of the various substances that exert a deleterious action on the animal body. It may here, however, be useful to remark, that in almost all cases of poisoning, copious vomiting should be excited *as soon as possible* by the administration of a *powerful emetic* (see *p.* 366); its action being promoted by copious draughts of *luke-warm water*, tickling the throat with the finger, &c. Should this fail, but not otherwise, the stomach-pump should be had recourse to. The vomiting should be kept up and the stomach well washed out with *bland albuminous* or *mucilaginous liquids*, such as milk-and-water, barley water, sweetened water, flour-and-water, or any similar matters as circumstances may afford. After the vomiting a brisk aperient draught, or clyster, may be administered, and nervous irritability or exhaustion allayed by means of ether, opium, wine, or warm spirit-and-water, as the case may require. Even in a *suspected case* of *poisoning*, when proper medical advice is not at hand, an emetic should be immediately taken or administered. Vomiting may be, in general, produced very promptly by merely swallowing a *cupful* of *warm water* mixed with a tea-spoonful of *flour of mustard.* If no dry mustard is at hand, a portion of the contents of a *mustard-pot*, put into the water will answer nearly as well. As mustard may thus prove of so much use, it should never be wanting in any house; but even should there be no mustard at hand, *warm water* by itself, freely taken, forms a tolerably efficacious emetic. (See the Editor's "*Epit. of Toxicology*" for further information connected with *poisons* and *poisoning.*)

POLARIZATION (of Light). A change produced upon light by the action of certain media and surfaces, by which it ceases to present the ordinary phenomena of reflection and transmission. Instruments or apparatus employed to effect this change are called "*polariscopes.*" Although the polarization of light is frequently employed as a means of chemical investigation, and is of the utmost interest to the philosophical inquirer, its consideration is not of a character to come within the province of this work.

POLISHES. Various substances, differing widely from each other, are popularly known under this name. See *Powders, Varnishes, &c.* (and *below*).

French Polish. See *p.* 490.

French Polish Reviver.—1. *Linseed oil,* ½ pint; *pale lac varnish* and *wood napththa,* of each, ¼ pint; well shaken together, and again every time before use.

2. *Methylated rectified spirit,* 3 pints; *linseed oil* and *French polish,* of each, 1 *pint;* as the last.

3. *Linseed oil* (pale), 1 quart; strong *distilled vinegar,* ½ pint; *spirit of turpentine,* ¼ pint; *muriatic acid,* 1 *oz.*

Furniture Cream.—1. *Pearlash,* 2 *oz.; soft soap,* 4 oz.; *bees' wax,* 1 *lb.; water,* 1 gall.; boil until the whole is united and forms a creamy liquid, when cold.

2. *Bees' wax,* ½ *lb.;* good *yellow soap,* ¼ *lb.; water,* 5 pints; boil to a proper consistence with constant agitation, then add of *boiled oil* and *spirit of turpentine,* of each, ½ pint. For *use,* the above are diluted with water, spread upon the surface with a painter's brush, and then polished off with a hard brush, cloth, or leather.

3. *Boiled oil* (pale), ½ pint; *bees' wax,* 1½ *oz.;* mixed by heat. Applied by a "rubber," and at once polished off.

Furniture Oil. See *page* 858.

Furniture Paste.—1. *Oil of turpentine,* 1 pint; *alkanet root,* ¼ *oz.;* digest until sufficiently coloured, then add of *bees' wax* (scraped small), 4 *oz.;* put the vessel into hot water, and stir until the mixture is complete, then put it into pots. If wanted *pale,* the alkanet root should be omitted.

2. (*White.*) *White wax,* 1 *lb.; liquor of potassa,* ½ gallon; boil to a proper consistence.

Harness Polish. See *p.* 140.

Leather Polish. See *Blacking.*

POLLARD. See *Flour.*

POLLEN. The farina which adheres to the anthers of flowers.

POLLENINE. A peculiar substance extracted by Prof. John from the *pollen* of *tulips.* It is insoluble in most menstrua, and extremely combustible, burning as a flash of white flame. It is said to be used in the Continental theatres to imitate lightning.

POLYCHREST. Syn. *Polychrestus,*—Lat. A term formerly applied to several medicines on account of the numerous virtues they were supposed to possess. *Sal poly-*

crestus is the old name for sulphate of potassa.

POLYCHROITE. The colouring matter of *saffron,* so named from the variety of colours which it exhibits with different reagents. Its alcoholic and aqueous solutions are of a golden yellow; nitric acid turns it *green;* sulphuric acid, first *blue,* and then *lilac.*

POLYCHROME. A peculiar substance obtained from the bark of the *horse chesnut,* and from *quassia wood,* by precipitating the *infusion* with *acetate of lead,* decomposing the precipitate by *sulphuretted hydrogen,* and filtering and evaporating the liquid to a syrup; crystals of *polychrome* form after some time. It is purified by repeated solutions in a mixture of *alcohol and ether.*

Prop., &c. It is chiefly remarkable for its solution appearing colourless by transmitted light, but blue by reflected light; and exhibiting a beautiful play of colours, visible when dissolved in even 1,500,000 parts of water.

POLYCHROMIC ACID. Syn. *Polychromate, Polychromatic Acid, Factitious Aloes-bitter.* A peculiar substance obtained by acting on aloes with nitric acid.

Prep. Take of *powdered aloes,* 1 part; *nitric acid* (sp. gr. 1·25), 8 parts; mix, and when the action is over, evaporate to a syrup, and add *cold water* to throw down the *polychromic acid;* purify it by washing it with water until the liquid passes off of a blue colour.

Prop., &c. A yellowish-brown powder, forming a purple solution; it explodes when heated. When used as a dye-stuff it yields a variety of colours. It is a mixture of *aloetic* and *aloeresinic acids.* (Schunck.) It closely resembles, if it be not identical with *chrysammic acid.*

POLYGALIC ACID. See *Senegine.*

POLYGALINE. See *Senegine.*

POMACE or *Pommage.* See *Cider* (*p.* 257).

POMAMBRA. Syn. *Pomum Ambra.* A ball composed of *musk, ambergris, civet, aromatics, &c.,* formerly used by embalmers to fill the vacant orbits of the eyes.

POMATUM. Syn. *Pomade; Pommade,* —Fr. This term was originally applied to a fragrant ointment prepared with *lard* and *apples;* but is now wholly restricted, in this country, to solid greasy substances used in dressing the hair. The *pomatums* of French pharmacy (*Pommades, Graisses médicamenteuses,* — P. Cod; *Liparolés,*— Guibourt; *Liparolés* and *Liparoïdés,*— Béral; *Stearolés,*—Chéreau) are soft ointments, having a basis of lard or fat, without resinous matter. See *Ointments* and *Pommades.*

POMEGRANATE. The *punica granatum* (Linn.), a small tree indigenous in Persia and the East. Fruit (*pomegranate; granata, mala punica*) is cooling and astringent; fruit-rind (*pomegranate peel; malacorium, cortex granati; Granatum,* —Ph. L.), and root-bark (*Granati radix,* —Ph. L. E. & D.) are powerfully astringent, detersive, and anthelmintic; the last more particularly so. The double flowers of the wild tree (*balaustines; balaustiæ*), as well as those of the cultivated one (*cytini*) are tonic and astingent. *Dose.* 15 to 20 gr., of the root-bark, repeated every 30 or 40 minutes, until four doses have been taken, followed by castor oil; in tape-worm. As an astringent, all the parts described are commonly given under the form of decoction.

POMMADE D'ALYON. See *p.* 898.

POMMADES. The *pomatums* of Continental perfumers.

In the *preparation* of *pommades,* one of the *first objects* of *consideration* is to obtain their fatty basis in as fresh and pure a state as possible. *Lard, beef* and *mutton suet, beef marrow, veal fat,* and *bear's fat,* are the substances commonly employed for this purpose, either singly, or in mixtures of two, or more of them. The *fat* carefully selected from a *young* and *healthy animal,* after being separated from extraneous skin and fibre, is pounded in a *marble mortar,* in the cold, until all the membranes are completely torn asunder. It is next placed in a *covered porcelain* or *polished metal pan,* and submitted to the heat of a water-bath, which is continued until its fatty portion has liquefied, and the albuminous and aqueous matter, and other foreign substances, have completely separated, and subsided. The *liquid fat* is then *carefully skimmed,* and at once passed through a clean *flannel filter.* In this state it may be *aromatized* or *perfumed* at will; after which, when it is intended that the *pommade* should be *opaque* and *white,* it is assiduously stirred or beaten with a *glass* or *wooden knife,* or *spatula,* until it concretes; but when it is desired that it should appear *transparent* or *crystalline,* it is allowed to cool very slowly, and without being disturbed. To prevent the *accession* of *rancidity,* a little *benzoic acid, gum benzoin,* or *nitric ether,* may be added to the fat, whilst in the liquid state, as noticed under *Fats* and *Ointments.* Sometimes a small portion of *white wax* or *bees' wax* (according to the intended colour of the product) is melted with the fat, to increase its *solidity.* Some parties employ a few grains of *powdered citric acid* per *ounce*, in a like manner, with the intention of increasing the *whiteness* of the compound; but the practice is not to be commended, as pommades so prepared prove injurious to the hair.

The *French perfumers*, who are celebrated for the variety and excellence of their pommades, divide them into *four classes* :—

1. *Pommades by Infusion.* These are made by gently melting in a *clean pan*, over a water-bath, 2 parts of *hog's lard*, and 1 part of *beef suet*, (both of the finest quality, and carefully "rendered,") and adding thereto, 1 part of the given *flowers*, previously carefully picked and separated from foreign matter; or, if the odorous substance is a *solid*, then coarsely bruised, but not reduced to fine powder. The mixture is next digested at a very gentle heat for from 12 to 24 hours, with occasional stirring; the vessel being kept covered as much as possible during the whole time. The next day the mixture is re-heated, and again well stirred for a short time, after which it is poured into *canvass bags*, and these being securely tied, are submitted to powerful pressure, gradually increased, in a screw or barrel press. This operation is repeated with the *same fat* and *fresh flowers*, several times, until the pommade is sufficiently perfumed. A good *pommade* requires *thrice* to *six times* its *weight* in *flowers* to be thus consumed; or of the *aromatic barks* and *seeds* a corresponding proportion. The *pommades of Cassia*, *orange flowers*, and several others kept by the French perfumers, are prepared in this manner.

2. *Pommades by Contact.* These are made by spreading, with a pallette knife, *simple pommade* (made with lard and suet as above,) on *panes of glass* or *pewter plates*, to the thickness of a finger, and sticking the surface all over with the *sweet-scented flowers.* These last are renewed daily for one, two, or three months, or until the pommade has become sufficiently perfumed. On the *large scale*, the panes are placed in small shallow frames made of four pieces of wood nicely fitted together, and are then closely piled one upon another. On the *small scale*, pewter plates are generally used, and they are inverted one over the other. In some of the perfumeries of France, many thousands of frames are employed at once. *The Pommades of Jasmin*, *Jonquil*, *Orange-flowers*, *Narcissus*, *Tuberose*, *Violet*, and of some other *delicate flowers*, are prepared in this manner.

3. *Pommades by Addition.* These are prepared by simply adding the *fragrant essences* or *essential oils*, in the required quantity, to the *simple pommade* of lard and suet (see *above*) to produce the proper odour. In this way the *Pommades* of *Bergamotte*, *Cédrat*, *Cinnamon*, *Lemons*, *Lemon thyme*, *Lavender*, *Limettes*, *Marjoram*, *Portugal*, *Roses*, *Rosemary*, *Thyme*, *Verbena*, and above 40 others kept by the Parisian perfumers, are made.

4. *Mixed Pommades.* Of these a great variety exists, prepared by the addition of judicious combinations of the *more esteemed perfumes* to *simple pommade;* or, by the admixture of the different *perfumed pommades*, whilst in the semi-liquid state.

The *coloured pommades* derive their respective tints from *tinctorial matter* added to the melted fat before perfuming it. *Green* is given by *gum guaiacum* (in powder), or by the *green leaves* or *tops* of *spinach*, *parsley*, *lavender*, or *walnut;*—*Red*, by *alkanet root* and *carmine;*—*Yellow* and *orange*, by *annatto* or *palm oil.*—*White pommades* are made with *mutton suet*, instead of beef suet. The *brown* and *black* hard pomatums, vended under the name of "*cosmetiques*," are noticed at *page* 293.

A few *compound pommades* are used as skin cosmetics.

Pommade or *Pomatum*, *Plain do.*, *Simple do.*—1. From *lard*, 2 *lb.;* *beef suet*, 1 *lb.;* carefully rendered, as above. The ordinary consistence for temperate climates.

2. *Lard* and *suet*, equal parts. For warm climates. Both may be *scented* at will.

Pommade (Scented).—1. *Plain pomatum*, 1 *lb.;* melt it by the least possible degree of heat, add of *essence of lemon* or *essence of bergamot*, 3 dr., and stir the mixture until it concretes. This forms the ordinary "*pomatum*" of the shops.

2. *Plain pomatum*, 1½ *lb.;* *essence of bergamot*, 1½ dr.; *essence of lemon*, 1 dr.; *oils of rosemary* and *cassia*, of each, ½ dr.; *oil of cloves*, 20 drops. More fragrant than the last.

Castor Oil Pommade.—1. From *castor oil*, 1 *lb.;* *white wax*, 4 *oz.;* melt them together, then add, when nearly cold, of *essence of bergamot*, 3 dr.; *oil of lavender* (English), ½ dr.; *essence of ambergris*, 10 drops. Supposed to render the hair glossy.

2 (*Crystallized.*) From *castor oil*,

1 *lb.; spermaceti*, 3 *oz.;* melt them together, by a gentle heat, add of *essence of bergamot*, 3 dr.; *oils of verbena, lavender*, and *rosemary*, of each, ½ dr.; pour it into wide-mouthed glass bottles, and allow it to cool very slowly, and undisturbed.

Cazenave's Pommade. From *prepared beef-marrow*, 4 *oz.; tincture of cantharides* (P. Cod.), 3 to 4 dr.; *powdered cinnamon*, ½ *oz.;* melt them together, stir until the spirit has, for the most part, evaporated, then decant the clear portion, and again stir it until it concretes. Recommended as a remedy for *baldness* and *weak hair.* It is to be used night and morning; the head being washed with *soap-and-water*, and afterwards with *salt-and-water*, before applying it. Dr. Cattell scents it with the *oils of origanum* and *bergamot*, instead of cinnamon.

Pommade Collante.—1. *Oil of almonds*, 3 *oz.; white wax*, ¾ *oz.;* melt them together, and add of *tincture of mastic* (strong), 1 *oz.; essence of bergamot*, ½ dr. *Used* to stiffen the hair, and to keep it in form.

2. *Burgundy pitch* (true), 3 *oz.; white wax*, 2 *oz.; lard*, 1 *oz.;* melt, and when considerably cooled, stir in of *tincture of benzoin*, 1 *oz.; essence of bergamot*, ½ dr. *Used* to fasten false curls.

Cowslip Pommade or *Pomatum.* From *plain pommade*, 2 *lb.; essence of bergamot*, 3 dr.; *essence of lemon* and *essence of orange peel*, of each, 1 dr.; *huile au jasmin* and *essence de petit grain*, of each, ½ dr.; *essence of ambergris*, 6 drops.

Crystallized Pommade. From *olive oil* and *spermaceti*, as *crystallized castor oil pommade*, with *scent* at will.

Pommade de Beauté. From *oil of almonds*, 2 *oz.; spermaceti*, 2 dr.; *white wax*, 1½ dr.; *glycerine*, 1 dr.; *balsam of Peru*, ½ dr.; mixed by a gentle heat. *Used* as a skin cosmetic, as well as for the hair.

Pommade de Casse. From *plain pommade*, 1 *lb.; palm oil*, ½ *oz.;* melt, pour off the clear, and add *oil of cassia* and *huile au jasmin*, of each, 1 dr.; *neroli*, 20 drops; *oil of verbena* or *lemon grass*, 15 drops; *otto of roses*, 5 drops; and stir until nearly cold. Very fragrant.

Pommade d'Hèbe. To *white wax*, 1 *oz.*, melted by a gentle heat, add of the *juice of lily bulbs* and *Narbonne honey*, each, 2 *oz.; rose water*, 2 dr.; *otto of roses*, 2 drops. Applied night and morning to remove wrinkles.

Pommade de Ninon de l'Enclos. Take of *oil of almonds*, 4 *oz.; prepared lard*, 3 *oz.; juice of houseleek*, 3 *fl. oz.* *Used* chiefly as a skin cosmetic. Said to be very softening and refreshing.

Pommade Divine.—1. *Washed* and *purified beef marrow*, 2 *lb.; liquid styrax, cypress wood*, and *powdered orris root*, of each, 2 *oz.; powdered cinnamon*, 1 *oz.; cloves* and *nutmegs*, of each (bruised), ½ *oz.;* digest the whole together by the heat of a water bath for six hours, and then strain through flannel.

2. *Plain pommade*, 2 *lb.; essence of lemon* and *bergamot*, of each, 2 dr.; *oils of lavender* and *origanum*, of each, 1 dr.; *oils of verbena, cassia, cloves*, and *neroli*, of each, 12 drops; *huile au jasmin*, 3 dr.; *essence of violets*, ½ *oz.*

Dupuytren's Pommade.—1. Take of *prepared beef marrow*, 12 *oz.;* melt, add of *baume nerval* (see *p.* 897), 4 *oz.; Peruvian balsam* and *oil of almonds*, of each, 3 *oz.;* and, lastly, of *alcoholic extract of cantharides*, 36 gr.; (dissolve in) *rectified spirit*, 3 fl. dr. This is the *original formula* for this celebrated pommade. The following modifications of it are now commonly employed:

2. (M. Cap.) *Beef marrow*, 2 *oz.; alcoholic extract of cantharides*, 8 gr.; *rose oil*, 1 dr.; *essence of lemons*, 30 drops.

3. (M. Guibourt.) *Beef marrow* and *baume nerval*, of each, 1 *oz.; rose oil*, 1 dr.; *alcoholic* (or *acetic*) *extract of cantharides*, 6 gr.; (dissolved in) *rectified spirit*, q. s. These compounds are *used* to promote the growth of the hair and to prevent baldness, for which purpose they are usually coloured and scented, according to the taste of the manufacturer. To be useful, they should be well rubbed on the scalp, at least once daily, for several weeks, and the head should be occasionally washed with soap-and-water.

East India Pomatum or *Pommade.* Take of *suet*, 3 *lb.; lard*, 2 *lb.; bees' wax* (bright), ½ *lb.; palm oil*, 2 *oz.; powdered gum benzoin*, 3 *oz.; musk*, (previously triturated with a little lump sugar), 20 gr.; digest the whole together in a covered vessel, by the heat of a water bath for 2 hours, then decant the clear portion, and add of *essence of lemon*, ½ *oz.; oil of lavender*, ¼ *oz.*; *oils of cloves, cassia*, and *verbena*, of each, ½ dr. A favorite pommade in the East Indies.

Pommade en Crème. See *Cold Cream.*

Hard Pomatum, Roll do.—1. Take of *beef suet*, 2 *lb.; yellow wax*, ¼ *lb.; spermaceti*, 1 *oz.; powdered benzoin*, ¼ *oz.*; melt them together, then add of *oil of lavender*, 2 dr.; *essence of ambergris*, ½ dr. Before it concretes pour it into moulds of *paper* or *tin foil.*

2. *Mutton suet* and *lard*, of each, 1 *lb.;*

white wax, 6 *oz.;* melt, and add of *essence of lemon*, 2 dr.; *oil of cassia*, ½ dr. Other perfumes may be employed at will.

Hard pomatums are used to gloss and set the hair. They act both as *pommade* and *fixateur.* See *Cosmetiques.*

Macassar Pommade. From *castor oil*, 5 *oz.; white wax*, 1 *oz.; alkanet root*, ½ dr.; heat them together until sufficiently coloured, then strain, and add *oil of origanum* and *oil of rosemary*, of each, 1 dr.; *oil of nutmeg*, ½ dr.; *otto of roses*, 10 drops. Said to be equal in efficacy to *Macassar oil.*

Marechal Pommade. Plain pommade scented by digesting it with *poudre marechale.*

Marrow Pommade, Marrow Pomatum. From *prepared beef marrow*, ½ *lb.; beef suet*, ¼ *lb.; palm oil*, ¼ *oz.*; melted together and scented at will.

Millefleur Pommade. From *plain pommade* scented with a mixture of *essence of lemon* and *essence of ambergris*, each, 4 parts; *oil of lavender*, 2 parts; *oil of cloves* and *essence de petit grain*, of each, 1 part; or with other like perfumes so proportioned to each other that no one shall predominate. Much esteemed.

Roll Pomatum. See *Hard Pomatum.*

Roman Pommade. See *below.*

Rose Pommade, Rose Pomatum. This is *plain pommade* or *hard lard*, which has been well beaten with *eau de rose*, or, better still, scented with *otto of roses.* It is sometimes tinged with *alkanet root.*

Soft Pomatum. Plain pomatum scented at will.

Soubeiran's Pommade. From *beef marrow*, 1½ *oz.; oil of almonds*, ½ *oz.; disulphate of quinine*, 1 dr. Recommended for strengthening and restoring the hair.

Vanilla Pomatum, Pommade à la Vanille, Pommade Romain. From *plain pommade* and *pommade à la rose*, of each, 12 *lb.; powdered vanilla*, 1 *lb.;* heat them together in a water bath, stir constantly for 1 hour, let it settle for another hour, decant the clear, and add *oil à la rose*, 2½ *lb.; bergamot*, 4 *oz.*

POMPHOLIX. See *Oxide of Zinc.*

POMPHOLYX. See *Pemphigus.*

POPPY. Syn. *White Poppy; Papaver Somniferum*,—Linn. The *capsules* or *fruit* ("mature,"—Ph. L.; "not quite ripe,"—Ph. E.) form the *poppies* or *poppy heads* of the shops (*papaveris capsulæ; papaver*,—Ph. L. E. and D.) They are anodyne and narcotic, similar to opium, but in only a very slight degree. The seeds (*maw seed*), which are sweet, oleaginous, and nutritious, are used as a substitute for almonds in confectionery and mixtures, and are pressed for their oil. See *Extracts, Opium*, and *Syrups.*

POPPY (Red). Syn. *Corn Poppy, Corn Rose; Papaver Rhœas*,—Linn. The fresh petals or flowers (*rhœados petala; rhœas*,—Ph. L. E. & D.) are reputed pectoral, but are chiefly employed on account of their rich colour. See *Syrups.*

POPULINE. Syn. *Populinum*,—Lat. A peculiar neutral, crystallizable substance, formerly supposed to be an alkaloid, found, associated with salicine, in the *root-bark* of the *populus tremula* (Linn.) or *aspen.*

Prep. Concentrate the *decoction* by a gentle heat, and set it aside in a cool situation to crystallize; dissolve the crystals which are deposited in *rectified spirit*, decolour them by digestion with *animal charcoal*, filter, and again crystallize. To render them still purer, they may be redissolved and crystallized a second, and a third time, if necessary.

Prop., &c. It resembles salicine in appearance and solubility, but, unlike that substance, has a penetrating sweet taste. Dilute acids convert it into benzoic acid, grape sugar, and *saliretine;* and with a mixture of sulphuric acid and bichromate of potassa it yields a large quantity of *hydruret of salicyle.* It appears to be tonic, stomachic, and febrifuge.

PORCELAIN. See *Pottery.*

PORK. The value of pork as an article of diet is well known. That from the young and properly fed animal is savoury, easy of digestion, and, when only occasionally employed, highly wholesome; but it is apt to disagree with some stomachs, and should, in such cases, be avoided. To render it proper for food, it should be *thoroughly*, but not over-cooked. When *salted* it is less digestible. "The frequent use of pork is said to favour obesity, and to occasion disorders of the skin, especially in the sedentary."

"The *quality* of *pork* entirely depends on the feeding. A friend of mine made various experiments, and more particularly on the same litter of pigs, and the various sizes and different flavour of the meat was extraordinary. There is one thing very certain, that whatever a pig is fed upon, it will be much better in size and quality if kept thoroughly clean, and supplied with a proper quantity of wholesome food." (A. Soyer.)

PORPHYRIZED and *Porphorization.* Words coined by recent pharmaceutical writers, and possessing similar meanings to *levigated* and *levigation.* (See *p.* 689.)

PORPHYROXINE. A neutral crystallizable substance discovered by Merck in opium. It is soluble in both alcohol and ether, insoluble in water, and is characterized by assuming a purplish red colour when heated in dilute hydrochloric acid.

PORRIGO. See *Ring-worm.*

PORTER. This well-known beverage, now the common drink of the inhabitants of London, by whom it is generally termed "beer," originated with a brewer named Harwood, in 1722. Previously to this date "*ale*," "*beer*" and "*twopenny*," constituted the stock in trade of the London publican, and were drunk, either singly, or together under the names of "*half-and-half*" or "*three threads*," for which the vendor was compelled to have recourse to two or three different casks, as the case might demand. The inconvenience and trouble thus incurred led Mr. Harwood to endeavour to produce a beer which should possess the flavour of the mixed liquors. In this he succeeded so well that his new beverage rapidly superseded the mixtures then in use, and obtained a general preference among the lower classes of the people. At first this liquor was called "entire" or "entire butt," on account of it being drawn from *one* cask only, but it afterwards acquired, at first in derision, the now familiar name of "*porter*," in consequence of its general consumption among porters and labourers. The word "*entire*" is still however, frequently met with on the signboards of taverns about the metropolis.

The *characteristics* of *pure* and *wholesome porter* are its transparency, lively dark brown colour, and its peculiar bitter and slightly burnt taste. Originally, these qualities were derived from the "high-dried malt" with which alone it was brewed. It is now generally, if not entirely, made from "*pale*" or "*amber malt*" mixed with a sufficient quantity of "*patent*" or "*roasted malt*" to impart the necessary flavour and colour. *Malt-wort* evaporated to an extract, and then partially torrefied in *an iron pan*, and, less frequently, *burnt sugar* or *caramel*, are also used for the same purpose. Formerly, this liquor was "vatted" and "stored" for some time before being sent out to the retailer, but the change in the taste of the public during the last quarter of a century in favour of mild or new porter, has rendered this unnecessary. The best "*draught porter*," at the time of its consumption, is now only a few weeks old. In this state only would it be tolerated by the modern beer-drinker. The old and acid beverage that was formerly sold under the name of porter would be rejected at the present day, as "hard" and unpleasant, even by the most thirsty votaries of malt liquor.

The *beer* or *porter* of the *metropolitan brewers* is essentially a *weak mild ale*, coloured and flavoured with *roasted malt* or *malt extract*. Its *richness* in *sugar* and *alcohol*, on which its stimulating and nutritive properties depend, is, hence, *less* than that of an *uncoloured* mild ale brewed from a like original quantity of malt. For pale malt is assumed to yield 80 to 84 *lb.* of saccharine per quarter; whereas the torrefied malt employed by the porter-brewers, only yields 18 to 24 *lb.* per quarter, and much of even this small quantity is altered in its properties, and is incapable of undergoing the vinous fermentation. In the manufacture of porter there is a waste of malt which does not occur in brewing ale; and the consumer must, therefore, either pay a higher price for it or be content with a weaker liquor.

The *hygienic properties* of *porter*, for the most part, resemble those of other malt liquors. Some members of the faculty conceive that it is better suited to persons with delicate stomachs and weak digestion than either ale or beer. That there may be some reason for this preference, in such cases, we are not prepared to deny, but undoubtedly, when the intention is to stimulate and nourish the system, *ale* is *preferable*. Certain it is, however, that the dark colour and strong taste of porter render its adulteration easier than that of ale, whilst such adulteration is more difficult of detection than in the paler varieties of malt liquors. "For *medical purposes*, 'bottled porter' (*cerevisia lagenaria*), is usually preferred to 'draught porter.' It is useful as a restorative in the latter stages of fever, and to support the powers of the system after surgical operations, severe accidents, &c." (Pereira, ii, 982.) When "out of condition" or adulterated, porter, more than perhaps any other malt liquor, is totally unfit for use as a beverage, even for the healthy; and when taken by the invalid, the consequences must necessarily be serious. Dr. Ure says that *pure porter*, "when drank in moderation, is a far wholesomer beverage for the people than the thin acidulous wines of France and Germany."

The *manufacture of porter* has been described in our article on "*brewing*," and is also referred to above. It presents no difficulty or peculiarity, beyond the choice of the proper materials. A mixture of "*brown*" and "*black malt*" is thought to yield a finer flavour and colour to the pale malt that gives the body to the liquor, than when "black" or "patent malt" is employed alone. The proportion of the former to the latter commonly varies from 1-6th to 1-4th. When "black malt" alone is used, the proportion varies from the 1-10th to 1-15th. 1 *lb.* of "*patent malt*" mashed with about 79 *lb.* of *pale malt*, is said to be capable of imparting to the liquor the flavour and colour of porter. The following formulæ were formerly commonly employed in London:—

1. (*Draught Porter.*) From *pale malt*, 3½ qrs.; *amber malt*, 3 qrs.; *brown malt*, 1½ qrs.; mash at twice with 28 and 24 barrels of water, boil with *brown Kent hops*, 56 *lb.;* and set with *yeast*, 40 *lb.* *Prod.* 28 barrels, or 3½ times the malt, besides 20 brls. of table-beer from a third mashing.

2. (*Bottling Porter; Brown Stout.*) From *pale malt*, 2 qrs.; *amber* and *brown malt*, of each, 1½ qrs.; mash at 3 times with 12, 7, and 6 brls. of water, boil with hops, 50 *lb.*; and set with *yeast*, 26 lb. *Prod.* 17 brls. or 1½ times the malt.

The *purity* and *quality* of *porter*, as well as of other malt liquors, may be inferred in the manner noticed under "*Beer*" (see *p.* 122); but can only be positively determined by a chemical examination. For this purpose several distinct operations are required:—

1. *Richness in Alcohol.* This may be correctly found by the *method* of M. Gay-Lussac; or, from the *boiling point.* (See *Alcoholometry* and *Ebullioscope.*) The method *with fused carbonate of potassa* (see No. 6. *p.* 36) will also give results sufficiently near to the truth for ordinary purposes, when strong or old beer is operated on, The quantity of the liquor tested should be 3600 water-grains measure; and it should be well agitated, with free exposure to the air, after weighing it, but before testing it for its alcohol. The WEIGHT OF ALCOHOL found, multiplied by 1·8587 gives its equivalent in *sugar*. This may be converted into *brewer's pounds* or *density per barrel*, as below.

2. *Richness in Saccharine* or *Extractive matter.* A *like quantity* of the *liquor* under examination, after being boiled for some time to dissipate its alcohol, or the *liquor from which the alcohol has been distilled* (see No. 1), is made up with *distilled water*, so as to be again exactly equal to 3600 water-grains measure. The sp. gr. of the resulting liquid is then taken, and this is reduced to BREWER'S POUNDS per barrel, by multiplying its excess of density above that of water (*or* 1000) by 360, and pointing off the three right-hand figures as decimals.

3. *Acetic Acid* or *Vinegar.* This is determined by any of the common methods of *Acidimetry.* (See *pp.* 17—20.) *Each grain* of ANHYDROUS ACETIC ACID, so found, represents 1·6765 gr. of *sugar*.

4. *Gravity of Original Wort.* This is obtained by the addition of the respective quantities of *saccharine matter* found in Nos. 1, 2, and 3 (*above*). These results are always slightly under the true original density of the wort, as cane sugar appears to have been taken by the Excise as the basis of their calculations. More correctly, 12% of *proof spirit* is equivalent to 19 *lb.* of SACCHARINE per *barrel.* 10½ *lb.* of *saccharine* are equiv. to 1 gall. of *proof spirit.*

5. *Detection of Narcotics.* This may be effected either by the *method* described under *Alkaloids* (*Tests, &c.* p. 45), or by one or other of the following processes:—

a. ½ gall. of the *beer under examination* is evaporated to dryness in a water bath; the *resulting extract* is boiled for 30 or 40 minutes in a covered vessel with 10 or 12 *fl. oz.* of *alcohol*, or strong *rectified spirit*, the mixture being occasionally stirred with a glass rod, to promote the action of the menstruum; the *alcoholic solution* is next filtered, treated with a sufficient quantity of *solution of diacetate of lead* to precipitate colouring matter, and again filtered; the filtrate is treated with a few drops of *dilute sulphuric acid*, again filtered, and then evaporated to dryness; it may then be tested with any of the usual reagents, either in the solid state, or after being dissolved in *distilled water*. Or, the *extract*, obtained as above, may be boiled as directed with *rectified spirit*, the solution filtered, the spirit distilled off, and a small quantity of pure *liquor of potassa* added to the aqueous residue, which is then to be shaken up with about 1 *fl. oz.* of *ether;* lastly, the *ethereal solution*, which separates and floats on the surface, is decanted, evaporated, and the residuum tested, as before. This answers well for the detection of STRYCHNINE or NUX VOMICA.

b. From 2 to 3 *oz.* of *purified animal charcoal* are diffused through ½ gall. of the *beer*, and is digested in it, with frequent agitation, for from 8 to 12 hours; the liquor is next filtered, and the *charcoal* collected on the filter, is boiled with about ½ pint of *rectified spirit;* the resulting *alcoholic solution* is then further treated as above, and tested.

6. *Picric Acid.* This substance, now so commonly employed to impart *bitterness* to London porter, in lieu of hops, may be detected as follows:—

a. A portion of the liquor agitated with a little *solution of diacetate of lead* LOSES its bitter flavour if it depends on *hops*, but RETAINS it, if it depends on *picric acid.*

b. Pure beer is *decoloured* and *deodorized* by *animal charcoal;* but beer containing *picric acid*, when thus treated, *retains both.* In this way the 1-12,000 to the 1-18,000th part of PICRIC ACID may be detected. (*Journ. de Chemie Méd.*)

c. The *complexion* of heavy drinkers of beer containing *picric acid* generally acquires more or less of a bilious yellow colour ; and the white of the eye gradually loses its original purity, assuming a peculiar abnormal appearance, not very marked, but which may be readily recognised by any person who has observed the peculiar physiological action of *picric acid* on animals.

7. *Alkaline or Earthy matter.—a.* A weighed quantity of *pure beer* evaporated to dryness, and then incinerated, does not furnish more than from ·20$\frac{0}{0}$ to ·35$\frac{0}{0}$ of ASH, the quantity varying within these limits with the strength of the liquor, and the character of the water used in brewing it.

b. A solution of this *ash*, made by coction with *distilled water*, should be only rendered slightly turbid by *solutions* of *acetate of lead*, *bichloride of platinum*, *nitrate of baryta*, *nitrate of silver*, *oxalate of ammonia*, and *sulphuretted hydrogen.*

c. If the beer contained *common salt* the above solution will give a cloudy white precipitate, with a *solution of nitrate of silver.* Each grain of this precipitate is equivalent to ½ gr. of COMMON SALT (nearly).

d. If *green copperas* or *sulphate of iron* is present, *ferridcyanide of potassium* gives a blue precipitate, and *ferrocyanide of potassium* a bluish-white one, turning dark blue in the air; *solution of chloride of barium* gives a white precipitate, *each grain* of which, after being washed, dried, and ignited, represents 1·188 gr. of CRYSTALLIZED PROTOSULPHATE OF IRON.

e. The *ash*, digested in *water slightly acidulated with nitric acid*, and then boiled, yields a solution, which, when cold, gives a black precipitate with *sulphuretted hydrogen*, and a white one with *dilute sulphuric acid* when LEAD is present. (See *p.* 157.)

Concluding Remarks. The adulteration of malt liquor, and especially of porter, has become so general, that the sale of *pure beer* by the publican is the *exception*, and *not* the *rule.* This we have amply verified by an extensive investigation of the subject, undertaken for the proprietors of one of the *medical journals*, in 1852. We collected and carefully examined altogether upwards of 70 samples of "*draught*" and "*bottled porter*," and "*draught* and *bottled stout*," not *one third* of which did we find to be the *produce of malt and hops* alone. Most of them were shamefully adulterated, and several of them contained substances of a highly deleterious character. Not more than 6$\frac{0}{0}$ of them were, indeed, absolutely pure, and at the same time in fine drinking condition. Since the above date this evil has increased, rather than lessened, and the venalities of the publicans seriously interfere with the hygienic condition of the people. The public of this great metropolis are the principal sufferers from this practice ; but, though they have been often warned, and are hence cognisant of its existence, they are utterly indifferent on the subject. They appear to prefer the stupor and narcotism produced by *cocculus Indicus*, *nux vomica*, *extract of poppies*, *opium*, and *tobacco*, with all their *frightful consequences*, to the genial stimulus and wholesome tonic action of pure malt liquor, when consumed in moderation. The drunken porter-drinker undoubtedly enjoys the delirium produced by these substances, and even prizes the shattered condition of the nervous system, the parched mouth, the "swimming head," and the "shaking hand" experienced on rising in the morning, on account of their reminding him of his over-night's "tipple." This is a state of things on which the medical practitioner and the observant philanthropist have long exerted themselves in vain. With the view of obviating this evil, some of these gentlemen, a few years since, called in the joint-stock system of trading, and obtained an *Act of Parliament* establishing a company upon entirely new principles, having for its especial object the production of *malt liquors*, not merely *absolutely pure*, but also at *reduced prices.* It was shown that the manufacture of the various beverages from malt and hops, known to be so largely remunerative, was much less satisfactory on the *small scale* than on a *large one*, but might be carried out with facility and success by a number of small capitalists united. The managers more particularly addressed themselves to the trading and working classes, and divided their capital of £200,000 in such a manner as to place a full participation in its advantages within their reach. The shares were fixed at £5 each, payable in calls of 10*s.* each ; and these at once enabled the shareholders to reap the advantages of being both buyers and sellers, and of being their own brewers. A person is also admitted as a *subscriber* by a single payment of £1, by which he is entitled to a *reduction in price*, and avoiding all further liability. The shareholders and subscribers are privileged to *inspect the premises*, the *operations* carried on, and the *materials used.* The company have hitherto paid a dividend of 5 per cent. to the shareholders; and the workmen regularly employed are allowed to participate in the surplus profits, in proportion to the wages earned. A larger capital would, however, enable the company to realize much larger profits, while, at the same time, it would place it in a position more extensively to diffuse the benefits derived from the manufacture of *good* and *cheap beer*, an article so essential to the health and enjoyment of the working man. The existing shareholders therefore wisely press upon *all*, but the working class more particularly, the importance of giving their support to the company.

We have carefully examined and analysed the *ales* and *beers* produced by the "*Metropolitan and Provincial Joint-stock Brewery Company*" above referred to, and can, therefore, positively affirm them to be *absolutely pure*, and to contain nothing but what is derived from *malt*, *hops*, and *water*, and which *alone* should be present in good malt liquor. In further evidence of our confidence in the integrity and wholesome character of these liquors, we may add, that, for some time, they are the only kind we have employed in our household, although, did we follow convenience instead of purity, we should not do so, as our *interest*, apart from *health*, lies *elsewhere.* The *company's premises*, where operations are now being carried on, are at Brentford, Middlesex, and Hemel Hempstead, Herts. The *Chief Office* is at No. 8, Moorgate Street; and their *Town Stores* (conducted by Mr. Wm. Stevens) at No. 13, Upper Wellington Street, Strand.

(For further information connected with this subject, see the '*Med. Circ.*,' i, 257-260, 296-300; '*Lancet*,' 1852, i, 473-479; and the articles *Alcoholmetry*, *Beer*, *Brewing*, *Distillation*, *Ebullioscope*, *Malt Liquors*, *Wines*, &c., in this work.)

PORT-FIRE. A paper tube, from 9 to 12 inches in length, filled with a slow burning composition of *meal-powder*, *nitre*, and *sulphur*, rammed moderately hard, by a similar process to that adopted for small rockets. It is *used* in lieu of a touch-match, to fire guns, mortars, pyrotechnical devices, &c.

PORTLAND CEMENT. A *species* of *mortar* formed by calcining a *mixture* of *limestone* and *argillaceous earth*, and grinding the calcined mass to powder, in which state it must be preserved from the air. It is characterised by absorbing a large quantity of water, and then rapidly becoming solid, and, after a time, acquiring considerable hardness. See *Mortars* and *Cements.*

POSCA. The old Latin name of *vinegar-and-water*, to which *eggs* were sometimes added.

POSOLOGY. See *Doses.*

POSSET. Syn. *Possetum*,—Lat. *Milk* curdled with *wine* or any other *slightly acidulous liquor.* It is usually sweetened with either *sugar* or *treacle*, and is taken hot.

Prep. From *new milk*, ½ pint; *sherry* or *marsala*, 1 wine-glassful; *treacle*, 1 or 2 table-spoonfuls, or q. s.; heat them together in a clean saucepan until the milk coagulates. This is called "*Treacle Posset*," or "*Molasses Posset*," and taken on retiring to rest, is highly esteemed in some parts of the country as a domestic remedy for colds. *Lemon juice*, *strong old-ale*, or even *vinegar*, is occasionally substituted for wine, and *powdered ginger* or *nutmeg* added at will.

POST. See *Poppy Wine.*

POTASH. The "*potash*," or "*potashes*," of commerce, is an impure *carbonate of potassa*, so named after the pots or vessels in which it was first made. The "*potash*," or "*potassa*," of the chemist, is the *hydrate of potassa*, or *hydrated oxide of potassium*, a peculiar metal, which is more particularly referred to below. The word *potash* is now generally employed in connexion with the crude or commercial compounds of the alkali; and *potassa*, in connexion with those which are chemically or commercially pure, or which are prepared on the small scale for the purposes of medicine, analysis, &c. See *Carbonate of Potassa, &c.*

POTASSA. Syn. *Potash* (pure); *Oxide of Potassium*, *Protoxide of do.; Vegetable Alkali; Potasse*,—Fr. *Kali*,—Germ. *Potassa*,—Lat. This occurs in two forms:—

1. (*Anhydrous.*) Obtained by the combustion of *potassium* in hot dry air. A volatile, fusible, white substance, intensely corrosive, and passing into *hydrate of potassa*, with the evolution of much heat, when moistened with water.

2. (*Hydrated.*) See *Hydrate of Potassa.*

Tests, &c. Potassa and its salts are—*colourless*, when not associated with a coloured metallic oxide or acid;—*non-volatile* by the strongest heat of a spirit lamp;—*soluble in water*, and, generally, freely so;—they impart a *purple* or *violet* colour to the *outer flame* of the blowpipe, when, supported on a platinum wire, they are heated in the apex of the *inner flame*.—A like colour is also imparted to the *flame of alcohol*, when that substance is ignited with a salt of potassa, previously heated with a very small quantity of water. The *presence* of SODA obscures the last two reactions completely.—*Pure potassa*, as well as its *hydrate* and *carbonate*, deliquesce in the air, forming oily liquids which do not solidify by the absorption of carbonic acid.

Solutions of potassa and its *salts* are thus distinguished:—1. They are unaffected by sulphuretted hydrogen, the hydrosulphurets, ferrocyanides, and carbonates.—2. A solution of tartaric acid, added, in excess, to moderately strong neutral, or alkaline solutions of potassa or its salts, gives a quickly subsiding, gritty or crystalline, white precipitate of bitartrate of potassa, which is redissolved on heating the liquid, and again separates as it cools; and is also soluble in aqueous solutions containing free alkali, or free mineral acids.—3. Bichloride of platinum produces, in neutral and acid solutions, a yellow, crystalline precipitate of potassio-chloride of platinum. Alkaline solutions require to be first slightly acidulated with hydrochloric acid. The separation of the precipitate here, as well as in No. 2, is promoted by violent agitation and friction against the sides of the vessel, and the delicacy of both is increased by the addition of some alcohol.—4. Carbazotic acid gives a yellow crystalline precipitate, which is only sparingly soluble in water.—5. Hydrofluosilicic acid gives a white precipitate, which is only slightly soluble.—6. Perchloric acid also gives a like white precipitate.

Estim. See *Alkalimetry.*

Concluding Remarks. The compounds of potassa are a highly valuable and important class of bodies, and are applied to an almost infinite variety of uses in the arts and manufactures, and in medicine. It is the most powerful antiscorbutic known. According to Dr. Garrod, the peculiar efficacy of fresh vegetables and fruit in scurvy depends on the potash which they contain. *Potatoes*, *wheat-meal*, and *lemon juice* are rich in *this substance. Fine wheaten flour* and *rice* contain little of it; the last, even too little to support life. Under the form of carbonate, citrate, malate, oxalate, tartrate, or some similar combination, potassa is universally diffused throughout the vegetable world, and from this kingdom of nature man obtains, by means at once simple and inexpensive, an unfailing and plentiful supply of this substance. Potassa is also found in the mineral kingdom, which indeed is the only original storehouse of it; but its direct elimination from this source has not, hitherto, been successfully carried out on the commercial scale.

Most of the *salts of potassa* may be *prepared* by directly saturating or neutralizing a *solution of the acid* with a *solution* of the *carbonate* or *hydrate of potassa;* and, in some instances, advantageously, by *double decomposition.* The filtered solution will generally yield crystals, either by simple evaporation, or by allowing the boiling concentrated solution to cool very slowly. See *Crystallization* (and *below*).

POTASSA (Acetate of). Syn. *Potassæ Acetas,*—Ph. L. E. & D. *Kali Acetas,*—Ph. D. 1807. *Kali Acetatum,*—Ph. D. 1788. *Sal Diureticus,* — Ph. L. 1745. *Diuretic Salt, Foliated Tartar, Regenerated do., Foliated Salt of Tartar, Essential Salt of Wine, Digestive Salt of Silvius, Arcanum Tartari, Terra Foliata Tartari, &c.,*—Obs. var. *Prep.* 1. (Ph. L.) *Acetic acid,* 26 fl. oz.; *distilled water,* 12 fl. oz.; mix, and add, gradually, of *carbonate of potassa,* 1 ℔, or q. s. to saturate the acid; next, filter the solution, and evaporate it by the heat of a sand-bath, gradually applied, until the salt is dried.

2. (Ph. E.) *Pyroligneous acid,* 1½ pint; *carbonate of potassa* (dry), 7 oz., or q. s.; mix as before, then evaporate the neutral solution over a vapour-bath, until it is sufficiently concentrated to form a (dry) concrete mass on cooling; lastly, allow the whole to cool slowly, so as to crystallize in a solid cake, which must be broken up, and immediately put into well-closed bottles.

3. (Ph. D.) Pure *carbonate of potassa,* 1 *lb.;* commercial *acetic acid* (sp. gr. 1·044), 1 quart; mix as before, and boil for "a couple of minutes;" next add, if necessary, a few drops more of acetic acid, "so that the solution may have a *slightly* acid reaction, and, having evaporated the liquid to dryness, melt the residuum, by the cautious application of heat, in a clean pot of cast iron; the liquefied salt is now to be removed from the fire, and when, upon cooling, it has solidified, it should be quickly broken into fragments of a suitable size, and enclosed in a bottle furnished with an air-tight stopper."

Prop., &c. Acetate of potassa, prepared as above, occurs in shining white masses, having a foliated, soft texture, a slight, but peculiar odour, and a warm sharp taste; it deliquesces in the air; dissolves in rather less than its own weight of water, and in about twice its weight of alcohol; and by exposure to a red heat is converted into pure carbonate of potassa. In trade it is preserved in well-corked and sealed bottles.

Pur. "It is (entirely) soluble in water, and in rectified spirit. These solutions neither affect litmus nor turmeric, nor are they disturbed by either chloride of barium or nitrate of silver; but if from a stronger solution anything is thrown down by nitrate of silver, the same is again dissolved on the addition of water or dilute nitric acid. Sulphuric acid being added, fumes of acetic acid are evolved. 100 gr. of this salt digested in sulphuric acid, the solution evaporated, and the residuum dried at a high temperature, furnish 88·8 gr. of sulphate of potassa." (Ph. L.)

Uses, &c. Acetate of potassa has been found useful in dropsies, febrile affections, jaundice, scurvy, calculus, and several chronic skin diseases. During its exhibition the urine becomes at first neutral, and then alkaline, owing to the salt being converted into carbonate of potassa in the system. *Dose.* As a diaphoretic and antiscorbutic, 15 to 20 gr.; as a diuretic, 20 to 60 gr.; as an aperient, 2 to 3 dr.; in each case dissolved in some bland liquid, or in the infusion of some mild vegetable bitter.

POTASSA (Antimoniate of). See *Diaphoretic Antimony.*

POTASSA (Arseniate of). Syn. *Neutral Arseniate of Potash; Potassæ Arsenias,*—Lat. From solutions of *arsenic acid* and *potassa,* in equivalent proportions; or by saturating the *excess* of acid in the *binarseniate* with *potassa.* Uncrystallizable. (See *below.*)

POTASSA (Binarseniate). Syn. *Superarseniate of Potash; Arsenicated Kali, Macqueer's Neutral Arsenical Salt; Potassæ Binarsenias; Kali Arsenias,*—Ph. D. 1806. *Prep.* Take of *arsenious acid* (white arsenic) and *nitrate of potassa,* of each, in powder, 1 part; heat the mixture to dull redness in a glass flask, until it fuses, and red vapours cease to be evolved; dissolve the residuum, when cold, in *boiling distilled water,* 50 parts; concentrate the solution by evaporation, and set it aside to crystallize.

Prop., &c. This salt forms large crystals, which are permanent in dry air, soluble in about $4\frac{1}{2}$ parts of water, and insoluble in alcohol. It is reputed tonic, alterative, and antiperiodic. *Dose.* $\frac{1}{16}$ to $\frac{1}{8}$ gr., dissolved in sweetened water. It is also used to form a resist-paste in calico-printing, and in the manufacture of cobalt blue.

Obs. Binarseniate of potassa is now made on a very extensive scale in Saxony. It forms the *arseniate of potash* of commerce, and the *potassæ arsenias* employed in medicine. The *arseniates of lime* and *magnesia* are prepared in a similar manner.

POTASSA (Arsenite of). Syn. *Potassæ Arsenitis,*—Lat. This is formed by boiling *hydrated potassa,* or its *carbonate,* with *arsenious acid,* in atomic proportions. It is a very soluble and scarcely crystallizable compound. It forms the basis of *Dr. Fowler's Solution,* and the *Liquor Arsenicalis* of the Pharmacopœias.

POTASSA (Benzoate of). Syn. *Potassæ Benzoas,*—Lat. Very soluble, and somewhat difficult to crystallize. See *Benzoates.*

POTASSA (Borate of). Syn. *Boraxated Kali; Potassæ Boras,*—Lat. *Prep.* From *dry carbonate of potassa* and *dry boracic acid,* equal parts, reduced to powder, and heated to redness in a covered crucible; the sublimed mass, when cold, being dissolved in boiling water, and the filtered solution concentrated by evaporation, and then set aside to crystallize; or at once completely evaporated to dryness. *Dose.* 1 to 6 gr.; in calculi, &c.

POTASSA (Boro-tartrate of). Syn. *Soluble Cream of Tartar; Crème de Tartre Soluble,*—Fr. *Potassæ Boro-tartras, Cremor Tartari Solubilis,*—Lat. *Prep.* (P. Cod.) *Crystallized boracic acid,* 1 part; *bitartrate of potassa,* 4 parts; *water,* 24 parts; dissolve by the aid of heat, in a silver basin, and, constantly stirring, evaporate the resulting solution, either to dryness, and then powder it, or merely to a syrupy consistence, when it may be spread upon plates, and dried in scales, by the heat of a stove. It must afterwards be preserved from the air.

Prop., &c. A white, deliquescent powder, freely soluble in water. It has been *used* as a solvent for lithic calculi, and in gout, &c. *Dose.* 15 to 30 gr. In doses of 2 to 4 dr. it is laxative, and is very popular as such on the Continent. For another formula for *soluble tartar,* see *Boro-tartrate of Potassa and Soda.*

POTASSA (Carbonate of). Syn. *Potassæ Carbonas,*—Ph. L. E. & D. *Potassæ Subcarbonas,*—Ph. L. 1824, Ph. E. 1839, and Ph. D. 1807. *Kali Præparatum,*—Ph. L. 1788. *Sal Absinthii, Sal Tartari,*—Ph. L. 1746. *Subcarbonate of Potash, Salt of Tartar, Salt of Wormwood, Prepared Kali, Fixed Nitre, Mild Vegetable Alkali, &c.,*—Obs. var. Impure or crude carbonate of potassa is chiefly imported from America and Russia, and is obtained by lixiviating *wood ashes*, and evaporating the solution to dryness. The mass is then transferred into iron pots, and is kept in a state of fusion for several hours, until it becomes quiescent, when the heat is withdrawn, and the whole is left to cool. It is next broken up and packed in air-tight barrels, and in this state constitutes the "*potashes*" or "*potash*" of commerce. *Another method* is to transfer the black salts, or product of the first evaporation, from the kettles to a large oven or furnace, so constructed that the flame is made to play over the alkaline mass, which is kept constantly stirred by means of an iron rod. The ignition is continued until the impurities are burned out, and the mass changes from a blackish tint to a dirty or bluish white. The whole is next allowed to cool, and is then broken into fragments, and packed in casks as before. It now constitutes "*pearlash.*" (*Lixivus Cinis,*—Ph. D.) When either *potash* or *pearlash* is dissolved in *cold distilled water*, the solution depurated, filtered, and crystallized, or simply evaporated to dryness, it forms "*refined ashes*," or carbonate of potash sufficiently pure for most pharmaceutical and technical purposes. The *granulated carbonate of potash, salt of tartar*, or *prepared kali*, of the shops, is simply *refined ashes* which, during the evaporation, and more especially towards the conclusion of the desiccation, has been assiduously stirred, so that it may form small white granulations, instead of adhering together to form an amorphous solid mass. In this state it constitutes the ordinary *carbonate of potassa* of the Pharmacopœias.

Prep. 1. (*Potassæ Carbonas è Lixive Cinere,*—Ph. D.) *Pearlash*, 10 *lb.; distilled water* (cold), 1 gall.; macerate for a week, occasionally stirring the mixture, filter the (depurated) solution through calico, and having evaporated it nearly to dryness (in an iron vessel), reduce the heat, and stir constantly with an iron rod, until granular crystals are obtained, which are to be immediately enclosed in well-stopped bottles (or otherwise excluded from the air). The formula of the Ph. L. 1836, was similar, except in directing simple solution, instead of "digestion for a week." The corresponding preparation of the Ph. L. & E. is included in the Materia Medica.

2. (M. Meyer.) *Raw potash*, 10 parts, is dissolved in *cold water*, 6 parts, and the solution is allowed to remain for 24 hours in a *cool place;* it is then filtered, and somewhat concentrated by evaporation, crystallization being prevented by continually stirring the mass until the whole is nearly cold; it is next decanted into a strainer, and the mother-liquor (containing chloride of potassium and silicate of potassa) allowed to drip off; the residuum is evaporated to dryness at a gentle heat, and redissolved in an equal quantity of *cold distilled water ;* the new solution, after filtration, is again evaporated to dryness. The *product* is *quite free* from sulphate of potassa, and is nearly free from both chloride of potassium and silicates.

3. *Pure Carbonate of Potassa ; Potassæ Carbonas Purum,*—Ph. E. & D., and Ph. L. 1836.—*a.* (Ph. L. 1836.) From *bicarbonate of potassa*, in crystals, heated to redness in a crucible.

b. (Ph. E.) As the last. Or, more cheaply, by dissolving *bitartrate of potassa* in thirty parts of *boiling water*, separating and washing the crystals which form on cooling, heating them in a loosely-covered crucible to redness so long as fumes are discharged, breaking down the mass, and roasting it in an oven for two hours with occasional stirring; lixiviating the product with (cold) *distilled water*, filtering the solution thus obtained, evaporating it to dryness, granulating the salt towards the close by brisk agitation, and, lastly, heating the granular salt, thus obtained, nearly to redness. The *potassæ carbonas è tartari crystallis*, Ph. D. 1826, and the *potassæ subcarbonas purissimus*, Ph. E. 1817, were prepared in a nearly similar manner, the evaporation being ordered in a "vessel of silver."

c. (Ph. D.) *White bitartrate of potassa*, 2 *lb.*, is exposed to a red heat in an iron crucible, as before ; the powdered calcined mass is boiled for 20 minutes in *water*, 1 quart, the solution filtered, and the filter washed with *water*, 1 pint, to which *sesquicarbonate of ammonia*, ½ *oz.*, has been added ; the mixed and filtered liquors are evaporated to dryness, and a low red heat having been applied, the residuum is rapidly reduced to powder in a warm mortar, and at once enclosed in (dry and) well-stopped bottles.

d. From *nitre*, 4 parts ; *charcoal*, 1 part (both in powder) ; the mixture being deflagrated by throwing it, in small portions at a time, into a red-hot crucible, which is then kept at a *bright red-heat* for a few minutes ; the calcined mass is, lastly, dissolved in *water*, and the solution filtered and evaporated, as before. The *purity* of the *product* corresponds to that of the nitre employed in the process.

Prop. These are well known. It exhibits most of the properties of hydrate of potassa, but in a vastly less degree. It is very deliquescent, effervesces with acids, exhibits a marked alkaline reaction with test paper, is insoluble in alcohol, but dissolves in less than its own weight of water; its affinity for the last being so great, that it takes it from alcoholic mixtures. (See *below.*)

Pur., &c. Carbonate of potassa frequently contains an undue quantity of water, as well as silicic acid, sulphates, and chlorides. The *first* may be detected by the loss of weight the salt suffers when heated; the *second,* by adding to it hydrochloric acid in excess, evaporating to dryness, and igniting the residuum, by which this contamination is rendered insoluble; the *third* and *fourth* may be detected by adding nitric acid in excess, and testing the liquid with nitrate of silver and chloride of barium. If the former produces a white precipitate, a *muriate* or *chloride* is present; and if the *latter* does the same, the contamination is a *sulphate.* Carbonate of potassa "deliquesces in the air, and is almost entirely dissolved by water; in an open vessel it spontaneously liquefies (forming the *oil of tartar; oleum tartari, o. t. deliquium* of the old chemists). It changes the colour of turmeric brown. Supersaturated with nitric acid, neither carbonate of soda nor chloride of barium throws down anything, and nitrate of silver very little. 100 gr. lose 16 gr. of water by a strong red heat; and the same weight loses 26·3 gr. of carbonic acid when placed in contact with dilute sulphuric acid." (Ph. L.) "*Pure carbonate of potassa* does not lose weight at a low red heat; and a solution supersaturated with pure nitric acid is precipitated either faintly or not at all by a solution of nitrate of baryta or of nitrate of silver. 100 gr. of the commercial salt does *not* lose *more* than 20 gr. on exposure to a red heat." (Ph. E.)

Estim. (See *Alkalimetry.*)

Ant. In excessive doses, carbonate of potassa acts as a corrosive poison. The *antidotes* are water soured with lemon juice or vinegar, or with citric or tartaric acid; followed by demulcents. See *Poisons, &c.*

Uses, &c. It possesses powerful alkaline and antiscorbutic properties, and is hence commonly exhibited as an antacid and alterative, in doses of 5 to 20 gr., in a similar manner to the bicarbonate. The *carbonate of commerce* is largely employed in the arts, in soap-making, dyeing, the manufacture of glass, &c.

Concluding Remarks. The high price of pearlash and potash has led, of late years, to the preparation of a carbonate of potash from the bisulphate or sulphate, by heating it in a reverberatory furnace with charcoal. A sulphuret is formed, which, by continuing the roasting, is converted into carbonate of potash, which is then purified by solution, defecation, and evaporation. (See *Carbonate of Soda.*) The "*Potasse d'Amérique,*" and "*Petit potasse bleu*" of our lively Continental neighbours, is said to be formed of *caustic soda* melted with *salt* and *lime,* and tinged with *oxide of copper.* This is sold to the Parisian laundresses for American potash, as they object to using soda. The potash of the shops in England is often mixed with a similar compound. The "*cendres gravelées*" of Burgundy, are incinerated *wine-lees.* The latter are peculiarly rich in potassa, and commonly yield about 16% of it.

POTASSA (Bicarbonate of). Syn. *Potassæ Bicarbonas,*—Ph. L. E. & D. *Potassæ Carbonas,*—Ph. L., 1824, and Ph. E., 1839. *Neutral Carbonate of Potash, Aerated Kali, A. Vegetable Alkali, Kali Aeratum, &c.*—Obs. This useful salt was first produced by Cartheuser, in 1752. The method which he adopted for this purpose is frequently employed, even at the present day.

Prep. 1. (Ph. L., 1836.) *Carbonate of potassa,* 6 ℔; *distilled water,* 1 gall.; dissolve, and pass *carbonic acid gas* (from chalk and oil of vitriol diluted with water) through the solution to saturation; apply a *gentle* heat, so that whatever crystals have been formed may be dissolved; and set aside the solution, that crystals may again form; lastly, the liquid being poured off, dry them. In the present Ph. L. bicarbonate of potassa is placed in the Materia Medica.

2. (Ph. D.) *Carbonic acid,* obtained by the action of dilute *hydrochloric acid* on *chalk* (the latter contained in a perforated bottle immersed in a vessel containing the acid), is passed, by means of glass tubes connected by vulcanized Indian rubber, to the bottom of a bottle containing a solution of carbonate of potassa, 1 part, in water, 2½ parts; as soon as the air is expelled from the apparatus, the corks through which the tubes pass are rendered air-tight, and the process left to itself for a week; the crystals, thus obtained, are then shaken with twice their bulk of *cold water,* drained, and dried on bibulous paper, by simple exposure to the air. From the *mother-liquor,* filtered, and concentrated to one-half, at a heat not exceeding 110° Fahr., more crystals may be obtained. "The tube immersed in the solution of carbonate of potassa will have to be occasionally cleared of the crystals with which it is liable to become choked, else the process will be suspended."

3. (*Apothecaries' Hall,* London.) *Carbonate of potassa,* 100 *lb.; distilled water,* 17 gall.; dissolve, and saturate the solution

with *carbonic acid gas*, as in No. 1, when 35 to 40 *lb.* of *crystals* of *bicarbonate of potassa* may be obtained; next dissolve, of *carbonate of potassa*, 50 *lb.*, in the *mother-liquor*, and add enough *water* to make the whole a second time equal to 17 gall.; the remaining part of the operation is then to be performed as before. This plan may be repeated *again* and *again*, for some time, provided the carbonate used is sufficiently pure.

4. (Ph. E.; *Cartheuser's Process.*) Take of *carbonate of potassa*, 6 oz.; *carbonate* (sesquicarbonate) *of ammonia*, 3½ oz.; triturate them together, and when reduced to a very fine powder, and perfectly mixed, make them into a stiff paste with a very little *water;* dry this, very carefully, at a heat not *higher* than 140° Fahr., until a fine powder, *perfectly devoid of ammoniacal odour*, be obtained, occasionally triturating the mass towards the end of the process.

5. (MM. Henry and Guibourt.) To *carbonate of potassa*, 5 parts; dissolved in *water*, 10 parts; contained in a porcelain capsule set in a salt-water bath, add gradually of *sesquicarbonate of ammonia*, 3 parts; slightly agitate the liquor until ammoniacal fumes are perceived, then filter over a heated vessel, and set it aside to crystallize. The proportions recommended by Geiger are, of *carbonate of potassa*, 2 parts; *sesquicarbonate of ammonia*, 3 parts. The ammonia process (Nos. 4 or 5) answer well on the *small scale.* On the *large scale* the fumes of ammonia may be recondensed or collected, and again usefully employed.

6. (M. Behrens.) *Acetic acid* is gradually and cautiously added to a *strong solution* of *carbonate of potassa*, in the cold, as long as a precipitate forms; *bicarbonate of potassa* is precipitated, and is drained on a filter, strongly pressed in linen, washed with *ice-cold water*, and dried. The decanted liquor is a solution of pure *acetate of potassa*, and yields that salt on evaporation. An excellent process on the *small scale.*

7. (*Commercial.*) From *carbonate of potassa*, in powder, made into a paste with *water*, and exposed for some time on shallow trays, in a chamber filled with an atmosphere of *carbonic acid gas*, generated by the combustion of either coke or charcoal, and purified by being forced through a cistern of cold water; the resulting salt is next dissolved in the least possible quantity of water at the temperature of 120° Fahr., and the solution filtered and crystallized.

Prop. It is soluble in 4 times its weight of water at 60° Fahr.; is fixed in the air, but loses carbonic acid below the temperature of boiling water, and is wholly decomposed into a carbonate at a red heat. It possesses the general alkaline properties of carbonate of potassa, but in an inferior degree, having only a slightly alkaline taste, and, when absolutely pure, not affecting the colour of turmeric.

Pur. In a solution of pure bicarbonate of potassa a solution of corrosive sublimate merely causes an opalescence, or very slight white precipitate; if it contains carbonate of potassa a brick-coloured precipitate is thrown down. "Crystals." "From 100 gr. of this salt, 30·7 gr. of water and carbonic acid are expelled at a red heat." (Ph. L.) In other respects it may be tested like the carbonate (which see).

Uses, &c. Bicarbonate of potassa is the most agreeable of all the salts of potassa, and is much used as an antacid or absorbent, and for making effervescing saline draughts. It has also been successfully employed in rheumatism, scurvy, gout, dyspepsia, and various other diseases in which the use of potash is indicated. The *dose* is from 10 gr. to ½ dr.

20 gr. *bicarbonate of potassa*, in crystals,

are equivalent to

14 gr. of *crystallized citric acid;*
15 gr. „ *tartaric acid;* and
½ *oz.* of *lemon juice.*

POTASSA (Chlorate of). Syn. *Potassæ Chloras*,—Ph. L. & D. *Oxymuriate of Potash*, *Hyperoxymuriate of do.*, *Potassæ Oxymurias*, *Kali Fulmineum*,—Obs. var. *Prep.* 1. *Chlorine gas* is conducted by a wide tube into a *moderately strong* and *warm solution* of *caustic potassa* or *carbonate of potassa*, until the absorption of the gas ceases, and the alkali is completely neutralized; the liquid is then kept at the boiling temperature for a few minutes, after which it is gently evaporated (if necessary) until a pellicle forms on the surface, and is next set aside, so as to cool very slowly; the crystals, thus obtained, are drained and carefully washed on a filter, with *ice-cold water*, and are purified by re-solution, and re-crystallization. The *product* is pure *chlorate of potassa.* The *mother-liquor*, which contains much *chloride of potassium* mixed with some *chlorate*, is either evaporated for more crystals (which are, however, less pure than the first crop), or is preserved for a future operation.

Obs. The *product* of the above process is small, varying from 10 to 45$\frac{0}{0}$ of the weight of the potash consumed in it, according to the skill with which it is conducted; this apparent loss of potash arises from a large portion of it being converted into *muriate of potassa* or *chloride of potassium*, a salt of comparatively little value. The following processes have been devised principally with the view of preventing this waste, or of employing a cheaper salt of potassa than the carbonate:—

2. (M. Gay-Lussac.) A *solution of chloride of lime* is precipitated with a *solution of carbonate of potassa*, and the liquid, after filtration, saturated with *chlorine gas;* it is then evaporated and crystallized as before. Dr. Ure has suggested the substitution of *sulphate of potash*, for the carbonate, by which the process would be rendered very inexpensive.

3. (Prof. Graham.) *Carbonate of potassa*, 1 equiv. (= 69 parts of the *dry*, or 82 parts of the *granulated* carbonate); *hydrate of lime*, 1 equiv. (= 37 parts of dry fresh slaked lime); both in powder; are mixed together, and exposed to the action of *chlorine gas*, to saturation; (the *gas* is absorbed with great rapidity, the temperature rises above 212° Fahr., and water is freely evolved;) the heat, with free exposure, is then maintained at 212° for a few minutes (to remove some trace of hypochlorite), the residuum, consisting of chlorate of potassa, and chloride of potassium, is treated with hot water, and the *chlorate of potassa* crystallized out of the resulting solution, as before. This process, which is an excellent one (the loss of potash being for the most part avoided), has been modified and improved by various authorities, as will be seen below.

4. (Prof. Juche.) *Dry* and *fresh hydrate of lime* and *carbonate of potassa*, of each, 1 part; are mixed with *water*, 8 parts; and *chlorine* passed through the mixture, to saturation; the *chlorate* is then obtained from the filtered liquid, as before.

5. (Prof. Liebig.) *Chloride of lime* is kept heated with a *little water*, until it ceases to effect vegetable colours; it is then dissolved in *hot water*, and to the solution, concentrated (if necessary) by evaporation, a *strong solution* of *chloride of potassium* is added, and the liquid filtered; crystals of *chlorate of potassa* are deposited as the solution cools. Chloride of lime utterly worthless for other purposes may be used in this process. "12 *oz.*, containing fully 65% of insoluble matter, yielded 1 *oz.* of the chlorate." (See No. 8.)

6. (M. Romer.) *Carbonate of potassa* is placed on shelves or trays in an air-tight chamber, which is then filled with an atmosphere of *chlorine gas* (generated in the usual manner), the supply being maintained for 15 or 18 consecutive hours; after which the apparatus is opened, and the *newly-formed chlorate* freed from chloride or muriate by solution and crystallization.

7. (M. Vée.) A *solution* of *chloride of lime* (18 to 20° Baumé) is heated in a *leaden* or *cast-iron vessel*, and sufficient *chloride of potassium* added to raise the density of the liquid 3 or 4 hydrometer degrees; the solution is then quickly, but carefully, concentrated until the gravity rises to 30° or 31° Baumé, when it is set aside to crystallize. A good and economical process.

8. (Dr. Wagenmann.) *Chloride af potassium*, 1 equiv. (= 76 parts), and *fresh hydrate of lime*, 6 equiv. (= 222 parts), are reduced to a thin paste with *water*, q. s., and a stream of *chlorine gas* passed through the mixture, to saturation; *chloride of calcium* and *chlorate of potash* are formed; the last is then removed by solution in *boiling water*, and is crystallized, as before. — *Obs.* This process has received the approval and recommendation of Liebig. It has long been practised in Germany, and was originally introduced to this country by Dr. Wagenmann. (Vide Buchner's *Repert.*) The *product* is very large, and of excellent quality.

9. As the last, but substituting 1 equiv. or 56 parts of *hydrate of potassa*, for the chloride, and heating the mixture to 125° Fahr. before exposing it to the *stream of chlorine*, which should be rapid, and plentiful. The *product*, under skilful management, varies from 210 to 225% of the weight of pure potassa operated on.

Prop. White, inodorous, four and six-sided pearly scales, soluble in about 20 parts of cold, and 2½ parts of boiling water; in taste it resembles nitre, but is somewhat more austere; at about 450° Fahr. it undergoes the igneous fusion, and on increasing the heat *almost* to redness, effervescence ensues, and fully 39% of *pure oxygen gas* is given off, whilst the salt becomes changed into chloride of potassium. When mixed with inflammable substances, and triturated, heated, or subjected to a smart blow or strong pressure, or moistened with a strong acid, it explodes with terrific violence. (See *below.*)

Pur., Tests, &c. The usual impurity of this salt is chloride of potassium, arising from careless or imperfect manipulation. When this is present, a solution of nitrate of silver, gives a curdy white precipitate soluble in liquor of ammonia; whereas a solution of the pure chlorate remains clear. (See *Potassa* and *Chlorate.*)

Uses. Chlorate of potassa is principally used in the manufacture of fireworks, oxygen gas, lucifer matches, &c. It was formerly used to fill percussion caps, but was abandoned for fulminating mercury, on account of its disposition to rust the nipples of the guns. As a *medicine* it is stimulant and diuretic. It has been given in dropsy, syphilis, scurvy, cholera, typhus, and other depressing affections. It gives a fine arterial colour to the blood. (Stevens.) *Dose.* 5 to 15 grs., in solution, twice or thrice daily.

Concluding Remarks. Formerly chlorate of potassa was a salt which was made only on the small scale, and chiefly used in experimental chemistry; now it is in considerable demand, and forms an important article of chemical manufacture. The latter has hence, of late years, received considerable attention and improvement in the leading laboratories of Europe. In many chemical books a variety of experiments illustrative of the extraordinary powers of this substance are given, as objects of amusement, for the juvenile reader; but we implore such parties not to meddle with such dangerous matters, without necessity or duty urges them to do so. We have been witnesses of the awful consequences of such folly and temerity. Even the wary and experienced are not unfrequently sufferers from the dangerous nature of this, and like explosive compounds. The late talented Mr. Hennel, of Apothecaries' Hall, was literally *blown into fragments* whilst preparing fulminate of mercury for the East India Company; and, more recently, Mr. Callow, of the firm of Melville and Callow, lost the fingers of his right hand, from an unforeseen explosion of some of his own celebrated '*blasting powder*,' whilst he was explaining its properties to a visitor. Numerous other similar accidents might be referred to. Chlorate of potassa should not, therefore, be kept in admixture with any inflammable substance, more especially with sulphur, phosphorus, or the sulphurets; as these compounds are exploded by the most trivial causes, and, not unfrequently, explode spontaneously.

POTASSA (Chromate of). Syn. *Neutral Chromate of Potash, Yellow do., Salt of Chrome; Potassæ Chromas, P. C. Flava,* —Lat. This salt is only prepared on the large scale. Its source is *chrome ore,* a natural octahedral chromate of iron, found in various parts of Europe and America. For *medicinal purposes* the commercial chromate is purified by solution in hot water, filtration, and re-crystallization.

Prep. 1. The *ore,* previously assayed to determine its richness, and freed as much as possible from its gangue, is ground to powder in a mill, and mixed with a quantity of *coarsely powdered nitre* rather less than that of the oxide of chromium which it contains; this mixture is exposed, for several hours, to a powerful heat on the hearth of a *reverberatory furnace,* during which time it is frequently stirred up with iron rods; the calcined mass is next raked out, and lixiviated with *hot water,* and the resulting yellow-coloured solution evaporated briskly over a *naked fire,* or by the heat of *high pressure steam; chromate of potash* falls under the form of a *granular yellow salt,* which is removed from time to time with a ladle, and thrown into a wooden vessel, furnished with a bottom full of holes (*draining box*), where it is left to drain and dry. In this state it forms the *chromate of potash* of *commerce.* By a second solution, and re-crystallization, it may be obtained in large and regular crystals. The next process has for its object the employment of a cheaper salt of potassa than the nitrate.

2. (Swindell & Co.) A mixture of *pulverized chrome ore* and *chloride of potassium* is exposed to a full red heat, on the hearth of a reverberatory furnace, with occasional stirring for some time, when *steam* at a *very elevated temperature* is made to act on it, until the conversion is complete, known by assaying a portion of the mass; the *chromate of potassa* is then dissolved out of the residuum, as before. *Common salt* or *hydrate of lime* may be substituted for chloride of potassium, when the *chromates of soda* or *lime* are respectively produced. *Patent* dated Nov., 1850.

3. (Chas. Watt, jun.) By the calcination, in the usual manner, of a *mixture* of *chrome ore, sulphate of potassa,* and *freshly slaked lime,* until a portion of the mass, digested in an excess of *dilute nitric acid,* yields a solution which only gives a "slight milkiness," and not a plentiful heavy white precipitate, on the addition of *solution of chloride of barium;* the calcined mass is then treated as before. A cheap, simple, and excellent process.

Prop. Yellow; tastes cool, bitter, and disagreeable; soluble in 2 parts of water at 60° Fahr.; the crystals are efflorescent.

Pur. The salt of commerce is frequently contaminated with large quantities of sulphate or muriate of potash, or both of them. To detect these, M. Zuber adds *tartaric* *acid*, dissolved in 50 parts of *water*, to a like solution of the sample. As soon as the decomposition is complete, and the colour verges towards the green, the supernatant liquor should afford no precipitate with solutions of the *nitrates of silver* and *baryta;* whence the *absence* of *muriates* (chlorides) and *sulphates* may be respectively inferred. The proportions are, 8 parts of *tartaric acid* to 1 part of the *chromate.* If saltpetre is the adulterating ingredient, the sample deflagrates when thrown upon burning coals.

Assay. 1. A solution of 50 gr. of the salt is treated with a *solution* of *nitrate of baryta*, the precipitate, digested in *nitric acid*, and the insoluble portion (*sulphate of baryta*) washed, dried, and weighed. 117 gr. of this substance are equivalent to 88 gr. of SULPHATE OF POTASH.

2. The *nitric solution*, with the *washings* (see *above*), is treated with a *solution* of *nitrate of the silver*, and the precipitate of *chloride of silver* carefully collected, washed, dried, ignited, and weighed. 144 gr. of *chloride of silver* represent 76 gr. of CHLORIDE OF POTASSIUM or MURIATE OF POTASH.

3. The *nitric solution* with the washings (see *above*), after having any remaining baryta thrown down by adding *dilute sulphuric acid*, in slight excess, is treated with *liquor of ammonia*, and the resulting precipitate of *oxide of chromium*, collected on a filter, washed, dried, carefully ignited in a silver, platinum, or porcelain crucible, and weighed. 40 gr. of *this oxide* represent 100 gr. of pure CHROMATE OF POTASSA. Any deficiency consists of impurities or adulterants.

Uses. Chromate of potash is used in dyeing, bleaching, the manufacture of chromic acid, bichromate of potash, &c. It is the common source of nearly all the other compounds of chromium. It is reputed *alterative* in doses of $\frac{1}{12}$ to $\frac{1}{2}$ gr.; and is *emetic* in *doses* of 1 to 4 gr. A solution in 8 parts of water is occasionally used to destroy fungus; one in 30 to 40 parts of water is also used as an antiseptic and desiccant.

Concluding Remarks. The first process is undoubtedly the best, when expense is not an object. To reduce this, a mixture of *potash* or *pearlash* with about $\frac{1}{2}$ of its weight of *nitre*, or 1-5th part of its weight of *peroxide of manganese*, may be substituted, without much inconvenience. The *assay* of the *chrome ore*, alluded to above, may be made by reducing 100 gr. of it to powder, mixing it with twice its weight of *powdered nitre*, and a little *hydrate of lime*, and subjecting the mixture to a strong red heat for 3 or 4 hours; the calcined mass may then be exhausted with *boiling water*, and the resulting solution, after precipitation with *dilute sulphuric acid*, in slight excess, and filtration, may be treated with *rectified spirit*, when its *oxide of chromium* may be thrown down by the addition of *liquor of ammonia.* (See *above.*) In the *conversion* of *chrome ore* into *chromate of potash*, care should, in all cases, be taken, that the proportion of nitre or alkali should be *slightly less*, than what is absolutely required to saturate the ore, as the production of a neutral salt is thereby ensured; for should not the whole of the chromate of iron be decomposed by the first calcination, it may easily be roasted a second time with fresh alkali, should the remaining quantity be thought worth the trouble. The *nature* of the *furnace* to be employed in the conversion, is not of any great importance, so long as carbonaceous matters from the fire are entirely excluded, and the required temperature is attainable.

POTASSA (Bichromate of). Syn. *Red Chromate of Potash; Potassæ Bichromas*, —Lat. *Prep.* To a *concentrated solution* of *yellow chromate of potash*, *sulphuric acid*, or better, *acetic acid*, is added in quantity equal to one-half that required for the entire decomposition of the salt; the liquid is then concentrated by evaporation, and slowly cooled, so that crystals may form.

Prop., *&c.* It forms very beautiful, square tables, or flat four-sided prismatic crystals; permanent in the air; soluble in 10 parts of water at 60°, and in less than 3 parts, at 212° Fahr.; it has a metallic, bitter taste, and is *poisonous.* It is chiefly used in dyeing and bleaching, and as a source of chromic acid. The *tests*, *&c.*, are the same as for the yellow chromate.

POTASSA (Citrate of). Syn. *Potassæ Citras*,—Ph. U. S. From a *solution of citric acid* neutralized with *carbonate of potassa*, evaporated, and granulated, or crystallized; very deliquescent. Or, *extemporaneously*, in the form of solution, by adding *carbonate* or *bicarbonate of potassa* to *lemon juice*, as in the common effervescing draught. The preparation sold under the names of "*Citrate of potash*," "*Lemon and Kali*," "*Acidulated Kali*," "*Lemoniated Kali*," &c., in the shops is a spurious compound made as follows:—

1. *Sesquicarbonate of soda* and *tartaric acid*, of each, 5 *oz.; lump sugar*, 1 *lb.;* all in the state of fine powder, and separately dried by a very gentle heat, after which they are mixed together, flavoured with

essence of lemon, 1 dr., rubbed through a gauze sieve in a warm dry situation, put into bottles, and corked down immediately.

2. Finely-powdered white sugar, 16 *lb.; tartaric acid*, 4¼ *lb.; sesquicarbonate of soda*, 4 *lb.; essence of lemon*, 1 *oz.;* as the last. Keeps well. A dessert-spoonful of either thrown into a glassful of water makes a pleasant effervescing draught.

POTASSA (Cyanate of). Syn. *Potassæ Cyanas*,—Lat. *Prep.* 1. By roasting, at a red heat, dry *ferrocyanide of potassium* in fine powder, upon an iron plate, constantly stirring it until it becomes fused into one mass, which must be reduced to fine powder, and digested in *boiling alcohol*, from which crystals of the cyanate will be deposited as the solution cools.

2. (Liebig.) A *mixture* of *ferrocyanide of potassium*, with half its weight of *peroxide of manganese*, may also be used to produce this salt, as the last; the compound should be kindled by a red hot body, and allowed to smoulder away, after which it may be treated with alcohol as before.

Obs. This salt is poisonous. The *cyanates* of *silver*, *lead*, and many other metals, may be made by adding a solution of *cyanate of potassa* to another of a *neutral salt of the base.*

POTASSA (Ferro-prussiate of). See *Ferrocyanide of Potassium.*

POTASSA (Hydrate of). Syn. *Pure Potassa, Caustic do., Hydrated Oxide of Potassium; Potassa*,—Ph. E. *P. Caustica*,—Ph. D. *P. Hydras*,—Ph. L. *P. Fusa*,—Ph. L. 1824. *Kali Purum*,—Ph. L. 1788. *K. Causticum*,—Ph. D. 1807. *Kali Hydras, Cauterium Potentiale, Lapis Alkalinus, L. Causticus, L. Infernalis, L. Septicus*,—Obs. var. *Prep.* 1. (Ph. L.) *Liquor of potassa*, 1 gall.; evaporate the water in a *clean iron vessel* over the fire until the ebullition being finished, the residuum of *hydrate of potassa* liquefies; pour this into proper moulds.

2. (Ph. E. & D.) As the last, but pouring the *fused hydrate* upon a bright and clean iron plate (*silver* or *iron dish*,—Ph. D.); "as soon as it solidifies break it quickly (into fragments), and put it into stoppered glass (*green-glass*,—Ph. D.) bottles."

3. (*Pure.*) The *hydrate*, obtained as above, is dissolved in *alcohol* or *rectified spirit*, and after repose for a few days in a closely-stopped green-glass or silver vessel, the solution is decanted, and cautiously evaporated in a deep silver basin, out of contact with the air.

Prop., &c. When perfectly pure, it is white, solid, very soluble in water, and in alcohol; very deliquescent; intensely acrid and corrosive; and exhibiting the usual signs of alkalinity in the highest degree. That of the shops has usually a grayish or bluish colour. "Boiling water commonly leaves oxide of iron undissolved, which should not exceed 1·25%." (Ph. E.) "It should be totally soluble in rectified spirit." (Ph. L.) Its dilute solution should be scarcely affected by the nitrates of baryta and silver. It is chiefly used as a caustic, and in chemistry. See *Solution* or *Liquor of Potassa.*

POTASSA (Hydriodate of). See *Iodide of Potassium.*

POTASSA (Hydrobromate of). See *Bromide of Potassium.*

POTASSA (Hydrocyanate of). See *Cyanide of Potassium.*

POTASSA (Hypochlorite of). See *Solutions.*

POTASSA (Iodate of). Syn. *Potassæ Iodas*,—Lat. *Prep.* 1. Neutralize a *hot solution* of *potassa* with *iodine*, evaporate to dryness by a gentle heat, powder the residuum, and digest it in *alcohol*, to remove iodide of potassium; dissolve the insoluble portion in *hot water*, and crystallize.

Obs. Iodate of potassa is resolved at a red heat into oxygen gas and iodide of potassium. It has been recommended in bronchocele. *Dose.* 1 to 5 gr. *Biniodate* and *teriodate of potassa* have also been formed, but possess little interest.

POTASSA (Muriate of). See *Chloride of Potassium.*

POTASSA (Nitrate of). Syn. *Nitre, Saltpetre; Potassæ Nitras*,—Ph. L. E. & D. *Nitrum, Sal Nitri, Sal Petræ, Kali Nitratum*,—Obs. var. This salt is spontaneously generated in the soil, owing to the action of the atmosphere, and crystallizes upon its surface, in various parts of the world, especially in the East Indies. It is also found in the horse-radish, nettle, sunflower, and several other plants. On the Continent it has long been produced artificially, by exposing a *mixture* of *calcareous soil* and *animal matter* to the atmosphere, when *nitrate of lime* is slowly formed, and is extracted by lixiviation. The liquid is then decomposed by the addition of *wood ashes*, or *carbonate of potash*, by which carbonate of lime is precipitated, and *nitrate of potash* remains in solution. The places where these operations are performed are called "*nitriaries*," or "*nitrières artificielles.*" The British market is wholly supplied from India. The salt of the first crystallization, by either process, is called *crude nitre* or *rough saltpetre*. This is *purified* by solution in *boiling water*, skimming, and after a short time allowed for defecation, straining (while still hot,) into *wooden* crystallizing vessels. The crystals thus obtained are called "*single refined nitre;*" and when the process is repeated, "*double refined nitre.*"

For *medicinal use,* nitre is purified as follows:—

1. (*Potassæ Nitras Purum,*—Ph. D.) *Commercial nitre,* 4 *lb.*: *boiling distilled water,* 1 quart; dissolve, withdraw the heat, and stir the solution constantly as it cools; the minute crystals, thus obtained, are to be drained, and washed in a glass or earthenware percolator, with *cold distilled water,* until that which trickles through ceases to give a precipitate with a solution of nitrate of silver; the contents of the percolator are then to be withdrawn, and dried in an oven.

2. (*P. N. Depuratum,*—Ph. Hann. N. 1831.) Dissolve *commercial nitre* in twice its weight of *water,* add a *solution of carbonate of potassa* as long as a precipitate forms, filter the liquid, evaporate, and crystallize. The *potassæ nitras purificata* of the old pharmacopœias was prepared in a similar manner, but without the addition of the carbonate.

Prop. White, pellucid, six-sided prisms; permanent in the air; soluble in 7 parts of water at 60°, and in 1 part at 212° Fahr.; insoluble in alcohol; its taste is cool, saline, and slightly bitter and pungent; at about 560° it fuses to an oily-looking mass, which concretes, on cooling, forming "*sal prunella;*" at a red heat it gives out oxygen, and afterwards, nitrous fumes; sp, gr. 1·925 to 1·975.

Pur. Commercial nitre generally contains *chlorides, sulphates,* or *calcareous salts.* The *first* may be detected by its solution giving a cloudy white precipitate with nitrate of silver,—the *second,* by chloride of calcium or barium giving a white precipitate,—and the *third,* by oxalate of ammonia, which also gives a white precipitate. "Crystals." "From 100 gr., digested in sulphuric acid, are prepared 86 gr. of sulphate of potassa, dried at a red heat." (Ph. L.)

Assay. Of the numerous methods prescribed for this purpose, few are sufficiently simple for mere practical men. The proportion of *chlorides, sulphates,* and *calcareous salts,* may be determined, as above; and the general richness of the sample by the method of M. Gay-Lussac, modified as follows:—100 gr. of the *sample* (fairly chosen) are triturated with 50 gr. of *lamp black,* and 400 gr. of *common salt,* and the mixture placed in an *iron ladle,* and ignited or fused therein, due care being taken to prevent loss; the residuum is exhausted with *hot water,* and the solution thus obtained tested by the usual methods of *alkalimetry* for carbonate of potash. The quantity of *carbonate of potassa* found, multiplied by 2·125 or $2\frac{1}{8}$, gives the per centage richness of the sample in NITRATE OF POTASSA.

Uses, &c. Nitre is chiefly employed in the manufacture of gunpowder, fireworks, and nitric acid. It is also used in medicine as a sedative, refrigerant, and diaphoretic, and as a cooling diuretic. It has been recommended in active hæmorrhages (especially spitting of blood), in various febrile affections, in scurvy, and in herpetic eruptions; and it has been highly extolled, by Dr. Basham, as a remedy in acute rheumatism. *Dose.* 5 to 15 grs. every 2 hours. A small piece, dissolved slowly in the mouth, frequently stops a sore throat at the commencement. In *large doses,* it is *poisonous.* The best *treatment* is a powerful emetic, followed by opiates. See *Sal Prunella.*

POTASSA (Nitrite of). Syn. *Hyponitrite of Potassa; Potassæ Nitris,*—Lat. *Prep.* 1. By heating *nitre* to redness, dissolving the fused mass in a *little water,* and adding twice the volume of the solution in *alcohol;* after a few hours the upper stratum of liquid is decanted, and the lower one, separated from the crystals, evaporated to dryness.

2. (Corenwinder.) *Nitric acid,* 10 parts, are poured on *starch,* 1 part, and the *evolved gas* passed through a *solution of caustic potassa* of the sp. gr. 1·380, to saturation; the liquid is then either neutralized with a little *liquor of potassa* (if necessary), and kept in the liquid form, or at once evaporated. *Used* as a test for iodine. See *Hyponitrous Acid.*

POTASSA (Oxalates of). *Prep.* 1. (*Oxalate of Potassa, Neutral do.; Potassæ Oxalas,*—Lat.) Neutralize a *solution of oxalic acid,* or the *acid oxalates of commerce,* with *carbonate of potassa,* evaporate, and crystallize. Transparent rhombic prisms, soluble in 3 parts of water.

2. (*Binoxalate of Potassa, Superoxalate of do., Salt of Sorrel, Essential Salt of Lemons; Potassæ Binoxalas, Sal Acetosellæ, Sal Limonis,*—Lat.) By saturating a *solution of oxalic acid,* 1 part, with *carbonate of potash,* adding to the mixture a *similar solution of* 1 part of *oxalic acid* unneutralized, and evaporating for crystals. It may also be obtained from the *expressed juice* of *wood* or *sheep's sorrel,* by clarifying it with *eggs* or *milk,* and evaporating, &c., as before. Colourless rhombic crystals, soluble in 40

parts of cold, and 6 parts of boiling water, yielding a very sour solution.

3. (*Quadroxalate of Potassa; Potassæ Quadroxalas,*—Lat.) Prepared by *neutralizing* 1 part of *oxalic acid* with *carbonate of potassa*, adding to the solution 3 parts more of *oxalic acid*, evaporating, and crystallizing. Or, by dissolving the *binoxalate* in *dilute hydrochloric acid*, and evaporating, &c., as before. Resembles the last; but is less soluble, and more intensely sour, and forms modified octahedral crystals. This salt, like the binoxalate, is occasionally sold under the names of *Sal Acetosellæ, Salt of Sorrel,* and *Essential Salt of Lemons.* Both are used to remove ink and iron stains from linen, to bleach the straw used for making bonnets, and, occasionally, in medicine, as a refrigerant.

Obs. When *pure*, each of the above salts, when strongly heated, emits white acid fumes, without being charred, and yields nothing but carbonate of potassa, under the form of a grayish-white mass. If it contains cream of tartar, it is rapidly charred, and emits the peculiar odour of burning bread. All the oxalates of potash are *poisonous.* See *Oxalic Acid.*

POTASSA (Perchlorate of). Syn. *Potassæ Perchloras,*—Lat. Prepared by adding well-dried and finely-powdered *chlorate of potassa*, in small portions at a time, to an equal weight of *concentrated sulphuric acid*, gently warmed in an open vessel; the bisulphate of potassa formed is washed off with a *little cold water*, and the residuum (*perchlorate of potassa*) dissolved in boiling water, and crystallized. See *Perchlorate,* and *Perchloric Acid.*

POTASSA (Prussiate of). See *Ferridcyanide* and *Ferrocyanide of Potassium.*

POTASSA (Silicate of). Syn. *Potassæ Silicas,*—Lat. See *Soluble Glass* (p. 529).

POTASSA (Stannate of). See *Stannates,* and *Tin Mordants.*

POTASSA (Sulphate of). Syn. *Potassæ Sulphas,*—Ph. L. E. & D. *Kali Vitrolatum,*—Ph. L. 1788. *Nitrum V.,*—Ph. L. 1746. *Tartarum V.,*—Ph. L. 1721. *Polychrest Salt, Sal Polychrest, S. Polychrestus, S. de Duobus, Nitrum Fixum, Arcanum Duplicatum, Specificum Purgans Paracelsi,*—Obs. var. This salt is now placed in the Materia Medica of the Ph. L. That of *commerce* is a secondary product of several chemical and manufacturing processes. Thus, the *residuum* of the distillation of *nitric acid from nitre* is dissolved in water, the solution neutralized with *carbonate of potash* (with *quick-lime,*—Ph. D.; with *marble,*—Ph. E.), and, after defecation, evaporated until a pellicle forms; it is then strained, or decanted, and set aside to crystallize. Or, the *residuum* is simply ignited, to expel excess of acid, and then dissolved, and crystallized, as before.

Prop., &c. Anhydrous, heavy, quartz-like crystals; permanent in the air; soluble in 12 parts of water at 60°, and in 5 parts at 212° Fahr.; insoluble in alcohol; extremely nauseous, and bitter-tasted. "It crepitates on the application of heat; fuses at a red heat, but loses nothing in weight. 100 gr., dissolved in distilled water, on the addition of chloride of barium and hydrochloric acid, furnish 132 gr. of sulphate of baryta, dried at a red heat." (Ph. L.)

Uses, &c. It is cathartic, and is reputed deobstruent. *Dose.* 10 gr. to 1 dr.; in jaundice, dyspepsia, and (in proportionate doses) in the visceral obstructions of children. It is usually given in powder, combined with rhubarb or jalap, and some aromatic.

POTASSA (Sulphate of,—with Sulphur). Syn. *Potassæ Sulphas cum Sulphure,*—Ph. E. *Glaser's Polychrest Salt, Sal Polychrestum Glaseri,*—Obs. *Prep.* (Ph. E.) *Nitrate of potassa* and *sulphur*, equal parts; mix them thoroughly, and throw the mixture, in small successive portions, into a red-hot crucible; when the deflagration is over, and the salt has cooled, reduce it to powder, and preserve it from the air.

Obs. This is the original *sal polychrest* of the older chemists, afterwards supplanted by the common sulphate. Glaser orders the deflagrated mass to be kept in a state of fusion for some time, then to be cooled, dissolved in water, and the filtered solution evaporated for crystals. It appears to be a mixture of sulphate, bisulphate, and sulphite of potassa. The *uses* and doses are similar to those of sulphate of potash.

POTASSA (Bisulphate of). Syn. *Supersulphate of Potash: Potassæ Bisulphas,*—Ph. E. & D., and Ph. L. 1836. *P. Supersulphas,*—Ph. L. 1824. *Acid Vitriolated Tartar, Sal Enixum, S. Polychrestus Acidulatum, S. Auri Philosophicum,*—Obs. var. *Prep.* 1. *Sulphate of potassa* and *oil of vitriol,* equal parts; *hot water,* q. s. (not more) to dissolve; *anhydrous bisulphate of potassa* crystallizes out, in long delicate needles, as the solution cools. If these are left for several days in the mother-liquor they are redissolved, and crystals of the ordinary *hydrated bisulphate* are deposited.

2. (Ph. L. 1836.) *Salt left in distilling nitric acid* (sal enixum), 2 ℔; *boiling water,* 3 quarts; dissolve, add of *sulphuric acid,* 1 ℔; concentrate by evaporation, and set the liquid aside, so that crystals may form.

3. (Ph. D.) *Sulphate of potash* (in powder), 3 *oz.; sulphuric acid*, 1 fl. oz.; mix them in a *porcelain capsule*, and expose it to a heat capable of liquefying its contents, until acid vapours cease to be evolved; powder the residuum, and preserve it in a well-stopped bottle.

4. (Ph. D. 1826.) *Sulphuric acid*, 1 part; *water*, 6 parts; mix, and saturate with *carbonate of potash*, q. s.; then add 1 part more of *sulphuric acid*, and proceed as before.

Prop., *&c.* Sour and slightly bitter-tasted rhombic prisms; soluble in about 2 parts of cold, and 1 part of boiling water, the solution exhibiting a strongly acid reaction. It is much employed, in lieu of tartaric acid, for the production of carbonic acid, in "*gazogenes*," &c.; also to adulterate cream of tartar and tartaric acid. According to Dr. Paris, it forms "a grateful adjunct to rhubarb." *Dose.* 12 gr. to $1\frac{1}{2}$ dr., in solution, combined with rhubarb or bitters, as the neutral sulphate. A *sesquisulphate* of *potassa*, in asbestos-like crystals, noticed by Mr. Phillips, was probably anhydrous sulphate. (See above.)

POTASSA (Sulphuret of). See *Sulphuret of Potassium.*

POTASSA (Tartrate of). Syn. *Neutral Tartar, Soluble do.; Potassæ Tartras*,—Ph. L. E. & D. *Kali Tartarizatum*,—Ph. L. 1787. *Tartarum Solubile, Tartarus Tartarizatus, Sal Vegetabile*,—Obs. var. *Prep.* (Ph. D.) *Carbonate of potash*, 8 *oz.; distilled water*, 2 quarts; dissolve, and to the solution, whilst boiling hot, gradually add of *bitartrate of potassa*, in fine powder, 1 *lb.*, or q. s., so that the liquid, after ebullition for a couple of minutes, ceases to change the colour of either *blue* or *reddened litmus paper;* next filter the liquid through calico, evaporate it until a pellicle forms on the surface, and set it aside to crystallize; after 12 hours, collect the crystals, dry them on bibulous paper, and preserve them from the air. The formula of the Ph. L. 1836, is nearly similar.

Prop., *&c.* The crystals of this salt, which are obtained with difficulty, are right rhombic prisms, and are deliquescent. The *salt* of *commerce* is usually in the form of a white, granular powder, which is obtained by simply evaporating the solution to dryness, with constant stirring. In this state it requires about 4 parts of cold water for its solution. Acids convert it into the bitartrate. As a *medicine*, it acts as a gentle diuretic and aperient; and is valued for correcting the griping properties of senna and resinous purgatives. It is also antiscorbutic. The "solution changes the colour neither of litmus nor turmeric. The addition of almost any acid throws down crystals of bitartrate of potassa, which generally adhere to the vessel. The precipitate occasioned by either chloride of barium or acetate of lead is dissolved by dilute nitric acid." (Ph. L.) "44 gr. are not entirely precipitated by 55 gr. of nitrate of lead." (Ph. E.) *Dose.* $\frac{1}{2}$ dr. to $\frac{3}{4}$ *oz.*, in powder, or dissolved in water.

POTASSA (Bitartrate of). Syn. *Supertartrate of Potash, Acidulous Tartrate of do., Cream of Tartar; Cremor Tartari; Potassæ Bitartras*,—Ph. L. E. & D. *Potassæ Supertartras*,—Ph. E. 1817. *Tartari Crystalli*,—Ph. D. 1826. This well-known salt is deposited during the fermentation of grape juice, as a crust on the sides of the casks or vats. In its unprepared or crude state, it is called *white*, or *red tartar* or *argol*, according to the wine from which it has been obtained. It is *purified* by boiling it in *water*, crystallization, re-solution in *water*, and treatment with *freshly burnt charcoal* and *aluminous clay* to remove the colour; the clear liquid is then decanted, whilst still *hot*, and allowed to cool slowly; the resulting crystals form the *cream of tartar* of commerce.

Prop., *&c.* Small, translucent, gritty, prismatic crystals, irregularly grouped together; permanent in the air; requiring fully 100 parts of cold water, and about 15 parts of boiling water for their perfect solution; the solution has a harsh, sour taste, and, like that of the tartrate, suffers spontaneous decomposition by keeping. Its "solution reddens litmus. At a red heat, it is converted into carbonate of potash." (Ph. L.) "Entirely soluble in 40 parts of boiling water; 40 gr., in solution, are neutralized by 30 gr. of crystallized carbonate of soda." (Ph. E.) *Dose.* As an aperient, 1 to 3 dr.; as a diuretic, $\frac{1}{2}$ dr. to 1 dr.; as an antiscorbutic, 10 to 20 gr., frequently. It is much used to make a pleasant cooling drink (*Imperial*), and in tooth-powders.

POTASSA (Zincate of). Syn. *Bi-zincate of Potassa; Potassæ Zincas, P. Bi-zincas*, —Lat. *Prep.* (Fremy.) By adding *rectified spirit* to a *strong saturated solution* of *oxide of zinc in liquor of potassa;* the resulting crystals are carefully washed, and dried. Its precise composition is not known.

POTASSA (Caustic), *Potassa fusa, Potassa pura*, &c. See *Hydrate of Potassa.*

POTASSA AND ALUMINA (Sulphate of). See *Alum.*

POTASSA AND AMMONIA (Tartrate of). See *Soluble Tartar* (Ammoniacal).

POTASSA AND IRON (Sulphate of). See *Iron Alum.*

POTASSA AND SODA (Tartrate of). See *Potassio-tartrate of Soda.*

POTASSA AND UREA (Ferrocyanate of). Syn. *Potassii et Ureæ Ferrocyanidum,*—Lat. A compound of about 3 parts of *ferrocyanide of potassium* and 1 part of *urea*, dissolved, and evaporated or crystallized together. Recommended by M. Baup in intermittents. *Dose.* 5 to 15 gr., twice or thrice daily.

POTASSA WITH LIME. Syn. *Vienna Paste, Common Caustic; Stronger do. do., Pasta Viennensis; Potassa cum Calce,*—Ph. L. & E. *Potassa Caustica cum Calce,*—Ph. D. *Kali Causticum cum Calce,*—Ph. D. 1807. *Calx cum Kali Puro,*—Ph. L. 1788. *Causticum commune fortius,*—Ph. L. 1746. *Prep.* 1. (Ph. L. & D.) *Hydrate of potassa* and *quicklime*, of each, 1 oz.; rub them together (in a warm mortar,—Ph. D.), and keep the powder from the air in a well-stopped bottle.

2. (Ph. E.) *Liquor potassa* is evaporated to 1-3rd its volume in a clean iron vessel, then mixed with sufficient *fresh-slaked lime* to give it the consistence of a firm paste, and at once put into well-stopped bottles.

Use, &c. As a caustic; but it is less manageable than either nitrate of silver or fused hydrate of potassa. For another formula see *Filho's Caustic* (p. 212).

POTASSIO-TARTRATES. See the names of *respective bases.*

POTASSIUM. The metallic base of potash. It was discovered, in 1807, by Sir H. Davy, who obtained it by acting on moistened hydrate of potassa, under a film of naphtha, with the negative wire of a very powerful galvanic battery. It has since been procured by easier methods, of which the following, invented by Brunner, is the best.

Prep. An intimate mixture of *carbonate of potassa* and *charcoal* is prepared by calcining, in a covered iron pot, the crude tartar of commerce; when cold, it is rubbed to powder, mixed with 1-10th part of *charcoal* in small lumps, and quickly transferred into a *retort of stout hammered iron;* the latter may be one of the iron bottles in which quicksilver is imported, a short and somewhat wide *iron tube* having been fitted to the aperture; the retort, thus charged, is placed upon its side, in a *furnace* so constructed that the flame of a very strong fire, preferably fed with dry wood, may wrap round it, and maintain every part of it at a very high and uniform degree of heat. A *copper receiver*, divided in the centre by a diaphragm, is next connected to the iron pipe, and kept cool by the application of ice, whilst the receiver itself is partly filled with *mineral naphtha*, to preserve the newly formed potassium as it distils over. The arrangement of the apparatus being completed, the fire is gradually raised until the requisite temperature, which is that of full whiteness, is reached, when decomposition of the alkali by the charcoal commences, carbonic oxide gas is abundantly disengaged, and potassium distils over, and falls in large drops into the liquid. To render the product *absolutely pure*, it is redistilled in an *iron* or *green glass retort*, into which *some naphtha* has been put, that its vapour may expel the air, and prevent the oxidation of the metal. The pieces of charcoal are introduced for the purpose of absorbing the melted carbonate of potassa, and preventing its separation from the finely divided carbonaceous matter. *Iron filings* are frequently employed with a like intention. *Prod.* $3\frac{0}{0}$ to $4\frac{0}{0}$ of the weight of tartar acted on; 1 *lb.* yielded 280 gr.

Prop., &c. Pure potassium is a brilliant white metal, with a high lustre; at the common temperature of the air it is soft, and may be easily cut with a knife, but at 32° Fahr. it is brittle and crystalline; it melts completely at 136° Fahr., and in close vessels distils unaltered at a low red heat. Sp. gr. 0·865. Its most remarkable property is its affinity for oxygen gas, which is so great that it takes it from most other substances containing it. Exposed to the air, its surface is instantly tarnished, and quickly becomes covered with a crust of caustic potassa. It inflames spontaneously when thrown on water, and burns with a beautiful purple or purple-red flame, yielding a pure alkaline solution. It can only be preserved in naphtha, or some other fluid hydrocarbon. With oxygen it forms two oxides, one of which is *potassa* or *protoxide of potassium*, and the other (*peroxide of potassium, teroxide of do.,*) an orange-coloured substance, formed by burning the metal in dry air or oxygen gas, or by passing oxygen over pure potassa heated to redness.

POTASSIUM (Bromide of). Syn. *Hydrobromate of Potash; Potassæ Hydrobromas; Potassii Bromidum,*—Ph. L. 1836. This compound is prepared by precisely similar processes to those adopted for *Iodide of potassium.* The proportions ordered in the Ph. L. 1836 were,—*Bromine*, 2 oz.; *iron filings*, 1 oz.; *distilled water*, 1½ pint; the solution being afterwards decomposed with *carbonate of potassa*, 17 dr.; dissolved in *distilled water*, ½ pint.

Prop., &c. In appearance and general characters it is indistinguishable from iodide of potassium; and it is employed in similar cases, and given in similar doses, to that substance.

POTASSIUM (Chloride of). Syn. *Potassii Chloridum,*—Lat. *Hydrochlorate of Potash, Muriate of do., Salt of Sylvius, Potassæ Hydrochloras, P. Murias, Sal Digestivus, S. Febrifugus Sylvii,*—Obs. var. The chloride of potassium of *commerce,* is generally a secondary product of the manufacture of *chlorate of potassa,* and other substances. The *mother-liquor* of the former is evaporated to dryness, and heated to dull redness; the calcined mass is then dissolved in water, the solution purified by defecation, and evaporated for crystals. On the *small scale,* it is sometimes prepared by neutralizing *dilute hydrochloric acid* with *carbonate of potash,* and evaporating, &c., as before.

Prop., &c. It closely resembles culinary salt in appearance; is anhydrous; dissolves in about 4 parts of cold, and 2 of boiling water; has a slightly bitter, saline taste; fuses at a red heat; and is volatilized at a very high temperature. As a *medicine* it is diuretic and aperient. It was formerly in high repute as a resolvent and antiscorbutic, and, particularly, as a remedy for intermittents. It is now seldom used. *Dose.* 10 gr. to ½ dr., or more.

POTASSIUM (Cyanide of). Syn. *Cyanuret of Potassium, Hydrocyanate of Potash; Potassii Cyanidum, P. Cyanuretum,*—Lat. Two varieties of this article are known in commerce,—the one, *pure* and *costly,* used for medicinal purposes;—the other, *impure,* but sufficiently cheap to be employed in the arts.

Prep. 1. *Medicinal Cyanide of Potassium.*—*a.* A solution of *pure hydrate of potassa,* 2 parts, in *highly rectified spirit,* 7 parts, is placed in a receiver furnished with a safety tube, and surrounded with *bruised ice;* the beak of a tubulated retort containing *ferrocyanide of potassium,* in powder, 4 parts, is then adapted to it in such a manner that any gas or vapour evolved in the retort must traverse the solution in the receiver; the arrangement being complete, *oil of vitriol,* 3 parts, diluted with an *equal weight* of *water,* and allowed to cool, is cautiously poured into the retort, and the distillation conducted *very slowly,* a *very gentle heat* only being applied, as circumstances may direct; as soon as the force of ebullition in the retort has subsided, the distillation is complete, and the connexion between the retort and receiver is broken; the *contents of the receiver,* now transformed into a mixture of a crystalline precipitate of *cyanide of potassium,* and an alcoholic solution of undecomposed potassa, is carefully thrown on a filter, and the precipitate, after the mother-liquor has drained off, very cautiously washed with *ice-cold* and *highly rectified spirit,* and then drained, pressed, and dried on the same filter. The *product* is *chemically pure,* and equal to fully 10% of the ferrocyanide employed. This is a modification of what is commonly known as "*Wigger's process.*"

b. Expose *well-dried* and *powdered ferrocyanide of potassium* to a moderate red-heat, in a close vessel; when cold, powder the fused mass, place it in a funnel, moisten it with a *little alcohol,* and wash it with *cold water;* evaporate the solution thus formed to dryness, expose it to a dull red heat in a porcelain dish, cool, powder, and digest it in *boiling rectified spirit;* as the spirit cools, *crystals* of *cyanide of potassium, nearly pure,* will be deposited. The alcohol employed in both this, and the preceding process, may be recovered by distillation from calcined sulphate of iron.

c. (Ph. U. S. 1840.) Heat *ferrocyanide of potassium,* 8 oz., until it becomes nearly white, and is deprived of its water of crystallization; put this into an earthen retort, with the beak loosely stopped, and expose it to a red heat for about two hours, or until gas ceases to be evolved, then withdraw it from the fire, close the orifice, and let it remain until cold; next break the retort, remove the contents, reduce them to a coarse powder, introduce them into a bottle of the capacity of 12 fl. oz., and add of *distilled water,* 6 fl. oz.; agitate occasionally for half an hour, throw it on a filter, evaporate the filtered solution rapidly to dryness, and keep in a closely stopped bottle. A cheap process, but the product is inferior to the last.

2. *Crude* or *Commercial Cyanide; Fused do.* (Liebig.) *Commercial ferrocyanide of potassium,* 8 parts, rendered *anhydrous* by gently heating it on an iron plate, is intimately mixed with *dry carbonate of potassa,* 3 parts; this mixture is thrown into a red-hot earthen crucible, and kept in a state of fusion, with occasional stirring, until gas ceases to be evolved, and the fluid portion of the mass becomes colourless; the crucible is then left at rest for a few minutes to allow its contents to settle, after which, the clear portion is poured from the heavy black sediment at the bottom, upon a clean marble slab, and the mass, whilst yet warm, broken up, and placed in well-closed bottles. —*Obs.* A cheap and excellent process. The *product* is said to contain about 1-8th part of *cyanate of potassa,* and though not sufficiently pure for employment in *medicine* as

cyanide of potassium, is admirably adapted for the various technical applications of this substance, as in *electro-plating, electro-gilding,* &c. It may also be advantageously substituted for the *ferrocyanide* in the preparation of hydrocyanic acid by the distillation of that substance along with dilute sulphuric acid.

Prop., &c. When pure, this salt is colourless and odourless; it forms cubic or octahedral crystals, which are anhydrous; it is freely soluble in water, and in boiling alcohol, but most of it separates from the latter as the solution cools; it is fusible; and undergoes no change, even at a full red heat, in close vessels; it exhibits an alkaline reaction; when exposed to the atmosphere, it absorbs moisture, and acquires the smell of hydrocyanic acid. If it effervesces with acids, it contains carbonate of potassa, and if it be yellow, it contains iron. It is employed in chemical analyses, and for the preparation of hydrocyanic acid; cyanide of soda may be made in the same way. The *dose* is $\frac{1}{12}$ to $\frac{1}{4}$ gr., in solution; in the usual cases in which the administration of hydrocyanic acid is indicated.

POTASSIUM (Ferridcyanide of). Syn. *Ferricyanide of Potassium, Ferric-cyanide of do., Ferridcyanate of Potassa, Hydro-ferridcyanate of do., Sesqui-ferrocyanate of do., Red Prussiate of Potash; Potassii Ferridcyanidum, Potassæ Ferricyanas, P. Prussias Rubrum,*—Lat. This important and beautiful salt was discovered by L. Gmelin. At first it was merely regarded as a chemical curiosity, but it is now extensively employed in dyeing, calico-printing, assaying, &c.

Prep. 1. *Chlorine gas,* prepared in the ordinary manner, is slowly passed into a *cold solution* of *ferrocyanide of potassium,* 1 part; in *water,* 16 parts; with constant agitation, until the liquid appears of a deep reddish-green colour, or of a fine red-colour by transmitted light, and ceases to give a blue precipitate, or even a blue tinge to a solution of a *sesqui-salt* of iron, an excess of chlorine being carefully avoided; the liquor is next evaporated by the heat of steam or boiling water, until a pellicle forms upon the surface, when it is filtered, and set aside to cool; the crystals are afterwards purified by re-solution, and re-crystallization.—*Another method* is simply to evaporate the original solution to dryness, by a steam-heat, with agitation, then to redissolve the residuum in the least possible quantity of *boiling water,* and after defecation, or filtration, to allow the new solution to cool very slowly that crystals may form.

2. (*Extemporaneous.*) Add *nitric acid,* very gradually, to a *cold solution* of *ferrocyanide of potassium,* with constant agitation, until a drop of the mixture ceases to impart a blue colour to a solution of a *sesqui-salt* of iron, carefully avoiding excess of acid. It may be at once used in solution, or evaporated, &c., as before.

Prop., &c., Magnificent regular prismatic, or sometimes, tabular crystals, of a rich ruby-red tint; permanent in the air; combustible; decomposed by a high temperature; soluble in 4 parts of cold water; insoluble in alcohol. Its most remarkable property is its not affecting solutions of the *sesqui-salts* or *per-salts* of iron, by which it becomes a valuable test for the *proto-salts* of that metal. It is further distinguished by precipitating solutions of—*Bismuth* (pale), *cadmium, peroxide of mercury,* and *zinc* (deep), of a yellow colour;—*Mercury, cobalt* (dark), *copper, molybdenum, silver,* and *uranium,* reddish brown;—*Peroxide of copper,* greenish yellow;—*Protoxide of iron,* blue;—*Manganese,* brown;—*Nickel,* yellowish-brown or olive green;—and *Protoxide of tin,* white; hence its use in chemical analysis.

POTASSIUM (Ferrocyanide of). Syn. *Ferrocyanuret of Potassium, Ferro-potassio-cyanide, Prussiate of Potash, Yellow do., Ferro-prussiate of Potash, Ferro-cyanate of Potassa, Ferruretted Hydrocyanate of do.; Potassii Ferrocyanidum,*—Ph. L. E. & D. *Phlogisticated Alkali, Prussian do.,*—Obs. This valuable salt, the well-known "prussiate of potash" of commerce, was discovered by the illustrious Scheele, about the middle of the 18th century. It is now only manufactured on the large scale.

Prep. 1. Good *potash* or *pearlash,* 2 parts, and *dried blood, horns, hoofs, woollen rags,* or other *refuse animal matter,* 5 or 6 parts, are reduced to coarse powder, and mixed with some coarse *iron-borings;* the mixture is then injected into egg-shaped *cast-iron pots* in a state of moderate ignition; the mass is frequently stirred with an *iron spatula* so as to prevent it running together, and the calcination is continued until fœtid vapours cease to be evolved, and flame is no longer seen on stirring the mixture, care being taken to exclude the air from the vessels as much as possible; during the latter part of the process the pots are kept constantly covered, and the ignited mass stirred less frequently the hot pasty mass is then removed with an *iron ladle,* and excluded from the air until cold; it is next exhausted by edulcoration with *boiling water,* and the resulting solution, after defecation, or filtration, is concentrated by evaporation, so that crystals may form as the liquid cools; these are redissolved in hot water, and the solution allowed to cool *very slowly*, when large and beautiful yellow crystals of *ferrocyanide of potassium* are deposited.—*Product.* 1 ton of *dried blood* or *woollen refuse*, with 3 cwt. of *pearlash*, yields from 2 to 2½ cwt. of *commercial ferrocyanide.* The mother-liquor contains sulphate of potash.

2. (Lewis Thompson.) *Potash* or *pearlash*, and *coke*, *cinders*, or *coal*, of each 10 parts; *iron turnings*, 5 parts; all in coarse powder; expose the mixture for ½ an hour to a full red heat in an open crucible, stirring occasionally until small jets of purple flame are no longer seen; then allow the whole to cool, dissolve out the soluble matter, and proceed as above. The *product* is about 15% of the weight of pure alkali employed. The *Society of Arts* presented their *Gold Medal* to Mr. Thompson for this discovery.

3. (*Pure.*) Fuse effloresced *commercial prussiate of potash* in a glass vessel, dissolve the fused mass in *water*, neutralize any excess of alkali with *acetic acid*, and precipitate the salt with *strong alcohol;* wash the precipitate with a little *weak alcohol*, redissolve it in water, and crystallize.

Prop. It forms large and very beautiful yellow crystals, which are permanent in the air, and very tough and difficult to powder; it is soluble in 4 parts of cold, and 2 parts of boiling water; has a mild saline taste; at a gentle heat loses water; at a higher temperature, in closed vessels, it is, for the most part, converted into cyanide of potassium, and when exposed to the air, into cyanate of potassa. It precipitates solutions of *Antimony*, *Bismuth*, *Protoxide of mercury*, and *Zinc*, of a white colour;—*Cadmium*, pale yellowish white;—*Protoxide of cerium*, white, soluble in acids;—*Protoxide of copper*, white, changing to red colour;—*Protoxide of iron*, white, rapidly turning blue;—*Lead*, white, with a pale yellowish cast;—*Protoxide of manganese*, white, rapidly passing into a peach or blood-red colour;—*Peroxide of mercury*, white, turning blue;—*Oxide of nickel*, white, turning green;—*Silver*, white, turning brown or blackish brown in the light;—*Protoxide of tin*, white (gelatinous);—*Cobalt*, green, turning reddish gray;—*Peroxide of copper*, brown-red;—*Peroxide* or *sesqui-oxide of iron*, dark blue;—*Deutoxide* or *sesqui-oxide of manganese*, greenish gray;—*Molybdenum*, dark brown;—*Protoxide of palladium*, green (gelatinous);—*Tantalum*, burnt yellow colour;—*Peroxide of tin*, yellow (gelatinous);—*Uranium*, reddish brown; and—*Zinc*, white.

Pur. It is "totally dissolved by water; loses 12·6% of its weight by a gentle heat; scarcely, if at all, alters the colour of turmeric; is precipitated deep blue by the sesquisalts of iron, and white by zinc; its ashes dissolved by hydrochloric acid are again thrown down by ammonia; it yields 18·7% of sesquioxide of iron. (Ph. L.)

Uses, &c. Ferrocyanide of potassium is chiefly used in dyeing and calico-printing, in the manufacture of Prussian blue, in electro-plating, and in chemistry, as a test, and a source of hydrocyanic acid. As a *medicine* it is said to be sedative and astringent, and in large doses purgative, but appears to possess little action. *Dose.* 10 gr. to ½ dr., dissolved in water; in hooping-cough, chronic bronchitis, night-sweats, leucorrhœa, &c. D'Arcet swallowed a solution containing ½ *oz.* of this salt without experiencing any injurious effects.

Concluding Remarks. According to Hofflmayr, the addition of 1 to 3% of nitre is useful to promote the fusion of the mixture, and a very strong heat, duly regulated, is favorable to the process. The animal matter may, in many cases, be advantageously carbonized before mixing it with the alkali. Of 100 parts of animal matters, the best proportions of *good potash* are said to be—for *dried blood*, 28 to 30%; *horns* or *hoofs*, 33 to 35%; *waste leather*, 45 to 48%; with 2 to 4% of *smith's scales* or *iron filings* to each. "*Woollen rags* or *clippings* give a larger product than any other substance within the range of our experience." (Ure.) The "*greaves*" obtained from the tallow-chandlers are employed as an economical substitute for horns and blood by one of the largest Scotch manufacturers.

POTASSIUM (Hydrargyro-iodide of). See *Iodide of Mercury and Potassimu* (p. 781).

POTASSIUM (Hydrargyro-iodo-cyanide of). See *Iodocyanide of Mercury and Potassium* (p. 781).

POTASSIUM (Iodide of). Syn. *Hydriodate of Potash; Potassii Iodidum*,—Ph. L. E & D. *Potassæ Hydriodas*,—Ph. D. 1826. *Ioduret of Potassium, Potassii Ioduretum, Potassium I., Kalium Iodatum*,—Obs. *or* unus. *Prep.* There are several methods of preparing this important medicinal compound, of which the following are the most valuable:—

1. (Ph. L. 1836.) Take of *iron filings*, 2 oz.; *distilled water*, 2 quarts; *iodine*, 6 oz.; mix them, and heat the solution until it turns green, then add of *carbonate of potassa*, 4 oz.; dissolved in *water*, 1 quart; filter,

wash the residuum on the filter with *water*, evaporate the filtered mixed liquors, and crystallize. *Product.* 1 oz. of *iodine* yields 1 oz. 45 gr. of *iodide.* This compound is placed in the Materia Medica of the *present* Ph. L. The formula of the new Ph. D. resembles the above.

2. (Ph. E.) As the last, nearly; but the solution is ordered to be "concentrated at a temperature, short of ebullition, until a dry salt be obtained, which is to be purified by dissolving it in less than its own weight of *boiling distilled water*, or, still better, boiling it in twice its weight of *rectified spirit*, filtering the solution, and setting it aside to crystallize."

3. (Ph. D. 1826.) By saturating, with *carbonate of potassa*, an *aqueous solution of hydriodic acid* formed by transmitting chlorine through water in which iodine is suspended. *Prod.* 1 oz. of *iodine* yields fully 1 oz. 1½ dr. of *iodide.*

4. (Duflos.) *Iodine* and *pure granulated zinc*, of each, 4 oz.; *water*, 8 oz.; after the action has ceased, neutralize the liquid with a *solution of pure carbonate of potassa*, in very slight excess, filter, neutralize, if necessary, with a *little hydriodic acid*, treat the liquid with *sulphuretted hydrogen*, for the sake of security, filter, evaporate, and crystallize. *Prod.* 1 oz. of *iodine* yields 1 oz. 2 dr.

5. (Gregory.) Add *iodine* to a *hot solution of pure potassa* until the alkali is perfectly neutralized, carefully avoiding excess, evaporate the liquid to dryness, and expose the dry mass to a gentle red heat in a *platinum* or *iron crucible;* afterwards, dissolve out the salt, gently evaporate, and crystallize. An excellent process, yielding a large product, but, if the ignition be not carefully managed, it is apt to contain a little undecomposed iodate. To obviate this Mr. Scanlan proposes the addition of a little *powdered charcoal* to the mass before ignition, a plan adopted in the Ph. U. S.

6. (Rev. J. B. Reade.) To a *solution of iodide of iron*, prepared by the ordinary process (*see* No. 1, above), *iodine*, in quantity equal to one half that already in it, is added; when the solution is complete, *ferrocyanide of potassium*, nearly equal to the *whole weight* of the iodine, and under the form of a semi-saturated solution, is further added, and the whole stirred together; *soluble prussian blue*, of very fine quality, and highly valuable in the arts, is precipitated, whilst *neutral iodide of potassium*, with a little iodide of iron, remain dissolved in the liquid; this last is then evaporated to dryness, and carefully ignited; the fused mass is dissolved in *water*, and the solution filtered, evaporated, and crystallized. The *product* is very large, perfectly neutral, and chemically pure. *Patented.*

7. (Turner.) To a *hot solution of caustic potassa* (sp. gr. 1·19), add as much *iodine* as it will dissolve, and pass *sulphuretted hydrogen* through the liquid until it becomes colourless; next apply a gentle heat to expel excess of acid, filter the liquid, exactly neutralize it with *potassa*, evaporate, and crystallize. *Prod.* 1 oz. of *iodine* yields 1 oz. 1¼ dr.

Prop. It crystallizes in cubes, which in the *pure salt* are extremely white, though frequently opaque; these are anhydrous; fuse when heated, without decomposition; dissolve in less than an equal weight of water, at 60° Fahr., and very freely in alcohol; and do not deliquesce in moderately dry air, unless they contain undecomposed potassa. Its solution dissolves iodine freely, and also, less readily, several of the insoluble metallic iodides and oxides.

Pur. It is *entirely* soluble in both water and alcohol. Its aqueous solution alters the colour of turmeric either not at all, or but *very slightly;* nor does it affect litmus paper, or effervesce with acids. "Nitric acid and starch being added together, it becomes blue. It is not coloured by the addition of tartaric acid with starch. No precipitate occurs on adding either a solution of lime or of chloride of barium. 100 gr., dissolved in water, by the addition of nitrate of silver, yield a precipitate of 141 gr. of iodide of silver." (Ph. L.) "Its solution is not affected, or only rendered hazy by solution of nitrate of baryta. A solution of 5 gr. in 1 fl. oz. of *distilled water*, precipitated by an excess of solution of nitrate of silver, and then agitated in a bottle with a little water of ammonia, yields quickly, by subsidence, a clear supernatant liquor, which is not altered by an excess of nitric acid, or is merely rendered hazy." (Ph. E.) The pure salt does not lose by weight when heated.

Assay. The *iodide* of *commerce* frequently contains fully one half its weight of either *chloride of potassium* or *carbonate of potash*, or both of them, with variable quantities of *iodate of potassa*, a much less valuable salt. The presence of these substances are readily detected by the above tests. As the first of these is only very slightly soluble in *cold alcohol* and the others insoluble in that liquid, a ready method of determining the richness of a sample in pure iodide, sufficiently accurate for ordinary purposes, is as follows:—Reduce 50 gr. of the *sample* to fine powder, introduce this into a test tube with 6 fl. dr. of *alcohol*, agitate the mixture violently for *one* minute, and throw the whole on a weighed filter set in a *covered* funnel, observing to wash what remains on the filter with *another* fl. dr. of *alcohol*. The *filtrate*, evaporated to dryness, gives the quantity of PURE IODIDE, and the *filter*, dried by the heat of boiling water, that of the IMPURITIES present in the sample examined, provided it contained no *caustic potassa*. The QUANTITY OF ALKALI, whether *caustic* or *carbonated*, may be found by the common method of "*Alkalimetry*."

Uses, &c. Chiefly in medicine and pharmacy. *Dose.* 1 to 10 gr., twice or thrice daily, made into pills, or better, in solution, either alone, or combined with iodine; in bronchocele, scrofula, chronic rheumatism, dropsy, syphilis, glandular indurations, and various other glandular diseases. Also *externally*, made into a *lotion* or *ointment*.

Concluding Remarks. According to theory, 4 oz. of *iodine* should yield 5 oz. 1 dr. 55 gr. of *pure iodide of potassium;* but such a product is never obtained in practice, as will be seen by reference to the above formulæ, which are those most generally approved of for the preparation of a pure salt. The *old method* of acting on iodine with *potassa*, or *carbonate of potash water*, yields a very impure product.

A not uncommon practice in the wholesale drug trade, is to send *iodine* to the manufacturing chemist, and to receive in return an *equal weight* of *iodide of potassium;* and, in most cases, a fee is paid for the conversion. The above data will, however, show how far such a practice is politic on the part of the holders of iodine.

POTASSIUM (Biniodide of). Syn. *Potassii Biniodidum*,—Lat. A name absurdly given to *ioduretted iodide of potassium*.

Prep. 1. *Iodide of potassium*, 3 parts; *iodine*, in powder, 1 part; *water*, at 180° Fahr., 3 parts; triturate them together, pour the mixture into a flask, and keep it for some days in ice. Brown crystals.

2. (Giordano.) *Iodide* (dry), 20 parts; *iodine*, 6 parts; triturate them together until they form a homogeneous mass, then place it at once in stoppered phials. *Used* to make *ioduretted draughts, lotions, &c.* See *Iodine* (and *above*).

POTASSIUM (Iodo-hydrargyrate of). See *page* 781.

POTASSIUM (Oxides of). See *Potassa* and *Potassium*.

POTASSIUM (Phosphuret of). Syn. *Potassii Phosphuretum*,—Lat. A compound formed by gently heating *phosphorus* with *sulphur* in a close vessel.

POTASSIUM (Salicylide of). Syn. *Hydrosalicylate of Potassa.* Formed by mixing *salicylous acid* (artificial oil of meadowsweet) with a *solution of caustic potassa;* it separates, on agitation, as a yellow crystalline mass, which, after pressure in bibulous paper, is recrystallized from *alcohol*. Golden-yellow crystals, soluble in both water and alcohol; damp air gradually converts them into *acetate of potassa* and *melanic acid*.

POTASSIUM (Sulphocyanide of). Syn. *Sulpho-cyanuret of Potassium; Potassii Sulphocyanidum, P. Sulpho-cyanuretum*,—Lat. *Prep.* 1. *Ferrocyanide of potassium* (anhydrous, or dried by a gentle heat), 46 parts; *sulphur*, 32 parts; *pure carbonate of potassa*, 17 parts; reduce them to powder, and very gradually heat the mixture to *low* redness in a covered iron crucible which it will less than one-half fill; remove the *half-refrigerated* and still soft mass, crush it, exhaust it with *water*, and evaporate the aqueous solution to dryness; powder the residuum, and exhaust it with *hot alcohol* or *rectified spirit;* the alcoholic solution will yield beautiful white crystals as it cools, and the residual or mother-liquor, may be evaporated for the remainder of the salt.

2. *Cyanide of potassium*, 3 parts; *sulphur*, 1 part; *water*, 6 parts; digest them together for some time, add 3 parts more of *water*, filter, evaporate, and crystallize.

Prop., &c. Long, slender, colourless prisms or plates, which are anhydrous, bitter-tasted, deliquescent, fusible, very soluble in both water and alcohol, and non-poisonous. It is chiefly used as a test for sesquioxide of iron, for which purpose it is preferable to all other substances.

POTASSIUM (Sulphuret of). Syn. *Sulphide of Potassium, Liver of Sulphur, Sulphuret of Potash; Potassii Sulphuretum*,—Ph. L. E. & U. S. *Hepar Sulphuris*,—Ph. D., & Ph. L. 1721. *Potassæ Sulphuretum*,—Ph. L. 1824 & Ph. D. 1826. *Kali Sulphuratum*,—Ph. L. 1788. *Prep.* 1. (Ph. E.) *Sulphur*, 1 oz.; *carbonate of potash*, 4 oz.; mix, heat them in a covered crucible till they form a uniform fused mass; when cold, break it into fragments, and preserve it in well-closed vessels. The formulæ of the Ph. L. 1836 & Ph. U. S., are similar.

2. (Ph. D.) *Sublimed sulphur*, 4 *oz.; carbonate of potash* (from pearlash, first dried, and then reduced to powder), 7 *oz.;* mix in a warm mortar, heat them in a Hessian crusible, as before, pour the fused mass into an iron cup, over which immediately invert a second vessel, to exclude the air, and when

cold, break the mass into fragments, and preserve it in a green-glass stoppered bottle.

Prop., *&c.* A hard, brittle, liver or greenish brown coloured solid; inodorous whilst dry; soluble in water, forming a highly fœtid solution; and, in acids, evolving strong fumes of sulphuretted hydrogen; reaction, alkaline; exposed to the air it is gradually converted into sulphate of potassa. As a *medicine*, it is reputed diaphoretic, expectorant, and stimulant. *Dose.* 2 to 6 gr., in solution, or made into pills with soap; in gout, rheumatism, liver affections, and various chronic skin diseases. *Externally*, made into a lotion and ointment. It is highly acrid and corrosive, and in large doses *poisonous.*

Obs. The above is the only sulphuret of potassium used in medicine, and is of doubtful constitution. Chemists describe six distinct compounds of potassium with sulphur. The *monosulphuret* or *protosulphuret* is formed by either reducing sulphate of potassa, at a full red heat, by means of hydrogen or charcoal; or by taking a strong solution of hydrate of potassa, saturating *one half* of it with sulphuretted hydrogen, then adding the remaining half, and evaporating and fusing the mixture. It forms a soluble, crystalline, cinnabar-red mass, which acts as a strong sulphur-base. The *higher sulphurets* may be formed by fusing the protosulphuret with the additional equivalents of sulphur, as required. The preparation of the Pharmacopœia is a mixture of these sulphurets with hyposulphite and sulphate of potassa, in variable proportions. From these compounds a solution of the *pentasulphuret of potassium* may be obtained by digestion in alcohol; and one of the *tersulphuret*, in like manner, from a fused mixture of carbonate of potassa with half its weight of sulphur.

POTATO. This well-known and valuable article of food is the *root* or *tuber* of the *solanum tuberosum* or *esculentum*, a plant which was introduced to this country, by either Sir Francis Drake or Sir Walter Raleigh, towards the latter part of the 16th century. It is now extensively cultivated in all the temperate climates of the world. It yields a vast quantity of food on a small space of ground, but only about 1-7th part of the weight of the tuber is nutritious, and this is chiefly farinaceous. Its farina or starch, is, however, accompanied by no inconsiderable portion of saline matter, more especially of potassa, which renders it highly antiscorbutic, and a powerful corrective of the grossness of animal food. When forming part of a mixed diet, perhaps, no substance is more wholesome than the potato; and certainly, no other esculent hitherto discovered appears equally adapted for universal use.

In the *choice* of *potatoes* "observe, as a general rule, that the *smaller the eye*, the *better the potato;* as when they are too full in the eye they are either of an inferior quality, or are running to seed. To *ascertain if they are sound*, nip a piece from the thickest end with your finger nail; if *good*, the inside will be of a white, yellow, or reddish hue, according to the sort and quality; if, on the contrary, they are spotted, they are bad, or getting so." (Soyer.)

No certain rules can be laid down for "*dressing*" potatoes. "If *boiled*, it may be that they require to be put into boiling water, or, may be, into cold, and either boiled quickly, or slowly; but this you must find out. Choose them all about the same size, with a smooth skin, and when they are boiled and begin to crack, throw off the water immediately, as it only damages the root. When dressed, let them stand near the fire, with a cloth over them, and serve them in the skins. Salt may be put into the water at the beginning. A *watery potato* will require quick boiling, and, sometimes, to be put into boiling water. If *very watery*, and they will not boil mealy, put them into the pot in their skins, fill up the pot with water, and add a piece of quicklime the size of a nut; they will then turn out mealy." (Soyer.)

To *retain* the *highest amount* of *nourishment* in *potatoes* they should be "dressed" with their skins on them. The bruised or damaged parts, worm-holes, &c., being removed with a knife, the dirt should be carefully cleaned out of the "eyes," and from the rough parts of the skins, by means of a brush and water, after which they should be well rinsed in clean water, and drained in a colander. If they are at all dry, or shrivelled, they may be advantageously left to soak for 3 or 4 hours in clean cold water before cooking them. Potatoes "dressed" in the skins have been found to be nearly twice as rich in potassa-salts as those which have been first peeled. The skins are easily removed before sending them to table.

New potatoes should have their *loose outer skin* rubbed off with a cloth or stiff brush before being dressed or cooked.

Mashed potatoes are prepared by crushing, with the back of a spoon, or with a rolling-pin, the hot "dressed" tubers placed in a bowl or dish, or on a pie-board. A little milk, butter, and salt, may be added to them at will; and they may be either at once "served up," or pressed into "forms," and first "browned off" in the oven. Potatoes, if not soft and mealy, and well masticated, frequently escape the solvent action of the stomach, and pass off undigested, often to the serious derangement of the health. By mashing them, this inconvenience is removed. The delicate, the dyspeptic, and the aged, shonld take them in no other form. See *Distillation*, *Salep*, *Starch*, *Sugar*, *&c.*

Potatoes may be *preserved*, so as to stand the longest voyages unchanged, by thoroughly desiccating them in an oven, or by steam heat. For this purpose, the roots, either raw or three-parts dressed, are generally first cut into dice of about $\frac{3}{4}$ inch square, to facilitate the operation. Under a patent granted to Mr. Downes Edwards, Aug., 1840, the boiled potatoes are mashed and granulated, by forcing them through a perforated plate, before drying them. The granulated product, beaten up with a little hot milk or hot water, forms an excellent *extemporaneous dish* of *mashed potatoes.*

POTATO DISEASE. Various schemes have been promulgated, from time to time, having for their object the prevention of this calamity, from which we select the following, as having proved the most successful in practice:—

1. This consists simply in *drying* the *seed potatoes completely*, before planting them. This plan originated in Russia, and has been very extensively adopted in Germany.

2. (Dr. Klotsch.) The potato is cultivated for the tubers, and not for the fruit, hence the mode of cultivation should be regulated accordingly. The chief points for effecting this object consist—1, in increasing the functional powers of the tubers; and—2, in restricting the metamorphosis of the leaves. We effect both these points in the following manner:—During the 5th, 6th, and 7th, week after the tubers have been planted, or in the 4th or 5th week after the planting of rooted shoots, or at any time when the young plants have reached a height of six or nine inches above the ground, the tops of the branches are lopped or clipped by means of the thumb and first finger to the extent of half an inch. This operation is repeated the 10th or 12th week after planting. The effect of this treatment in the development and strength of the tubers is stated to be remarkable.

3. The potatoes are steeped in *weak milk of lime* for some hours, and afterwards, in *water soured with sulphuric acid*, they are then drained, dried, and stored, in the usual manner. Chevalier Bunsen found that potatoes so treated soon after being dug up, retained their good qualities unimpaired; whilst the remainder of the same crop, not so treated, was in a few weeks rendered valueless by the disease.

4. The "changes in question can only be brought about by introducing a complete alteration in the mode of cultivation:—1, in thoroughly drying the seed potatoes;—2, in steeping them for a short time in a *dilute solution* of *sulphate of copper* (blue vitriol or blue stone), of about the same strength as that used for 'pickling' wheat;—3, in planting them in poor, well drained land;—4, and lastly, in substituting for the farm-yard manure, &c., now employed, some *inorganic* compost." (Thornton J. Herapath.)

POTESTATES SUCCINI. See *page* 342.

POTIONS. See *Draughts*, and *Ptisans.*

POT METAL. An alloy of *copper* and *lead.* (Brande.) The vulgar name for the metal of which iron pots are made. (Wilcox.)

POT POURRI. A mixture of odorous flowers, roots, gums, &c., varied according to the taste of the operator, either mixed together *dry*, or in the *fresh state* preserved with salt. "The usual way of making it is to collect *roses*, *lavender*, and other *sweet-scented flowers*, as they blow; to put them into a large jar mixed (stratified) with *salt*, until a sufficient quantity has been collected; then to add to these such other *odorous substances* as may be required to form an agreeable perfume." Among the substances thus added are—*ambergris*, *benzoin*, *calamus root*, *cascarilla*, *cassia*, *cassia buds*, *cinnamon*, *civet*, *cloves*, *musk*, *musk seed*, *orange berries* and *flowers*, *orris root*, *pimento*, *storax*, *vanilla*, *yellow sandal wood*, *&c.*

"Instead of the fresh flowers, *dried roses* are sometimes used, and with the addition of some *essential oils*, these answer quite as well." (Redwood.)

POTTED MEATS. See *Putrefaction* (and below).

POTTERY. The mechanical operations connected with the manufacture of pottery (*ceramic art*) do not come within the province of this work. The materials employed, in this country, to produce the best kind of earthenware (*Staffordshire ware*) are the fine white clays of Devonshire and Cornwall, and *powdered chert* or *flint*. This is brought to a perfectly homogeneous plastic mass with *water*, and in this state is fashioned upon the *potter's wheel* and *lathe*, or by moulding, into all the various objects of utility and ornament which are made in this material. After the newly formed vessels and other articles have been dried by exposure in heated rooms, they are enclosed in clay-cases (*seggars*) and exposed to heat in a kiln, by which they arrive at a state (*biscuit*) which renders them fit for *glazing;* the patterns (if any) and, afterwards, appropriate vitreous materials having been applied to their surfaces, they are again placed in the *seggars*, and are again exposed in a kiln to a heat sufficiently high to fuse the newly applied compound, by which they acquire a uniform enameled surface, and become fit for the market. *Porcelain*, or *China*, as it is commonly called, is manufactured in a nearly similar manner, but the materials are selected, and the various processes conducted with corresponding skill and care.

The *ornamental patterns* are produced upon both *Staffordshire ware* and *porcelain* by a number of ingenious processes, among which *printing*, *painting*, and *moulding*, are the principal. The *colours* employed are those which have been already referred to under "*Enamels.*"

The *metallic lustres* now so common on *stoneware*, &c., are given as follows:—

1. *Gold Lustre.* Dissolve of *grain-gold*, 1 dr.; in *aqua regia*, $\frac{3}{4}$ oz.; to the solution add of *metallic tin*, 6 gr.; and when this is dissolved pour it very gradually, with constant stirring, into a mixture of *balsam of sulphur*, $\frac{1}{2}$ dr.; *oil of turpentine*, 20 gr.; when the mass begins to stiffen, $\frac{1}{2}$ dr. more of *oil of turpentine* must be added, and well mixed in. *More gold* deepens and brightens the lustre; *more tin* turns it on the violet or purple.

2. *Iron Lustre.* From a *mixture* of *muriate of iron* and *spirit of tar.*

3. *Platinum Lustre.* To a *solution of platina in aqua regia* (bichloride of platinum) is added, drop by drop, a *mixture* of *spirit of tar* and *balsam of sulphur* in equal proportions, until by a trial the composition is found to give the required result. This gives the appearance of polished steel.

4. *Silver Lustre.* The *ammonio-chloride of platinum* is reduced to an impalpable powder, ground up to the requisite consistence with a little *spirit of tar*, and at once applied with a brush.

The above *lustres* are applied, over an *easily fusible glaze*, to the outer surfaces only of the vessels, after which adhesion is produced by exposing the pieces to a slight degree of heat in the *muffle*. To give them their full beauty, they must be rubbed with *cotton*, *wool*, or *chamois leather*, after the firing. See *Alumina*, *Enamels*, *Gilding*, *Glazes*, *Kaolin*, *&c.*

POTTING. A term commonly applied to the operation or practice of preserving animal substances in a state fit for immediate use, in small pots or jars. The method of proceeding is, first, to mince the *substance* (previously well dressed, and carefully deprived of bones, sinews, skin, &c.), and next, to pound it in a clean polished marble or iron mortar, along with a little *butter*, and some *cayenne pepper*, or other suitable *spice* or *sauce*, until it forms a perfectly smooth paste; this is pressed into the pots, so as to about 2-3rds fill them, and *clarified melted butter* is then poured in to the depth of about 1-8th of an inch; the pots are, lastly, closely covered over, and kept in a cool situation. In this state, their contents may be preserved for a year, or longer. *Potted Beef*, *Ham*, *Veal*, *Poultry*, *Game*, *Anchovies*, *Bloaters*, *Salmon*, *&c.*, are commonly sold in the shops. They are all intended for *relishes*, and are eaten spread upon bread, in the same manner as butter.

POUDRE CLARIFICANTE. Powdered albumen. (See *p.* 31.)

POUDRE KOUSIQUE. A French nostrum, consisting of *nitre* and *sulphur*, of each, 50 parts; *charcoal* and *antimony*, of each, 1 part. It is divided into $\frac{1}{2}$-dr. doses, of which three are put into each packet. It is given to dogs in a ball of butter, to prevent the disorders to which they are liable.

POUDRE METALLIQUE. See *Tooth Cements.*

POUDRE SUBTILE. See *Depilatories.*

POUDRES COSMETIQUES, *P. odorantes*, &c. See *Powders.*

POUDRETTE. Dried *night-soil.* The manure sold under this name is a compound of *night-soil* with *clay*, *charcoal*, or *gypsum*, made into balls or cakes. Its extensive use in Belgium, France, the United States of America, and, more particularly, in China, where it was first employed, has shown it to be the most fertilizing, and generally applicable, of all the numerous substances used as manures. Unfortunately, the prejudices of Englishmen lead them to poison the air of their cities and towns, and the water of their rivers, with a substance which, if rightly applied, would crown their fields with golden harvests, and drive pauperism from the land.

POULTICE. Syn. *Cataplasm; Cataplasma*,—Lat. An external application, generally extemporaneous, used to promote suppuration, allay pain and inflammation, resolve tumours, &c.

Poultices (*cataplasmata*) are generally prepared with substances capable of absorbing much water, and assuming a pulpy consistence, so as to admit of their application to any surface, however irregular. Their curative action principally depends upon the liquids with which they are moistened, and the heat retained by the mass. With this object they should never be heavy, or very bulky, and should be frequently repeated, and lightly, but securely bandaged on, to prevent displacement.

The addition of a little *lard*, *olive oil*, or still better, *glycerine*, to a poultice, tends greatly to promote its emollient action, and to retard its hardening.

As the continued medication of the part with warmth and moisture, or with substances applied in the moist way, is the principal object to be attained in the application of poultices, a fold or two of *lint* or *soft linen* dipped in *hot water*, either simple or medicated, and covered with a piece of thin *sheet gutta-percha*, or *Indian-rubber cloth*, to prevent evaporation, may be often conveniently applied in their stead. A very elegant and useful substitute of this kind is the *spongio-piline*, of Mr. Margwick. Its cleanliness, lightness, and ease of application, must ultimately lead to its general adoption by the medical profession.

The following formulæ embrace all the *cataplasmata* of the pharmacopœias:—

POULTICE (Alum). Syn. *Cataplasma Aluminis*,—Ph. D. 1826. *Coagulum Aluminis*,—Ph. L. 1788. *Prep.* (Ph. D. 1826.) *Alum* (in powder), 1 dr.; *whites of* 2 *eggs;* shake them together until they form a coagulum. Applied, between the folds of fine linen, to chilblains, sore nipples, inflamed eyes, &c.

POULTICE (Bread). Syn. *Cataplasma Panis*,—Lat. *Prep.* From *crum of bread* soaked in *hot water*, slightly pressed, and then beaten up with a little *lard*, *butter*, or *oil*. Emollient. See *Linseed-meal Poultice.*

POULTICE (Carrot). Syn. *Cataplasma Dauci*,—Ph. D. 1826. *Prep.* 1. From the common esculent *carrot* scraped fine, so as to form a pulp.

2. (Ph. D. 1826.) From the *cultivated carrot* boiled with a *little water*, until it becomes soft enough to form a poultice. Anodyne and antiseptic. *Used* in foul and painful ulcers, burns, contusions, &c. That from the first formula is the more stimulant.

POULTICE (Charcoal). Syn. *Cataplasma Carbonis*,—Ph. L. *C. C. Ligni*,—Ph. D. 1826. *Prep.* (Ph. L.) Soak *bread*, 2 oz., in *boiling water*, ½ pint; to this, add, by degrees, of *linseed meal*, 10 dr.; and, afterwards, of *powdered* (recently burnt) *charcoal*, 2 dr.; lastly, sprinkle on the surface of the poultice, *powdered charcoal*, 1 dr. As an application to fœtid and gangrenous sores; frequently renewed.

POULTICE (Chloride of Soda). Syn. *Cataplasma Sodæ Chlorinatæ*,—Ph. L. *Prep.* (Ph. L.) *Boiling water*, 6 fl. oz.; *linseed meal*, 4½ oz.; mix gradually, then add of *solution of chlorinated soda*, 2 fl. oz. Applied to foul ulcers, gangrenous parts, &c.

POULTICE (Hemlock). Syn. *Cataplasma Conii*,—Ph. L. *Prep.* (Ph. L.) *Boiling water*, ½ pint; *linseed meal*, 4½ oz., or q. s.; make a poultice, and on this spread of *extract of hemlock* (Ph. L.), 1 oz., first softened with a *little hot water*. Anodyne. In irritable and painful cancerous, scrofulous, and syphilitic sores, tumours, &c.

POULTICE (Linseed-meal). Syn. *Cataplasma Lini*,—Ph. L. *Prep.* (Ph. L.) To *boiling water*, ½ pint, add, gradually, constantly stirring, of *linseed meal*, 4½ oz., or q. s. Emollient. *Used* to promote the suppuration or "ripening" of tumours. A little *oil* or *lard* should be added, and some smeared over the surface as well, to prevent its getting hard. For small "gatherings," as of the fingers, a little *chewed bread* and *butter* is an efficient and convenient substitute.—*Obs.* Linseed meal prepared from the cake from which the oil has been expressed, is less adapted for poultices than that prepared from the unpressed, whole seed. The latter is ordered in the Ph. L.

POULTICE (Mustard). Syn. *Cataplasma Sinapis*,—Ph. L., and Ph. D. 1826. *Prep.* 1. (Ph. L.) *Linseed meal* and *powdered mustard*, of each, 2½ oz., or q. s.; *boiling water*, ½ pint; mix as before.

2. (Ph. L. 1836.) As the last, but substituting *boiling vinegar* for *water*. *Used* as a powerful counter-irritant, stimulant, and rubefacient; in low fevers, apoplexy, coma, &c., where there is a determination of blood to the head; in deep-seated inflammatory pains; neuralgic pains, &c. It should not be left on long enough to raise a blister. See *Plasters.*

POULTICE (Poppy). Syn. *Cataplasma Papaveris*,—Lat. *Prep.* (P. Cod. 1839.) A strong *decoction of poppies* thickened with *crum of bread.* Anodyne.

POULTICE (Potato). Syn. *Cataplasma Solani Tuberosi*,—Lat. *Prep.* From the *raw potato*, scraped or grated fine. A popular application to fresh bruises, extravasations, burns, scalds, &c.

POULTICE (Pradier's). Syn. *Pradier's Cataplasm; Cataplasme de Pradier*,—Fr. *Prep.* Take of *balm of Mecca*, 6 dr.; *rectified spirit*, 16 oz.; dissolve; next, separately, take *red cinchona bark*, *sarsaparilla*, and *sage*, of each, 1 oz.; *saffron*, ½ oz.; *rectified* *spirit*, 32 oz.; digest for 48 hours, and filter; mix the two liquors, and add to them twice their weight of *lime water*. In gout; 2 fl. oz. are sprinkled on the surface of a *hot linseed-meal poultice* sufficiently large to surround the affected part. It is said that the Emperor Napoleon gave £2500 for this receipt.

POULTICE (Simple). Syn. *Cataplasma Simplex*,—Ph. D. 1826. *Prep.* (Ph. D. 1826.) *Powder for a cataplasm* and *boiling water*, of each, q. s. to form a poultice, the surface of which is to be smeared over with *olive oil.* Emollient. *Bread poultice* and *linseed-meal poultice* are now generally called by this name.

POULTICE (Soap). Syn. *Cataplasma Saponis*,—Lat. *Prep.* From *white soap* (scraped or sliced), 1 *oz.; boiling water*, ¼ pint; dissolve, and add *crumb of bread*, q. s. As an application to scalds and burns.

POULTICE (Vinegar). Syn. *Cataplasma Aceti*,—Lat. *Prep.* From *crum of bread* soaked in *vinegar*. Applied cold in bruises, extravasations, &c., especially black eyes. *Verjuice* is often employed in the same way.

POULTICE (Yeast). Syn. *Cataplasma Fermenti*,—Ph. L. *C. F. Cerevisiæ*,—Ph. D. 1826. *Prep.* (Ph. L.) *Beer yeast* and *water* at 100° Fahr., of each, 5 fl. oz.; mix, stir in *flour*, 1 ℔; and place it near the fire until it rises. In gangrenous or foul ulcers; to correct the fœtor of the discharge, and to hasten the sloughing.

POULTRY. Domestic birds, which are propagated and fed for the table, and for their eggs, feathers, &c.

The poultry of this country are the common *domestic fowl*, the *turkey*, the *duck*, and the *goose;* to which some writers add the *guinea fowl*, and the *peacock*. Of these, the first (*phasianus gallus*,—Linn.) is the most generally useful. Though a native of India, it accompanies man through almost every gradation of civilization and climate, and flourishes almost everywhere, when properly secured from the inclemency of the weather, and allowed an ample supply of fresh air, with proper food. For the production of abundance of eggs, it must, however, be well fed, and warmly lodged. The *hen-roosts* and *poultry-house* should be well protected from the weather, and their temperature should be duly maintained by proximity to the stables, cow-houses, or dwelling-house, and, in cold weather, by the employment, when necessary, of artificial heat. The *food* should also contain an ample supply of nitrogenous matter, for without this how can it be expected that hens can produce abundance of eggs, which are peculiarly rich in nitrogen. The "*greaves*" of the tallow-chandlers, and such-like substances, are hence excellent additions to the ordinary food of poultry. But it is not sufficient merely to supply poultry with abundance of food and warmth; it is equally necessary that they should have ample space for exercise and recreation. This space "should always contain living plants of various kinds, and some gravelly or sandy soil; because worms, snails, as well as, occasionally, grass and herbage, form a part of the food of poultry; and sand or gravel is swallowed by them for the purpose of promoting digestion. Hence, no healthy poultry can ever be reared in towns, however much the natural food may be imitated by the supply of animal matters, herbage, and sand." (Loudon.)

Choice. The "*age* is known by the spur, and the *quality* by the skin. There is, perhaps, no poultry in the world that comes up to the well-fed Dorking capon. The new breed of *Cochin China fowls* (of which the best for eating is the grey kind), if fed and treated in the same way as the Dorking capon, might produce a larger fowl, but it is questionable if so tender." (Soyer.) White-legged fowls are generally preferred, but there are black ones equally as good; and many judges say that the yellow-legged ones are better than either. See *Eggs, Food, Fattening, Boiling, Roasting, &c.*

POUNCE. *Powdered gum sandarac* generally passes under this name. It is used to prepare *parchment* for writing on, and to prevent *ink* from spreading upon *paper* after erasures. *Powdered cuttle-fish bone* is occasionally employed in the same way. Both are applied to the surface by means of a cylindral roll of *list*, called a "*rubber*." *Packers* rub the surface of porous and greasy wood, as the heads of boxes, cases, casks, &c., with *whiting*, or *powdered rosin*, to make them bear the ink. The *coloured powders* used by *pattern drawers*, for sprinkling over pricked papers, are also called pounce. For *liquid pounce*, see *Marking Ink.*

POWDER. Syn. *Pulvis*,—Lat. Powders are divided by pharmaceutical writers into two classes—*simple* and *compound.* The first are prepared by simple pulverization; the second, by the admixture of two or more simple powders. For *use*, the appropriate *doses* are separately weighed, and placed in separate papers. They are usually *exhibited* in a little honey, sugar, or milk, either taken from a spoon, or made into an electuary or bolus, and swallowed in the semi-solid form. Metallic and other heavy powders are best taken in the latter state. *Very active substances* should be, in all cases, mixed with some inert powder, as that of starch, gum, liquorice, or marshmallow, at the time of "dispensing" them.

"This form of preparing medicines is the simplest, and perhaps the least objectionable; but it is not applicable to all the articles of the Materia Medica. Those remedies which are very unpleasant to the taste; those which deliquesce rapidly when exposed to the air, or are very volatile; and those which require to be given in very large doses, or which are not diffused readily in water, cannot, with propriety, be administered in the form of powder. Some substances cannot be reduced to powder unless they be very much dried; and the heat necessary for that purpose alters their properties." Nor can we "be surprised that a great alteration should be effected in a short time by the action of the air on so great an extension of surface as takes place in the operation usually adopted for reducing drugs to a fine powder." (A. T. Thomson.)

In this country, *compound powders* appear to be a favorite form of medicine in the diseases of infancy and childhood.

"It is necessary that whatever we order to be reduced to powder should be *rubbed through a fine sieve*, so that the impurities and coarser parts may be separated; and it is needful that most powders should be recently prepared, and not too long kept." (Ph. L.)

As nearly all powders suffer by exposure to the air and light, they should be preserved in closely corked opaque or green-glass bottles, or in tin canisters from which the external air is carefully excluded. See *Pulverization, &c.*

The following formulæ include all the powders (*pulveres*) of the British Pharmacopœias, with some others of interest or utility:—

POWDER (Algaroth's). See *Oxychloride of Antimony.*

POWDER (Almond,—Cosmetic). This is noticed under "*almond paste.*" It is *used* for cleaning and softening the skin, and may be scented at will. (See *p.* 938.)

POWDER (Aloes,—Compound.) Syn. *Pulvis Aloës Compositus,*—Ph. L. *P. Aloës cum Guaiaco,*—Ph. L. 1788 & Ph. D. 1807. *P. Aloëticus cum Guaiaco,*—Ph. L. 1787. *P. de Diambræ,*—Ph. L. 1720. *Prep.* (Ph. L.) *Socotrine* or *hepatic aloes* (in powder), 1½ oz.; *guaiacum* (in powder), 1 oz.; *compound cinnamon powder*, ½ oz.; rub them together. A warm, sudorific purgative. *Dose.* 10 to 20 gr.

POWDER (Aloes with Canella). Syn. *Pulvis Aloës cum Canellâ,*—Ph. D. 1826 & Ph. L. 1746. *Aloetic Powder, Holy Bitter, Hiera Picra,*—Obs. var. *Prep.* From *powdered socotrine* or *hepatic aloes*, 4 parts; *powdered white canella*, 1 part. *Uses* and *dose*, as the last.

Obs. Once a highly popular remedy. It was originally made into an electuary with honey, and in this form was frequently called *Hiera Logadii.* It is still a favorite in domestic medicine and veterinary practice. The principal objection to both this and the preceding preparation, is the nauseous flavour of the aloes, which is ill concealed by the aromatics. The "*hiera picra*" for farriers is usually made with the cheapest Cape aloes.

POWDER (Alum,—Compound). Syn. *Styptic Powder; Pulvis Stypticus; P. Aluminis Compositus,*—Ph. E. *Prep.* (Ph. E.) *Alum*, 4 oz.; *kino*, 1 oz.; mix them, and reduce them to fine powder. Astringent and styptic. *Dose.* 5 to 15 gr.; in diarrhœa, profuse menstruation, &c. *Externally*, in hæmorrhages, &c.

POWDER (Anchovy). Syn. *Pulvis Clupeæ Encrasicoli,*—Lat. *Prep.* Pound *anchovies* to a paste, then rub them through a sieve, and add enough *flour* to make a dough, which must be rolled out into thin slices and dried by a gentle heat in a stove; it is, lastly, powdered and bottled. Colouring is frequently added. Chiefly *used* to make sauces. British anchovies are frequently substituted for the genuine fish.

POWDER (Antimonial). Syn. *Fever Powder, Lisle's do.; James's do.* (?)*; Pulvis Jacobi* (?)*; Pulvis Antimonialis,*—Ph. E. & D. *Pulvis Antimonii Compositus,*—Ph. L. *Oxydum Antimonii cum Phosphate Calcis,*—Ph. E. 1817. *Prep.* 1. (Ph. L.) A mixture of *tersulphuret of antimony*, 1 ℔., and *hartshorn shavings*, 2 ℔., is reduced to powder, thrown into a crucible heated to whiteness, and stirred constantly until vapour no longer rises; the calcined mixture is then rubbed to powder, again put into the crucible, and the heat gradually increased to whiteness, and maintained so for 2 hours; the residuum is, lastly, reduced to a very fine powder.

2. (Ph. E.) From *sulphuret of antimony* and *hartshorn shavings*, equal weights; as the last.

3. (Ph. D.) *Tartarized antimony*, 4 *oz.*, is dissolved in *water*, ½ gall.; and added to a *solution of phosphate of soda*, 4 *oz.*, in *water*, 1 quart; a *solution of chloride of*

calcium, 2 *oz.*, in *water*, 1 quart, and to which *solution of ammonia* (Ph. D.), 4 fl. oz. has been added, is next poured in, and the whole boiled for 20 minutes; the pre-precipitate is then collected on a *calico filter*, and washed with *hot distilled water*, until the liquid which passes ceases to give a precipitate with a *weak solution of nitrate of silver;* it is, lastly, dried by a *steam* or *water heat*, and reduced to a fine powder.

Uses, &c. Febrifuge and diaphoretic. Intended as a substitute for the proprietary and more expensive James's powder. *Dose.* 3 to 10 or 12 gr., or more, repeated every fourth or fifth hour until diaphoresis is set up; in fevers, rheumatic affections, chronic skin diseases, &c. It is a very uncertain and variable compound, unless it has been carefully prepared. Dr. Elliotson exhibited it in doses of upwards of 100 gr., without producing any sensible effect. A *spurious article*, made by triturating 1 *oz.* of *tartar emetic* with 18 or 19 *oz.* of *burnt hartshorn*, is frequently sold for it in the shops. It appears to differ from the true *James's powder* in containing *antimonious acid*, instead of *teroxide of antimony*. See *Antimonious Acid* and *James's Powder*.

POWDER (Antimony,—Compound). See *Antimonial Powder*.

POWDER (Aromatic). See *Compound Cinnamon Powder*.

POWDER (Arsenical). See *Escharotic Powder*.

POWDER (Asarabacca,—Compound). See *Cephalic Snuff*.

POWDER (Astringent). Syn. *Pulvis Astringens*, *P. Stypticus*,—Lat. *Prep.* From *Aleppo galls* and *burnt alum*, in fine powder, equal parts. *Used* in piles, soft polypi of the nose, chilblains, &c.

POWDER (Baking). *Prep.* 1. *Tartaric acid*, ½ *lb.;* *bicarbonate of soda* and *potato farina* or *British arrow-root*, of each, ¾ *lb.;* (each in powder;) separately dry them *perfectly* by a very gentle heat, then mix them in a dry room, pass the mixture through a sieve, and at once put it into packets, observing to press it hard, and to cover it with tinfoil or close-made paper, to preserve it as much as possible from the air lastly, and moisture.

2. (*Delforte's.*) *Powdered tartaric acid*, ¼ *lb.; powdered alum*, ½ *lb.; bicarbonate of soda*, ¾ *lb.; farina*, 1 *lb.;* dry separately, as before, mix, and further add of *sesquicarbonate of ammonia* (in powder), 3 *oz.;* lastly, closely pack it in tinfoil.

3. (*Green's.*) *Tartaric acid*, 35 *lb.; sesquicarbonate of soda*, 56 *lb.; potato flour* 1 cwt.; mix as before.

Uses, &c. Baking powder is chiefly employed as a substitute for yeast. 1 or 2 tea-spoonfuls are mixed with the dry flour and other ingredients, which are then made into a dough, as *quickly as possible*, with *cold water*, and *at once* baked or boiled, as the case may be. By the addition of about ½ dr. of *turmeric powder* to each *pound of the mixture* it is converted into *egg powder*. When intended to be kept for any length of time it should be preserved in bottles or tins, so as to prevent the absorption of moisture. We have discovered *traces* of *arsenic* in some of the baking powders of the shops, which we refer to common washerwoman's soda being used in their composition, instead of the pure carbonate or sesquicarbonate.

POWDER (Basilic). Syn. *Royal Powder*, *Cornachini's do.; Pulvis Basilicus*, *P. Cornachini*,—Lat. *Prep.* From *scammony*, *calomel*, *cream of tartar*, and *diaphoretic antimony*, equal parts. This is the formula generally adopted for this compound, which has now long been omitted from the British Pharmacopœias. It is still a favorite with many practitioners, as an alterative purgative, and vermifuge for children. *Dose.* For a child, 2 to 8 gr.; for an adult, 5 to 20 gr. *Compound powder of scammony* is now generally sold for it.

POWDER (Bezoardic). See *Gascoigne's Powder*.

POWDER (Blaine's Distemper). The basis of this preparation is the *aurum musivum*, or *bisulphuret of tin*. (Dr. Paris.)

POWDER (Blancmange). *Prep.* From *sago-meal*, 1 *lb.; essence of lemon*, 15 drops; *mace*, 12 gr.; mix.

POWDER (Bleaching). Chloride or hypochlorite of lime. (See p. 693.)

POWDER BLUE. See *Smalts*.

POWDER (Bole,—Compound). See *Compound Chalk Powder*.

POWDER (Bronze). See *Bisulphuret of Tin*, *Bronzing*, *&c.*

POWDER (Burnt Hartshorn). Syn. *Pulvis Cornu Cervini Usti*,—Ph. D. 1826. *Prep.* From pieces of *hartshorn* calcined to whiteness, and powdered. It consists principally of phosphate of lime. *Dose.* 10 to 30 gr.; in rickets, &c.

POWDER (Burnt Hartshorn,—with Opium). Syn. *Pulvis Opiatus; Pulvis Cornu Usti cum Opio*,—Ph. L. 1824. *Prep.* From *powdered calcined hartshorn*, 1 oz.; *powdered opium* and *cochineal*, of each, 1 dr. *Dose.* 5 to 20 gr.

POWDER (Capuchin). *Prep.* From *powdered cevadilla*, *parsley seed*, *stavesacre*, and *tobacco*, equal parts. *Used* to destroy pediculi.

POWDER (Castillon's). *Prep.* From *sago-meal*, *salep*, and *gum tragacanth*, of each, 3 dr.; *prepared oyster shells*, 1 dr.; *cochineal*, q. s. to colour. Absorbent. *Dose.* ½ to 1 dr., boiled in milk; in diarrhœa, &c.

POWDER (Catechu,—Compound). Syn. *Pulvis Catechu Compositus*,—Ph. D. *Prep.* (Ph. D.) Take *catechu* and *kino*, of each, 2 *oz.; cinnamon* and *nutmeg*, of each, ½ *oz.;* reduce each to a fine powder, mix, and keep the prepared powder in a well-stopped bottle. Aromatic and astringent. *Dose.* ½ dr. to 2 dr.; in various affections.

POWDER (Chalk,—Compound). Syn. *Pulvis Creta Compositus*,—Ph. L. E. & D. *P. Carbonatis Calcis Comp.*,—Ph. E. 1841. *P. è Bolo Compositus, P. è B. sine Opio, Species è Scordio sine Opio*,—Obs. var. *Prep.* 1. (Ph. L.) *Prepared chalk*, ½ ℔; *cinnamon*, 4 oz.; *tormentil* and *gum acacia*, of each, 3 oz.; *long pepper*, ½ oz.; rub them, separately, to a very fine powder, and mix them.

2. (Ph. E.) *Prepared chalk*, 4 oz.; *cinnamon*, in fine powder, 1½ dr.; *nutmeg*, in fine powder, 1 dr.

3. (Ph. D.) *Prepared chalk*, 5 *oz.; cinnamon*, 2½ *oz.; gum*, 2 *oz.; nutmeg*, ½ *oz.*

Uses, &c. Aromatic, astringent, and antacid. *Dose.* 10 to 30 gr.; in acidity, flatulence, heartburn, diarrhœa, &c. The following form is used by many wholesale houses:—*prepared chalk*, 4 *lb.; powdered cassia*, 2 *lb.; powdered calamus aromaticus*, ¾ *lb.; powdered gum*, 1½ *lb.; long pepper*, ¼ *lb.*

POWDER (Compound Chalk,—with Opium). Syn. *Opiated Chalk Powder; Pulvis Cretæ Compositus cum Opio*,—Ph. L. *Pulvis Cretæ Opiatus*,—Ph. E. & D. *P. Opiatus*,—Ph. E. 1839, and Ph. L. 1787. *P. è Bolo Comp. cum Opio, Species è Scordio cum Opio*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Compound chalk powder*, 6½ oz.; *powdered opium*, 80 gr.

2. (Ph. E.) *Compound chalk powder*, 6 oz.; *powdered opium*, 80 gr.

3. (Ph. D.) *Compound chalk powder*, 4 *oz.* 7 *dr.; opium*, in fine powder, 1 dr.

4. (*Wholesale.*) *Compound chalk powder*, 21 *oz.; powdered opium*, ½ *oz.* Anodyne, antacid, and carminative. *Dose.* 10 to 30 gr.; in the same cases as the preceding, than which it is more active. It has long been a favorite remedy in all cases of simple, and even choleraic diarrhœa.

POWDER (Chalk Mixture). Syn. *Pulvis pro Mistura Cretæ*,—Lat. *Prep.* (Mr. Beasley.) *Powdered gum acacia*, 5 oz.; *prepared chalk*, 4 oz.; *white sugar*, 3 oz.; *oil of cinnamon*, 1½ fl. dr.; mix. 40 gr. of this powder triturated with 1 fl. oz. of *water*, forms the *mistura cretæ* of the Pharmacopœia.

POWDER (Cholera,—Saline). Syn. *Pulvis Salinus Anticholericus*,—Lat. *Prep.* 1. (Dr. O'Shaughnessey.) *Carbonate of soda*, 5 gr.; *chloride of sodium*, *phosphate of soda*, and *sulphate of soda*, of each, 10 gr. For a *dose.*

2. (Dr. Stevens.) See *p.* 251.

POWDER (Cinnamon,—Compound). Syn. *Aromatic Powder; Pulvis Cinnamomi Compositus*,—Ph. L. *Pulvis Aromaticus*,—Ph. E. & Ph. L. 1788. *Species Aromaticæ*,—Ph. L. 1746. *S. Diambræ sine Odoratis*,—Ph. L. 1721. *Prep.* (Ph. L.) *Cinnamon*, 2 oz.; *cardamoms*, 1½ oz.; *ginger*, 1 oz.; *long pepper*, ½ oz.; rub them together so that a fine powder may be made.

2. (Ph. E.) *Cinnamon, cardamom seeds*, and *ginger*, equal parts; to be kept in a well-closed glass vessel.

3. (Ph. D.) *Cinnamon* and *ginger*, of each, 2 *oz.; cardamon seeds* (husked), and *nutmegs*, of each, 1 *oz.* Aromatic and carminative. *Dose.* 10 to 30 gr. In the powder of the shops *cassia* is very frequently substituted for *cinnamon.*

POWDER (Clarifying). Powdered albumen. (See *p.* 31.)

POWDER (Cockle). From the well-known shell-fish *cardium edule* (Linn.), as "*oyster powder.*"

POWDER (Colbatche's Specific). *Prep.* From *solution of sesquichloride of iron*, and *acetate of lead*, of each, 4 oz.; mix, evaporate to dryness, powder the residuum, and preserve it from the air. Astringent and hæmostatic. *Dose.* 3 to 8 gr.

POWDER (Colocynth). Syn. *Pulvis Colocynthidis*,—Lat. That of the shops is generally prepared from the whole of the peeled fruit, with the seeds, instead of merely from the pulp; by which its activity is greatly lessened. A *factitious article* is also met with in trade, made by grinding *bryony root* with about twice its weight of *colocynth seeds*, and a very small quantity of *gamboge.*

POWDER, (Contrayerva,—Compound). Syn. *Pulvis Contrayervæ Compositus*,—Lat. *Prep.* (Ph. L. 1824.) *Powdered contrayerva root*, 5 oz.; *prepared oyster-shells*, 1½ lb.; mix. A tonic absorbent or antacid. *Dose.* 10 gr. to ½ dr., as required.

POWDER (Corn). See *Corn Solvents* (p. 293), and *Wart Powder* (below).

POWDER (Cosmetic). See *Almond*

Powder, Hair do.; Scented Powders, Pastes, &c.

POWDER (Cosmetic). Syn. *Pulvis Cosmeticus*,—Lat. *Prep.* (Ph. Hann. 1831.) *Blanched sweet almonds* and *beans*, of each, 18 oz.; *orris root*, 8 oz.; *white Spanish soap*, 6 oz.; *spermaceti*, 1½ oz.; *dried carbonate of soda*, 1 oz.; *oils of lavender, bergamot*, and *lemon*, of each, 6 dr.; mix, and beat them to a powder. See *Hand Powder.*

POWDER (Crystal). From *quartz*, like "Powdered Glass." *Used* to make fine glass; also as a dryer for paints; and, under the name of "*Diamond Dust*," for razor strops.

POWDER (Curry). Syn. *Indian Curry Powder.* The samples of this compound prepared by different houses vary so greatly from each other in the proportions of the ingredients, that it is difficult to regard any one as a standard. The following are therefore merely given as examples:—

Prep. 1. *Corianders*, 1 *lb.; turmeric*, ¾ *lb.; black pepper*, ½ *lb.; scorched mustard*, ¼ *lb.; ginger*, 2 *oz.*; *cumin seed*, 1 *oz.; capsicums*, ¾ *oz.; mace*, ¼ *oz.;* (all in powder;) mix well.

2. *Coriander seeds* and *black pepper*, of each, 8 *lb.; turmeric* and *cumin seeds*, of each, 4 *lb.; allspice*, ¾ *lb.*; *mace*, 1 *oz.*; (all in powder); mix. This receipt is employed by an eminent wholesale house that does very largely in currie powder. *Used* as a condiment and flavouring ingredient. The addition of a *few heads* of *garlic* gives it an increased zest for Indian veterans.

POWDER (Custard). *Prep.* From *sago meal*, 2 *lb.; powdered turmeric*, ½ *oz.; bitter-almond powder, cassia*, and *mace*, of each, ½ dr.

POWDER (Cyprus). From *lichen rangiferinus* (Linn.) or *rein-deer moss.* It has a very agreeable smell, and being extremely retentive of odours, is much used as a basis for *scent-powders, sachets, &c.* The lichen *evernia prunastri* or *ragged hoary evernia*, also possesses nearly similar properties, and is often substituted for it. See *Scented Powders.*

POWDER (Depilatory). See *page* 325.

POWDER (Diapente). See *page* 326.

POWDER (Disinfecting). Syn. *Pulvis Disinfectans*,—Lat. *Prep.* (Keist.) *Bisulphate of potassa*, 41 parts; *sugar of lead*, 7 parts; *binoxide of manganese*, 3 parts; reduce them separately to a fine powder, and when wanted for *use*, mix a proper quantity in any suitable vessel. For other formulæ, see *Disinfecting Compounds.* The name is commonly applied to *Chloride of lime.*

POWDER (Dover's). Syn. *Pulvis Doveri*,—Lat. *Prep.* (Original Formula.) *Nitre* and *sulphate of potash*, of each, 4 oz.; melt them together in a red-hot crucible, reduce the cold fused matter to powder, and add *powdered ipecacuanha, liquorice*, and *opium*, of each, 1 oz. This is the formula adopted in the Paris Codex. *Compound Ipecacuanha Powder* is now sold under this name. (See *below.*)

POWDER (Egg). See *Baking Powder.*

POWDER (Emmenagogue). Syn. *Pulvis Emmenagogus, P. Hæmatinus, P. contra Amenorrhœam*,—Lat. *Prep.* 1. *Saccharine carbonate of iron*, 3 parts; *powdered myrrh, ginger*, and *nutmeg*, of each, 1 part; divide into ½ dr. papers. One for a *dose*, twice or thrice daily.

2. (Augustin.) *Myrrh*, 12 gr.; *saffron*, 3 gr; *oil of cloves*, 1 drop. For a *dose*, as the last.

3. (Klein.) *Calomel*, 4 gr.; *extract of yew*, 10 gr.; *powdered savine*, 1 dr.; *Quevenne's iron*, ½ dr.; *loaf sugar*, 2 dr. For 6 powders; as before.

POWDER (Epilepsy). Syn. *Pulvis Antepilepticus, P. ad Epilepsiam*,—Lat. *Prep.* 1. (Ph. E. 1744.) *White dittany, peony, misletoe of the oak*, and *valerian*, equal parts. *Dose.* 12 to 60 gr.

2. (*Poudre de Guttète.*) From *misletoe, peony root* and *seeds, prepared coral, elk's hoof, orache seeds*, and *white dittany*, of each, 2 parts; reduced to powder. *Dose.* 2 to 6 gr., in the convulsions of infants; ½ to 1 dr., in epilepsy.

3. (*Poudre de Ragola.*) From *misletoe, valerian, orange leaves*, and *sugar*, of each, 4 dr.; *magnesia*, 1 dr.; *oxide of zinc*, ½ dr.; *oil of cajeput*, 40 drops. *Dose.* 15 to 20 gr., thrice daily.

4. (*Sommer's Specific.*) From *wall-crop* and *lump sugar*, of each, 1 dr.; divide into 8 powders. *Dose.* One, twice a day until all are taken.

POWDER (Escharotic,—Arsenical). Syn. *Pulvis Escharoticus Arsenicalis*,—Lat. *Poudre du Frères Cosme*,—Fr. *Prep.* 1. (*Original formula.*) From *white arsenic*, 12 gr.; *burnt hartshorn*, ½ dr.; *cinnabar*, 1 dr.

2. (P. Cod.) *Red sulphuret of mercury* and *powdered dragon's blood*, of each, 2 parts; *levigated arsenious acid*, 1 part; carefully mixed together. See *Arsenical Caustic.*

POWDER OF ETHIOPIA (Guy's). A mixture of *tin filings* with about 1-3rd their weight of *æthiop's mineral*, triturated together. Vermifuge.

POWDER (Extract of Colocynth,—Compound). Syn. *Pulvis Extracti Colocynthidis Compositi*,—Lat. *Prep.* From *compound extract of colocynth* (Ph. L. 1836), dried by a gentle heat, and powdered.

Obs. This, like many other articles employed by lazy dispensers, does not represent the preparation for which it is used as a substitute; whilst, from its peculiar character, it is very open to sophistication, a practice, we regret to say, very general with certain druggists. Indeed some of these parties make this article by simply throwing the *ingredients of the extract* into a pan along with a *little water*, and when they have become soft, stirring them together with a spatula, after which they are desiccated, and powdered. This is then labelled by certain houses "*Pulv. Ext. Coloc. Co. P. L.*" and sold to their unfortunate customers as such, although, no such an extract has been in the Ph. L. since that of 1836.

POWDER (Faynard's). The *charcoal* of *beechwood*, finely powdered. (Paris.) *Used* in piles, and as a styptic.

POWDER (Fever). See *Antimonial Powder.*

POWDER (Filtering). See *p.* 455.

POWDER (Flint.) Syn. *Silex Contritus*,—Ph. L. *Prep.* As powdered glass. (See *p.* 529.) It is ordered in the Ph. L. to be employed, instead of magnesia, for the purpose of mechanically dividing the *essential oils* used in the preparation of *distilled waters.* It is also used as an escharotic.

POWDER (Fly). *Prep.* From *white arsenic*, 5 *oz.; white sugar*, 6 *lb.; rose pink*, 2 *oz.;* mix, and put 6 dr. in each paper. *Used* to kill flies. It is *poisonous*, and should be employed with great caution, particularly where there are children.

POWDER (Fulminating). See *page* 497.

POWDER (Fumigating). Syn. *Pulvis Fumalis*,—Lat. *Prep.* (Ph. Russ.) *Amber*, *mastic*, and *olibanum*, of each, 3 parts; *storax*, 2 parts; *benzoin* and *labdanum*, of each, 1 part; reduce them to coarse powder, and mix them well. See *Fumigations.*

POWDER (Galls,—Compound). Syn. *Pulvis Gallæ Compositus*,—Lat. See *Astringent Powder.*

POWDER (Gascoigne's). Syn. *Pulvis Gascoigni*,—Lat. *Prep.* From *powdered crabs' claws*, 1 *lb.; oriental bezoar*, 1 *oz.* When made into balls it forms *Gascoigne's balls.* This powder was once held in great repute as an absorbent, &c. It is, however, no better than the less costly *prepared chalk* of modern pharmacy.

POWDER (Goelis's Antihectic). *Prep.* From *burnt hartshorn, powdered nutmeg, black pepper*, and *roasted laurel berries*, of each, 1 part; *liquorice powder*, 3 parts. *Dose.* ½ to 1 dr.; in the hectic fever of scrofulous subjects.

POWDER (Goulard). Effloresced sugar of lead. *Poisonous.*

POWDER (Gray). Mercurial powder.

POWDER (Gregory's). See *Compound Rhubarb Powder.*

POWDER (Guy's). See *page* 1058.

POWDER (Hæmostatic). Syn. *Pulvis Hæmostaticus*,—Lat. *Prep.* 1. (Guibourt.) *Charcoal* and *gum arabic*, of each, in powder, 1 part; *powdered resin*, 4 parts.

2. (Mialhe.) From *powdered alum, gum tragacanth*, and *tannin*, equal parts. *Used* to check local bleeding.

POWDER (Hair). Syn. *Pulvis pro Crine*,—Lat. *Starch* reduced to a very fine powder, and then *scented* according to the fancy of the artist; it is, lastly, passed through a gauze sieve. In its simple form, without any addition, it constitutes "*plain hair powder.*" In other cases it is distinguished by the name of the substance added to perfume it. Thus, we have "*Rose hair powder*," "*Violet do.*," &c. Potato farina, well triturated, is now commonly used for hair powder. Amongst the lower classes, the contents of the "flour dredger" of the kitchen, are frequently misappropriated to this purpose. See *Scented Powders* (below).

POWDER (Hand). *Prep.* From *almond powder*, 1 *lb.; powdered cuttle-fish bone* and *white soap*, of each, 4 *oz.; orris powder*, 1 *oz.;* mix. *Used* to clean the hands, and to render them soft and white. See *Cosmetic Powder.*

POWDER (Helvetius's). Syn. *Pulvis Helvetii*,—Lat. A mixture of *powdered alum* and *dragon's blood.* (Dr. Paris.)

POWDER (Herrenschwand's Specific). See *p.* 948.

POWDER (Hiera Picra). See *page* 1055.

POWDER (Hufeland's). Syn. *Hufeland's Quinquina Factice; Pulvis Cinchonæ Factitius, P. Salicis Compositus*,—Lat. *Prep.* From *bennet* (the herb), *calamus aromaticus, chestnut bark, gentian root*, and *willow bark*, equal parts; reduced to powder.

POWDER (Hunter's). See *Wart Powder.*

POWDER (Hunt's Breakfast). See *page* 273.

POWDER (Hydrophobia). Syn. *Pulvis Antilyssus*,—Lat. *Prep.* 1. (Dr. Asmus.) *Prepared crab's eyes* and *gentian*, of each, 1 *oz.; Armenian bole*, ½ *oz.; powdered myrrh*, ¼ *oz.;* mix, rub them to a very fine powder. *Dose.* As much as will stand on a sixpenny-piece, every morning fasting, for several days.

2. (Heine.) *Yellow broom*, in fine powder, 2 oz.; *black pepper*, 1 oz.; mix, add of *levigated arsenious acid*, 6 gr.; mix *very carefully*, and put ½ dr. into each paper. *Dose.* 1 paper, twice a day, after a meal.

3. (Dr. Meade.) *Ash-coloured ground liverwort* (peltidea canina *or* lichen caninus), ½ oz.; *black pepper*, ¼ oz.; (both in powder;) mix, and divide it between 4 papers. *Dose.* 1 paper, every morning for four successive days.

4. (*Ormskirk Medicine.*) See *page* 916.

5. (*Pulvis Antilyssus*,—Ph. L. 1746.) As the last.

6. (*Tonquin Powder*,—Sir G. Cobb's.) From *pure musk*, 16 gr.; *red cinnabar*, 48 gr.; well triturated together. To be taken for a dose, in a gill of arrrack, on three alternate days, and repeated in the same manner on the next three changes of the moon.

Obs. All the above have been celebrated as *preventives of hydrophobia;* the *first*, *third*, and *sixth* are, indeed, stated by their respective advocates to be "*infallible.*" Their action may, probably, be through the imagination; but we beg the reader to take them at the same value as other reputed specifics and nostrums. See *Hydrophobia.*

POWDER (Ipecacuanha,—Compound). Syn. *Dover's Powder, Compound Powder of Ipecacuanha with Opium; Pulvis Doveri; Pulvis Ipecacuanhæ Compositus*,—Ph. L. E. & D. *Poudre d'Ipecacuanha et d'Opium*,—Fr. *Prep.* 1. (Ph. L.) *Ipecacuanha* and *opium*, of each, in fine powder, 1 dr.; *sulphate of potassa*, in fine powder, 1 oz.; mix them (thoroughly). The Edin. & Dublin formulæ are similar.

2. (P. Cod.) *Nitre* and *sulphate of potassa*, of each, 4 oz.; *ipecacuanha*, *liquorice root*, and *hard extract of opium*, of each, 1 oz. This closely resembles the original formula.

3. (*Wholesale.*) From *powdered ipecacuanha* and *opium*, of each, 1 *lb.; powdered sulphate of potash*, 8 *lb.* *Uses, &c.* Dover's powder is a powerful and valuable sudorific. *Dose.* 5 to 15 or 20 gr., followed by warm diluents; in inflammatory affections, rheumatisms, colds, &c.

POWDER (Itch). Syn. *Pulvis Antipsoricus*,—Lat. *Prep.* 1. *Sulphur* and *potato farina*, of each, ½ *lb.; essence of bergamot*, ¼ *oz.;* mix.

2. (*Poudre de Pihorel.*) A mixture of finely pulverized *sulphuret of calcium* and *farina*, in nearly equal quantities. *Used* either as a dusting powder, or mixed with a little oil or fat, and rubbed into the affected part.

POWDER (Jalap,—Compound). Syn. *Pulvis Jalapæ Compositus*,—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Jalap*, 3 oz.; *bitartrate of potassa*, 6 oz.; *ginger*, 2 dr.; rub them separately into fine powder, then mix them.

2. (Ph. E.) As the last, *omitting* the *ginger.*

3. (Ph. D.) *Jalap*, 2 *oz.; bitartrate of potassa*, 3½ *oz.; ginger*, ½ *oz.;* (all in fine powder;) mix by careful trituration. *Dose.* 20 to 60 gr.; as a purgative in habitual costiveness, dropsies, &c.; also in worms, the tumid bellies of children, &c.

4. (*Pulvis Lenitivus; Sucre Orangé Purgatif.*) From *refined sugar*, ¾ *lb.; jalap* and *cream of tartar*, of each, 2 *oz.; oil of orange-peel*, ¼ *oz.* A popular purgative on the Continent. *Dose.* 1 to 3 dr.

POWDER (James's). Syn. *Pulvis Jacobi, P. Febrifugus Jacobi*,—Lat. The *antimonial powder*, or *compound powder of antimony*, of the Pharmacopœias, is the preparation which usually passes under this name; but the *true James's powder* is a nostrum, the pretended secret of the preparation of which is claimed to be possessed by only two parties in the kingdom. The *patent specification* of the once celebrated Dr. James runs as follows:—

"Take of *antimony*, calcine it with a continued protracted heat, in a flat, unglazed earthen vessel, adding to it, from time to time, a sufficient quantity of any *animal oil* and *salt*, well dephlegmated; then boil it in *melted nitre* for a considerable time, and separate the *powder* from the nitre by dissolving it in water." On this, it has been remarked, that it yields a product totally different from that which Dr. James and his successors have sold under the name, and he has hence been charged with concealing the real formula for his powder, and publishing a false one in its stead.

According to Dr. Robinson, the original formula for this nostrum, and that still adopted by the vendors of the proprietary article at the present day, is—*Tartarized antimony*, 1 part; *prepared burnt hartshorn* and *calx of antimony*, of each, 5 parts; carefully mixed together, and divided into 21-gr. powders. ('Phil. Journ. Pharm.,' vi, 282.) If this formula be the true one, as asserted, we suspect heat must be employed in the process.

Perhaps no nostrum ever received such extensive patronage from the faculty as James's powder. Dr. James was himself remarkably successful in its use, but whether his success depended upon his powder, or the mercurials and bark which he commonly employed at the same time, is still undetermined. The death of an eminent personage, as was asserted, from a dose of this nostrum, at one time injured its sale, but the unfortunate circumstance was soon forgotten, and the happy proprietors continued as prosperous as ever.

POWDER (Kino,—Compound). Syn. *Pulvis Kino Compositus*,—Ph. L. and Ph. D. 1826. *Prep.* (Ph. L.) *Kino*, 15 dr.; *cinnamon*, 4 dr.; *dried opium*, 1 dr.; reduce them separately to fine powder, and then mix them. Astringent. *Dose.* 5 to 20 gr.; in diarrhœa, pyrosis, &c.

POWDER (Lausanne). *Prep.* From *nitre*, 1½ dr.; *carbonate of magnesia*, *bitartrate of potassa*, *precipitated sulphur*, and *oleo-saccharum of peppermint*, of each, 4 dr.; *sugar of milk*, 1 oz. Lenitive and anti-dysenteric.

POWDER (Laxative,—St. Germain). See *Species.*

POWDER (Liquorice,—Compound). Syn. *Pulvis Glycyrrhizæ Compositus*, *P. Pectoralis Kurellæ*,—Lat. *Prep.* (Ph. Bor.) *Liquorice root* and *senna leaves*, of each, 6 oz.; *fennel seed* and *milk of sulphur* (pure), of each, 3 oz.; *white sugar*, 18 oz. (all in fine powder); mix. Pectoral and laxative.

POWDER (Magnesia and Rhubarb). See *Compound Rhubarb Powder.*

POWDER (Martin's Cancer). An American nostrum, composed of the *powdered stems* of the *orobanche Virginiana* (Linn.) combined with a *very small quantity* of *arsenious acid.* It is *used* as a sprinkle for open cancers, and cancerous sores.

POWDER (M'Kinsey's). See *Patent Medicines.*

POWDER (Mercurial). Syn. *Mercury with Chalk.* In addition to the authorised formulæ given at *p.* 781-2, the following may be found useful:—Take of *mercury*, 3 oz.; *powdered resin*, ¾ oz.; *prepared chalk*, 5 oz.; *rectified spirit*, q. s.; make a paste with the *resin*, and a small quantity of the *spirit;* add the *mercury*, which may be extinguished in a short time; then the *chalk* and *alcohol*, gradually, so as to keep up the pasty consistence; lastly, add *sufficient spirit* to dissolve out the *resin*, wash the powder on a filter, and dry it. *Rectified oil of turpentine* may be substituted for the spirit.

POWDER (Milk). See *page* 789.

POWDER (Morison's Aperient). See *Patent Medicines.*

POWDER (Mushroom). Syn. *Pulvis Agarici*, *P. A. Esculenti*,—Lat. From *edible mushrooms* dried by a gentle heat, and then powdered along with a little *white pepper*, *cloves*, and *mace.* Some *cayenne* is frequently added.

POWDER (Mussel). From the *mytilus edulis* (Linn.), or *common mussel*, in the same way as *Oyster powder.*

POWDER (Myrrh,—Compound). Syn. *Pulvis è Myrrhâ Compositus*,—Lat. *Prep.* (Ph. L. 1788.) *Myrrh*, *dried savine*, *dried rue*, and *Russian castor*, equal parts, rubbed to powder, and then well mixed. Emmenagogue and antispasmodic. *Dose.* 12 to 30 gr.

POWDER (Nursery). See *Violet Powder.*

POWDER (Opiated). See *p.* 1057.

POWDER (Oyster). Syn. *Pulvis Ostreæ*,—Lat. *Prep.* From the *common oyster* (ostrea edulis,—Linn.), pulped through a sieve, made into a paste with *wheaten flour*, and a *little salt*, and then rolled out into thin pieces and dried; these are reduced to powder, sifted, and packed in well-corked bottles. *Used* to make sauce; about 1 *oz.*, to *water* 1 pint. Other shell-fish are treated in the same way.

POWDER (Pea). Syn. *Farina Pisorum*,—Lat. *Prep.* From *peas*, in the usual manner. *Used* to make *extemporaneous pea-soup.*

POWDER (Pearl). *Prep.* From pure *pearl white* and *French chalk* (scraped fine by Dutch rushes), equal parts; triturated together. Some makers add more French chalk. *Used* as a skin cosmetic. This mixture is preferable to *pearl white* alone, from being more adhesive. See *Subchloride* and *Trisnitrate of Bismuth.*

POWDER (Pease). *Prep.* From *dried mint* and *sage*, of each, 4 *oz.; celery seed* and *white pepper*, of each, ½ *oz.; turmeric powder*, ¼ *oz.;* reduced to fine powder. *Used* as a condiment and kitchen spice.

POWDER (Pectoral). See *above.*

POWDER (Piles). Syn. *Pulvis Antihæmorrhoidalis*, *P. Hæmorrhoidalis*,—Lat. *Prep.* 1. (Fr. Hosp.) *Precipitated sulphur*, 3 oz.; *cream of tartar*, and *black pepper*, of each, 1 oz.; *oil of cubebs*, ½ dr. *Dose.* A teaspoonful, in milk or honey, thrice a day.

2. (*External.*)—*a.* From *Aleppo galls*, in very fine powder, 2 oz.; *opium*, in fine powder, 1 dr. A pinch to be applied occasionally.

b. From *sesquioxide of iron*, 1 oz.; *powdered acetate of lead*, ½ dr. As the last.

POWDER (Plate). Syn. *Pulvis pro Argento*,—Lat. *Prep.* 1. *Jeweller's rouge*, ¼ *lb.; prepared chalk* or *levigated burnt hartshorn*, ¾ *lb.;* mix.

2. *Levigated putty powder*, ½ *lb.; burnt hartshorn*, ½ *lb.; prepared chalk*, 1 *lb.; rose pink*, 1 *oz.*

3. (*Mercurial.*) From *quicksilver with chalk*, 1 *oz.; prepared chalk*, 11 *oz.;* mix. *Used* to clean and polish plate. See *Plate.*

POWDER (Plate Boiling). *Prep.* From *cream of tartar*, *common salt*, and *alum*, *equal parts.* A *little* of this powder, added to the water in which plate is boiled, gives to it a silvery whiteness.

POWDER (Plummer's Alterative). See *page* 410.

POWDER (Portland). Syn. *Pulvis Antarthriticus*, *Pulvis Ducis Portlandiæ*,—Lat. *Prep.* (Dr. Paris.) *Roots* of *gentian*, and *round birthwort* (aristolochia rotunda), and the *tops* and *leaves* of *germander* (chamædrys), *ground pine* (chamæpitys), and *lesser centaury* (chirouca centaurium), of each, in powder, equal parts. A once celebrated gout remedy, ascribed to the Duke of Portland. *Dose.* 1 dr., twice or thrice a day, when required.

POWDER (Poterius's Antihectic). Syn. *Antheticum Poterii*, *Diaphoreticum Joviale*, —Lat. *Prep.* Melt together equal parts of *tin* and *metallic antimony*, powder, mix it with 6 parts of *powdered nitre*, and deflagrate it in a red-hot crucible; lastly, powder, and wash the residuum well with water. Astringent and tonic; formerly held in great esteem in hectic and consumption. *Dose.* 10 to 30 gr.

POWDER (Poultice). Syn. *Pulvis pro Cataplasmate*,—Ph. D. 1826. *Prep.* From *linseed meal*, 1 part; *oatmeal*, 2 parts; mixed together.

POWDER (Quevenne's Ferruginous). See *Quevenne's Iron* (p. 650).

POWDER (Rat). See *Rat Poisons.*

POWDER (Rhubarb,—Compound). Syn. *Gregory's Mixture*, *Gregory's Powder; Pulvis Rhei Compositus*,—Ph. E. & D. *Prep.* 1. (Ph. E.) *Calcined magnesia*, 1 ℔; *rhubarb*, 4 oz.; *ginger*, 2 oz; all in fine powder; mix, and preserve it from the air.

2. (Ph. D.) *Calcined magnesia*, 6 *oz.; rhubarb*, 2 *oz.; ginger*, 1 *oz.*

3. *Calcined magnesia* 8 *oz.; rhubarb*, 3 *oz.; chamomile*, 2 *oz.; ginger*, 1 *oz.*

Obs. An excellent stomachic, antacid, and laxative. *Dose.* 20 gr. to ½ dr. Some druggists substitute the *heavy carbonate* for the calcined magnesia ordered above, but this alters the nature of the preparation, and requires the dose to be increased. *Heavy calcined magnesia* may, however, be employed with advantage.

POWDER (Sachet). See *Scented Powders.*

POWDER (Saline,—Compound). Syn. *Pulvis Salinus Compositus*,—Ph. E. & Ph. D. 1826. *Prep.* (Ph. E.) *Pure muriate of soda* and *sulphate of magnesia*, of each, 4 oz.; *sulphate of potash*, 3 oz.; each separately dried by a gentle heat, and pulverized, then triturated together, and preserved in well-closed vessels. An excellent saline purgative. *Dose.* 2 to 6 dr., in ½ pint of water or table-beer, in the morning fasting.

POWDER (Scammony,—Compound). Syn. *Basilic Powder? Pulvis Basilicus? Pulvis Scammonii Compositus*,—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Scammony* and *hard extract of jalap*, of each, 2 oz.; *ginger*, ½ oz.; rub them separately to a very fine powder, and then mix them. *Dose.* 5 to 15 gr.

2. (Ph. E.) *Scammony* and *bitartrate of potassa*, of each, in very fine powder, equal parts. *Dose.* 7 to 20 gr.

3. (Ph. D.) *Scammony*, in fine powder, 1 *oz.*; *compound powder of jalap*, 3 *oz.*; mix. *Dose.* 10 to 30 gr.

Obs. The above are favorite cathartics in worms, especially for children. They are commonly sold for *Basilic Powder.* (See *p.* 1056.)

POWDER (Scammony,—with Calomel). Syn. *Pulvis Scammonii cum Calomelane*,—Ph. L. 1788. *Prep.* From *scammony*, ½ oz.; *calomel* and *white sugar*, of each, 2 dr. An excellent vermifuge for children. *Dose.* For an adult, 5 to 20 gr.; for a child, 2 to 8 gr. Sold for *Basilic powder*, to which it approaches nearer in composition than the preceding.

POWDER (Scammony,—with Woodsoot). Syn. *Poudre d'Ailhaut; Pulvis Scammonii cum Fuligine*,—Lat. *Prep.* *Scammony*, 2 parts; *wood-soot*, 3 parts; *resin*, 4 parts. Purgative and vermifuge. A once fashionable medicine. *Dose.* 20 to 40 gr.

POWDER (Schmidt's Parturifacient). Syn. *Schmidt's Poudre Ocytique*,—Fr. *Prep.* From *powdered ergot of rye*, *borax*, and *oleo-saccharum* of *chamomile*, of each, 8 gr.; *powdered sugar*, q. s. For a *dose;* to be repeated every quarter of an hour, until some effect is produced.

POWDER (Senna,—Compound). Syn. *Pulvis Sennæ Compositus*,—Ph. L. 1824. *Pulvis è Sennâ Compositus*,—Ph. L. 1788. *Prep.* (Ph. L. 1824.) *Senna and bitartrate of potassa*, of each, 2 oz.; *scammony*, ½ oz.; *ginger*, 2 dr.; all in fine powder; mix. *Dose.* 20 to 30 gr., or more; as a purgative or anthelmintic.

POWDER (Senna,—Battley's Green). Syn. *Pulvis Sennæ Viridis*,—Lat. *Prep.* From *senna leaves* dried and heated until they turn yellow, then powdered along with a little (blue) *charcoal*, to give a green colour.

POWDER (Silvering). *Prep.* 1. *Silver dust* (fine), 20 gr.; *alum*, 30 gr.; *common salt*, 1 dr.; *cream of tartar*, 3 dr.; rub them together to a fine powder.

2. As the last, but substituting 35 gr. of *nitrate of silver* for the silver dust.

3. *Chloride of silver* is dissolved in a *solution of hyposulphite of soda*, and the solution made into a paste with *levigated burnt hartshorn* or *bone dust;* this is next dried, and powdered.

4. *Silver dust*, 1 *oz.; common salt* and *sal ammoniac*, of each, 4 *oz.; corrosive sublimate*, ¼ *oz.*

Obs. The above powders, made into a paste with a little water, are *used* to silver dial-plates, statuettes, and other articles in copper, previously *well cleaned*, by friction. The best silver powder for the purpose, is that precipitated from its nitric solution by means of a copper plate. When the product of the last formula is used, the articles should be afterwards made red-hot, and polished.

POWDER (Soap). Syn. *Sapo Contritus, Pulvis Saponis*,—Lat. *Castile soap*, sliced or cut small, dried by exposure to a warm atmosphere, or by a very gentle heat, and then powdered. *Used* in dispensing; also as a *hand*, *shaving*, and *tooth powder*. As a cosmetic it may be scented at will.

POWDER (Sponge). Syn. *Pulvis Spongiæ, P. Spongiæ Ustæ*,—Ph. D. 1826. *Prep.* Let *sponge*, cut into small pieces, be beaten so as to free it from sand or stones; then burn it in a covered iron vessel, until it becomes black and friable; finally, reduce it to powder. Deobstruent. *Dose.* ½ to 3 dr.; in glandular indurations and enlargements, &c. It should be of a brownish black colour; if over burnt its efficacy is destroyed.

POWDER (Squills). Syn. *Pulvis Scillæ*,—Ph. D. 1826. *Prep.* Remove the membranous integuments from the *bulb* of the *squill*, cut it into thin slices, and dry it at a heat between 90 and 100° Fahr.; next reduce it to powder, and keep it in well-stopped bottles.

POWDER (Sternutatory). See *Snuffs* (Medicated).

POWDER (Styptic). See *p.* 1056-9, &c.

POWDER (Succession). See *page* 950.

POWDER (Tragacanth,—Compound). Syn. *Pulvis Tragacanthæ Compositus*,——Ph. L. and E. *Prep.* (Ph. L.) *Gum tragacanth, gum acacia*, and *starch*, of each, in fine powder, 1½ oz.; *powdered white sugar*, 3 oz. The Edinburgh formula is similar. Demulcent. *Dose.* ½ dr. to 2 dr., in water or any simple liquid; in hoarseness and catarrhs, combined with squills and henbane, to allay irritation; in dysentery, combined with ipecacuanha; and in gonorrhœa, strangury, &c., combined with acetate of potassa or nitre.

POWDER (Vienna). Potash with lime. (See *p.* 1044.) The once celebrated refrigerant powder, *pulvis Viennensis albus virgineus*, has now been long obsolete.

POWDER (Violet). Syn. *Nursery Powder, Skin do.* This is simply *starch* reduced to a very fine powder, and scented with *orris powder* or *essence of violets.* The *best kinds* are also perfumed with a little *musk* or *ambergris*, and are now generally made with *potato farina.* The *commoner sort* is only scented with a little *essence of bergamot* or *essence of lemon.* "*Plain violet powder*" is, of course, unscented.

Prep. 1. *Powdered starch*, 28 *lb.*; *powdered orris root*, 1 *lb.; essence of ambergris* and *essence of bergamot*, of each, ½ *oz.; oil of rhodium*, ½ dr.; mix, and pass the powder through a sieve.

2. *Powdered starch*, 14 *lb.*; *essence of bergamot*, ½ *oz.*; *oil of cloves*, ¼ *oz.;* as last. *Used* as a dusting powder in excoriations, &c. See *Cosmetic Powders* (below).

POWDER (Voght's Stomachic). *Prep.* From *powdered nux vomica*, 18 gr.; *powdered ipecacuanha*, 24 gr.; *powdered rhubarb, prepared oyster shells*, and *mint oleosaccharum*, of each, 1 dr.; mix, and divide it into 12 powders. One for a *dose;* twice daily.

POWDER (Ward's Sweating). Resembles *Dover's powder.*

POWDER (Wart). Syn. *Corn Powder, Cosmetic Caustic*, &c. *Prep.* 1. *Ivy leaves* ground to powder. A pinch is applied with a rag, the part being first moistened with strong vinegar. Useful for soft corns and warts.

2. (*Hunter's.*) From *savine* and *verdigris*, equal parts. See *Corn Solvents.*

POWDER (Warwick's,—Earl of). Syn. *Pulvis Comitis Warwicensis*,—Ph. L. 1721. *Prep.* From *scammony*, prepared with the fumes of sulphur, 2 oz.; *diaphoretic antimony*, 1 oz.; *cream of tartar*, ½ oz. *Dose.* 15 to 30 gr.

Obs. This is a modification of *Cornachini's powder.* It is represented in the present pharmacopœias by *compound scammony powder.* "Cornachini wrote a whole book about his powder, the proportions of the ingredients of which he varied according to circumstances." (*Med. Lex.*)

POWDER (Washing). The numerous compounds vended under this name have for their basis the *soda-ash* of commerce, blended with common *Scotch soda* in variable proportions. The *best of them* consist either wholly, or chiefly, of the first of these substances. The *alkaline matter* is reduced to coarse powder, and stirred up with *liquid size*, or with a *decoction of linseed*, *Irish moss*, or *British gum*, and is then dried, and again crushed, or powdered, and at once put into the packages, in which it is rammed tight, and covered up immediately. The object aimed at by the manufacturer is to keep his commodity from the air as much as possible; because exposure renders it less caustic, and consequently, less detergent. We have samples of *Green's*, *Ward's*, and several other *Washing powders* now before us; and from personal examination, and the tests which they have been put to in our household, we are absolutely lost to conceive how persons can be so foolish as to purchase such articles at the rate of 8*d.*, 10*d.*, 1*s.*, or even more per *lb.*, when they can buy *really good soda* at ¾*d.* This last, rendered partly caustic by a little quicklime, is better than any of them; and 1 *pennyworth of lime*, judiciously used, would, for this purpose, last an ordinary household a *twelvemonth*. From this category, we must, however, exclude the "*Washing Crystal*" of Mr. Manby, of Temple Bar, which candour compels us to admit is a most excellent article of its kind, and, more than all, is "put up" in a very neat and convenient form, especially for toilet use. We always keep a packet of Mr. Manby's article on our dressing table, by which the hard water with which we are supplied is instantly rendered soft and agreeable.

POWDERS (Effervescing). Syn. *Pulveres Effervescentes*,—Ph. E. *Prep.* Take of *tartaric acid*, 1 oz.; *bicarbonate of soda*, 1 oz. 54 gr. (534 gr.), or *bicarbonate of potassa*, 1 oz. 2 dr. 40 gr. (640 gr.); reduce the acid, and either bicarbonate separately to fine powder, divide each of these into 16 powders, and preserve the acid and alkaline powders in separate papers of different colours.

POWDERS (Effervescing Citric). Syn. *Pulveres Effervescentes Citrati*,—Ph. D. *Prep.* Take of *citric acid* (crystallized), 9 *dr.*; *bicarbonate of soda*, 11 *dr.*, or *bicarbonate of potassa*, 13 *dr.*; proceed as last, dividing each into 18 parts.

POWDERS (Effervescing Tartaric). Syn. *Pulveres Effervescentes Tartarizati*,—Ph. D. *Prep.* Take of *tartaric acid* (in crystals), 10 dr.; *bicarbonate of soda*, 11 dr., or *bicarbonate of potassa*, 13 dr.; reduce them to powder, and divide them into 18 parts, as before.

POWDERS (Ginger Beer). Syn. *Pulveres Effervescentes cum Zingibere*,—Lat. *Prep.* 1. *Powdered white sugar*, 1 to 2 dr.; *bicarbonate of soda*, 26 gr.; *finest powdered Jamaica ginger*, 6 gr.; *essence of lemon*, 1 drop; mix, and wrap it in BLUE PAPER. In the WHITE PAPER put of *powdered tartaric acid*, 35 gr., or of *powdered citric acid*, 30 gr.

2. *Finest Jamaica ginger*, 1 dr.; *bicarbonate of soda*, 5 dr.; *white sugar*, 16 dr.; *essence of lemon*, 6 or 8 drops; mix, and divide it between 12 papers (*blue*). For the *white papers*, divide *tartaric acid*, 6 dr., in the same way. By taking the *drachms* as *ounces* the quantity will be sufficient for 8 dozen. For *use*, dissolve one of each colour separately in somewhat less than half a glass of water, mix the two, and drink the mixture whilst effervescing.

3. (*In one bottle.*)—*a.* The *sugar* and the *saline ingredients* are separately dried by a very gentle heat, then mixed in a dry room with the *ginger* and *essence of lemon*, and *at once* put into bottles.

b. By adding to the *lemoniated kali*, noticed at *page* 1039, about 1-16 of its weight of the *finest powdered Jamaica ginger*, (i. e., ½ *dr.* to each *oz.*; 1 *oz.* to each *lb.*,) at the time of mixing the ingredients together. A dessert-spoonful, thrown into a tumbler two thirds filled with *cold water*, produces an excellent glass of ginger beer.

POWDERS (Ink). The article usually sold under this name is noticed at *p.* 628. *Another formula*, which we have adopted with considerable success, is as follows:—*Good black ink*, 3 pints; *lump sugar*, 1½ *oz.*; and *gum arabic*, ½ *oz.*; are put into a clean iron pan, and evaporated by the heat of boiling water, with occasional stirring, to dryness; the dried mass is reduced to powder, and divided into 12 parts, which are enveloped in either *tin-foil* or *glazed paper*, and kept dry. One of these papers dissolved in ¼ pint of *hot water* forms that quantity of an *excellent black ink*, without sediment, and which answers well with the copying press.

POWDERS (Lemonade). Syn. *Lemon Sherbet*; *Limonadum Siccum*, *Pulvis pro Limonado*,—Lat. *Prep.* 1. *Powdered citric* or *tartaric acid*, 12 gr.; *powdered white sugar*, ½ *oz.*; *essence of lemon*, 1 drop, (or a little of the *yellow peel of a lemon* rubbed off on a piece of sugar); mix. For one glass.

2. *White sugar*, 4 *lb.; citric* or *tartaric acid*, 1½ *oz.; essence of lemon*, ¼ *oz.;* mix well, and preserve it in a bottle, for use. 1 to 2 dessert-spoonfuls make a glass of lemonade. It is also put up in papers, containing about 2½ dr. each.

3. (*Effervescing.*)—*a.* For the *blue papers*, take of *powdered white sugar*, 1 *lb.*; *bicarbonate of soda*, ¼ *lb.; essence of lemon*, 1½ dr.; mix, and divide it between 6 dozen papers. Next divide *tartaric* or *citric acid*, 5 *oz.*, between 6 dozen *white papers.* Or the two may be kept in bulk, in separate bottles.

b. (*In one bottle.*) As *acidulated kali* (p. 1039). Some makers slightly increase the quantities of *acid* and *essence of lemon*, there ordered.

POWDERS (Polishing). *Prep.* 1. (For *Brass* and *Copper.*)—*a.* From *rotten stone*, 3 *oz.; powdered soap*, 1 *oz.*

b. From *rotten stone*, 7 *oz.; powdered oxalic acid*, 1 *oz.* Both are used with a little water. See *Brass Paste.*

2. (For *Gold.*) See *Jeweller's Rouge.*

3. (For *Ivory.*) Pumice stone and putty powder.

4. (For *Plate.*) See *Plate* and *Plate Powder.*

5. (For *Silver.*) As the last.

6. (For *Specula.*) Putty powder and jeweller's rouge. See *Glass* and *Specula.*

POWDERS (Scented). *Prep.* 1. *Cosmetic Powders.*—*a.* (*Poudre de Chipre.*) Macerate *oak-moss* in *running water* for 2 or 3 days, then dry, and powder it. *Used* as a basis for other powders, on account of its being highly retentive of odours. *Reindeer moss* and *ragged hoary evernia*, are also used for the same purpose. See *Cyprus Powder* (above).

b. (*Poudre de Chipre de Montpelier.*) From *poudre de chipre*, 2 *lb.; musk*, 30 gr.; *civet*, 20 gr.; (the last two powdered by means of a little sugar;) *cloves*, ¼ *oz.*

c. (*Poudre de Fleurs d'Oranges.*) From *starch* or *cyprus powder*, 25 *lb.; orange flowers*, 1 *lb.;* mixed in a covered chest, and stirred twice or thrice daily; the process being repeated, with *fresh* flowers, a second, and a third time. Or, the *plain powder* is scented by the addition of a little *neroli* or *essence of petit grain.*

d. (*Poudre de Frangipane.*) From *poudre de fleurs d'oranges* and *poudre de chipre*, of each, 6 *lb.; essence of ambergris*, 1 *oz.; civet* (powdered with sugar), ½ dr. Ash-gray colour.

e. (*Poudre de Jasmine.*) As *poudre de Fleurs d'oranges*, but using *jasmin flowers.*

f. (*Poudre à la Maréchale.*) From *poudre de chipre*, 2 *lb.; starch powder*, 1 *lb.; calamus aromaticus, cloves*, and *cyperus perennis* or *rotundus*, of each, 2 *oz.* Or, *starch powder*, 28 *lb.; powdered cloves*, ¾ *lb.; powdered orris root*, ½ *lb.; essence of ambergris*, 2 dr.

g. (*Poudre à la Mousseline.*) From *orris root*, 1 *lb.; coriander seed*, 6 *oz.; mace*, and *violet ebony*, of each, 2 *oz.; musk-seed, cassia, cloves*, and *sandal wood*, of each, 1 *oz.*

h. (*Poudre de Jonquille.*) From *jonquilles*, as *poudre de jasmine.*

i. (*Poudre à l'Œillet.*) From *plain powder*, 2 *lb.; orris root* and *dried red rose* leaves, of each, 1 *lb.; cloves* and *musk-seed*, of each, 4 *oz.; essence of bergamot* and *essence de petit grain*, of each, ½ dr.

k. (*Poudre de Roses communes.*) From *pale roses*, as *poudre de fleurs d'oranges.*

l. (*Poudre de Roses musquées.*) From *musk roses*, as the last.

m. (*Poudre à la Vanille.*) From *poudre de chipre* or *cyprus*, 3 *lb.; vanilla*, powdered by means of sugar, 2 dr.; *oil of cloves*, and *essence of ambergris*, of each, 20 drops.

n. (*Poudre à la Violette.*) See *page* 1063.

The above are used as *cosmetic powders* for the skin and hair; also, but less frequently, for *sachets, drawers*, &c.

2. *Sachet Powder.*—*a.* From *orris root*, 2 *oz.; cassia*, 1½ *oz.; cloves*, 1 *oz.; yellow sandal wood*, ¼ *oz.; oils of lavender* and *bergamot*, of each, 1 dr.; *otto of roses*, 20 drops; *musk* and *ambergris*, of each, rubbed with a little sugar, 6 gr.; reduce the dry ingredients to coarse powder, mix them, and add the oils.

b. From *corianders, orris root, rose leaves*, and *calamus aromaticus*, of each, 4 *oz.; lavender flowers*, 8 *oz.; rhodium wood*, 1 *dr.; musk*, 20 gr.

c. From *corianders, orris, calamus aromaticus*, and *red roses* (dried), of each, 1 *oz.; lavender flowers*, 2 *oz.; mace* and *cloves*, of each, 1 dr.; *essential oil of almonds*, 10 drops.

d. As last, but substituting *musk*, 5 gr., for the oil of almonds.

e. From *patchouli*, 8 *oz.; lavender flowers* (lightly dried), 3 *oz.*; *orris root*, 2 *oz.; cloves*, 1 *oz.; essence of bergamot*, 1 dr.; *essences of ambergris* and *musk*, of each, ½ dr.

These are *used*, along with cotton wool, to fill *scent bags, cassolettes*, &c.; and as *scent powders* for boxes, drawers, and the like. The scent is added to the dry ingredients, separately reduced to powder, and the whole is then passed through a fine sieve, to ensure perfect admixture.

POWDERS (Seidlitz). Syn. *Pulveres Effervescentes Aperientes*,—Lat. *Prep.* 1.

Potassio-tartrate of soda (Rochelle salt), 2 dr.; *bicarbonate of soda*, 40 gr.; *mix*, and put it in a *blue* paper; *tartaric acid*, 35 gr., to be put in a *white* paper. For about ½ pint of water. Laxative.

2. (*In one bottle.*) From *potassio-tartrate of soda*, 12 *oz.; bicarbonate of do.*, 4 *oz.; tartaric acid*, 3½ *oz.; white sugar*, 1 *lb.;* all in fine powder; dry each separately by a gentle heat, add of *essence of lemon*, ½ dr., mix well, pass the mixture through a sieve, and put it *at once* into clean dry bottles. *Dose.* A dessert-spoonful, or more, to a tumbler full of water.

Obs. The above mixtures, though now universally sold as *Seidlitz powder*, do not, when dissolved, exactly resemble the natural water, which contains carbonates, sulphates, and muriates of lime and magnesia. However, the factitious article is equally effective, and much more agreeable. See *Mineral Waters.*

POWDERS (Sherbet). These are made of the same materials as *lemonade powders*, the flavouring ingredient being varied to suit the particular case. See *Sherbets* (and *above*).

POWDERS (Soda-water). Syn. *Effervescing Powders, E. Saline, do., Sodaic do., Aerated Soda do.; Pulveres Effervescentes*, —Lat. *Prep.* 1. From *bicarbonate of soda*, 30 gr., in each BLUE PAPER; *tartaric acid*, 25 gr. (or *citric acid*, 24 gr.), in each WHITE PAPER. One of each is dissolved separately in about ½ a glassful of water, and the two solutions mixed, and drank immediately. A cooling, wholesome summer beverage, but it should not be indulged in to excess.

2. (*Chalybeated.*) By adding 1 gr. of dried *protosulphate of iron* to each paper of acid. Tonic.

3. (*Midgeley's.*) Made by adding ⅛ gr. of *tartarized antimony* to *each paper* of *acid.* Refrigerant and diaphoretic. For the Ph. formulæ see *p.* 1064.

POWDERS (Soup). See *Currie Powder, Pease do., Spices, Zests, &c.*

POWDERS (Spruce Beer). Syn. *Pulveres Effervescentes cum Abiete*,—Lat. *Prep.* As *ginger-beer powders*, but substituting *essence of spruce*, 3 to 6 drops, for the powdered ginger.

POWDERS (Steedman's Soothing). These are said to consist chiefly of *nitre*, together with a very small portion of a *salt of morphia.*

POWDERS (Tooth). Syn. *Pulvis Dentifricii*,—Lat. The general principles which should be kept in view in the selection of the materials, and in the preparation of *dentifrices*, have been already fully noticed (see *p.* 323-4), and need not, therefore, be repeated here. Care must be taken that all the dry ingredients be *finely pulverized*, and that the harder and gritty ones, be reduced to the state of an impalpable powder, either by levigation or elutriation. The *mixture* of the *ingredients* must also be complete. This is the most readily effected by stirring them well together until they form an apparently homogeneous powder, and then passing this powder through a very fine sieve. Those which contain *volatile substances* should be preserved in closely-corked wide-mouth bottles; and those which contain *acidulous* or *gritty matter* should not be frequently employed. The *selection* of the *tooth brush* likewise deserves attention. It should be sufficiently stiff to effect its purpose completely; but, at the same time, it should be so formed as not to cause irritation or injury to the gums during its use.

Prep. 1. *Cuttle-fish bone* and *prepared chalk*, of each, 2 *oz.; oil of cloves*, 20 drops. This may be perfumed at will, and medicated by any of the substances referred to under *Dentifrices.*

2. To the last add of *powdered Castile soap*, 2 *oz.*

3. *Prepared chalk*, 12 *oz.; cuttle-fish bone*, 8 *oz.*; *orris root*, 4 *oz,; dragon's blood*, 1½ *oz.; oils of cloves* and *cassia*, of each, ½ dr.

4. *Prepared chalk*, 1 *lb.; pumice stone*, in impalpable powder, ¼ *lb.; orris root*, 2 *oz.; pure rouge*, ¼ *oz.; neroli*, ½ dr.

5. *Yellow cinchona bark* and *myrrh*, of each, ½ *oz.; recently burnt charcoal*, 3 *oz.; cloves*, 1 dr.

6. *Pumice stone, red coral*, and *powdered rhatany root*, of each, 2 *oz.; orris root*, ½ *oz.; essence of vanilla*, ½ dr.

7. (*Aromatic Tooth Powder.*) From *cuttle-fish bone*, 4 *oz.; calamus aromaticus*, 2 *oz.; powdered Castile soap*, 1 *oz.; oil of cloves*, ½ dr.

8. (*Asiatic Dentifrice.*) From *prepared red coral*, 8¼ *lb.; Venetian red*, ¾ *lb.; prepared chalk* and *pumice-stone*, of each, 1¼ *lb.; China musk*, 30 gr.

9. (*Cadet's.*) From *lump sugar* and *charcoal*, of each, 1 *oz.; Peruvian bark*, ½ *oz.; cream of tartar*, ¼ *oz.; cinnamon*, ½ dr.

10. (*Camphorated.*) See *Camphorated Chalk.*

11. (*Charcoal Dentifrice.*) From *charcoal*, preferably that from the willow, or the areka nut, either alone, or combined with twice its weight of *prepared chalk.* Scent or medicinals injure it.

12. (*Coral Dentifrice.*) See *below.*

13. (*Deschamp's Alkaline Dentifrice.*)

From *powdered talc*, 4 *oz.*; *bicarbonate of soda*, 1 *oz.*; *carmine*, 6 gr.; *oil of mint*, 12 or 15 drops.

14. (*Florentine Dentifrice.*) From *prepared shells*, 4 *oz.*; *orris root*, 1½ *oz.*; *bitartrate of potassa*, ¾ *oz.*; *Florentine lake*, q. s. to colour.

15. (*Galvanic Dentifrice.*) From *gold*, 3 leaves; *silver*, 4 leaves; triturate them with *alum* and *sulphate of potash*, of each, 1½ dr.; then add of *dry common salt*, *pellitory of Spain*, and *Peruvian bark*, of each, 1 dr.; *prepared hartshorn*, 1 *oz.*; mix, and either colour it *blue* with smalts, or *red* with lake. A useless compound.

16. (*Grosvenor's.*) From *red coral*, 3*lb.*; *prepared oyster-shells*, 2½ *lb.*; *orris powder*, ½ *lb.*; *oil of rhodium*, 25 drops. *Rose-pink* is now commonly substituted for the coral.

17. (*Hemet's Dentifrice.*) From *cuttle-fish bone*, 6 *oz.*; *cream of tartar*, 1 *oz.*; *orris root*, ½ *oz.*

18. (Lancet.) *Red bark* and *Armenian bole*, of each, 1 *oz.*; *powdered cinnamon* and *bicarbonate of soda*, of each, ½ *oz.*; *oil of cinnamon*, 2 or 3 drops.

19. (*Lardner's.*) See *page* 231.

20. (*Miahle's Rational Dentifrice.*) From *sugar of milk*, 3 *oz.*; *pure tannin*, 3 dr.; *red lake*, 1 dr.; *oils of mint* and *aniseed*, of each, 7 or 8 drops; *neroli*, 4 or 5 drops.

21. (*Myrrh Dentifrice.*) From *cuttle-fish bone*, 6 *oz.*; *myrrh* and *orris root*, of each, 2 *oz.*

22. (*Pearl Dentifrice.*) From *heavy carbonate of magnesia* or *precipitated chalk*, 1 *lb.*: *finest smalts*, 3 dr.; *essence de petit grain*, ½ dr.

23. (*Pelletier's Quinine Dentifrice.*) From *prepared red coral*, 3 oz.; *myrrh*, 1 dr.; *disulphate of quinine*, 12 to 15 gr.

24. (Ph. Russ.) *Cinchona bark*, 4 oz.; *orris root*, 2 oz.; *catechu* and *myrrh*, of each, 1½ oz.; *sal ammoniac*, 1 oz.; *oil of cloves*, 20 drops.

25. (*Poudre Dentifrice*,—P. Cod.) *Red coral*, *red bole*, and *cuttle-fish bone*, of each, 3 oz.; *dragon's blood*, 1½ oz.; *cinnamon*, ¾ oz.; *cochineal*, 3 dr.; *cloves*, 1 dr.; *bitartrate of potassa*, 4½ oz.; reduce them separately to very fine powder before mixing them. This is the "*Coral Dentifrice*" of the French.

26. (*Righini's.*) From *charcoal*, 1 *oz.*; *yellow bark*, ¼ *oz.*

27. (*Rose Dentifrice.*) From *precipitated chalk*, 6 *oz.*; *cuttle-fish bone*, 3 *oz.*; *bicarbonate of soda*, 2 *oz.*; *red lake*, ¼ *oz.*; *otto of roses*, 20 drops.

28. (*Ruspini's Dentifrice.*) From *cuttle-fish bone*, 8 *oz.*; *roach alum* and *orris root*, of each, 1 *oz.*; *cream of tartar*, 2 *oz.*; *oil of rhodium*, 6 or 8 drops.

29. (*Violet Tooth Powder.*) From *orris root*, 3 *oz.*; *cuttle-fish bone* and *rose pink*, of each, 5 *oz.*; *precipitated chalk*, 12 *oz.*; *pure indigo*, q. s. to give it a pale violet tinge.

30. (*Zieter's.*) From *finely powdered calcined hartshorn* and *cuttle-fish bone*, of each, 6 *oz.*; *calamus aromaticus*, *cassia*, and *pellitory of Spain*, of each, 1 *oz.*; *essence of vanilla*, ½ dr.; *essence of ambergris*, 10 or 12 drops.

POWDERS (Worm). Syn. *Pulveres Anthelmintici*, *P. Vermifugi*,—Lat. *Prep.* 1. (Bouchardat.) *Powdered Corsican moss* and *worm-seed*, of each, 5 dr.; *calomel*, 40 gr.; rub them together.

2. (Collier.) From *powdered jalap* and *scammony*, of each, 1 dr.; *cream of tartar*, 2 dr.; *Ethiop's mineral*, 3 dr.

3. (Guibourt.) *Sulphate of iron*, 1 dr.; *tansy*, 2 dr.; *worm-seed*, 3 dr.

4. (P. Cod.) *Corsican moss* and *worm-seed*, of each, 2 oz.; *rhubarb*, 1 oz.; rubbed to a fine powder, and carefully mixed.

POWERS OF AMBER. See *page* 342.

POX. A corruption of a Saxon word, originally applied to pustules or eruptions of any kind, but now restricted to *varicella*, *variola*, *vaccinia*, and, in its unqualified form, to *syphilis*. (See *below*.)

POX (Chicken). Syn. *Water Pox*; *Varicella*,—Lat. An eruptive disease, consisting of smooth, semi-transparent vesicles of various sizes, which afterwards become white and straw-coloured, and about the fourth day break and scale off, without leaving any permanent mark behind them. In hot weather the discharge sometimes becomes purulent, and at others the eruption is attended with considerable fever. Sometimes the vesicles assume a pointed form, and the fluid remains clear throughout the disease; it is then frequently called the "*swine-pox.*" When the vesicles are large and globular, and their contents, at first whey-coloured, afterwards turn yellow, it is popularly known as "*hives.*"

The *treatment* of chicken-pox consists in the adoption of a light, vegetable diet, and in the administration of mild saline aperients, and cooling drinks.

The chicken-pox, except in children of a very bad habit of body, is an extremely mild disease. Like the small-pox, it only attacks the same person once during life.

POX (Cow). Syn. *Vaccinia*, *Variola Vaccina*,—Lat. This disease was proposed as a substitute, and a preventive of small-pox, by Dr. Jenner, in 1798. The success which has followed its artificial production has nearly led to the extinction of small-pox in England. There appears no reason to doubt that *the pretensions* of the *advocates of vaccination* have been *fully justified* by the *experience of more than half a century;* or, that *this disease*, when actively developed, evinced by the completeness and maturation of the pustules, *acts as a certain prophylactic of small-pox.*

The *process* of *vaccination* is similar to that of *inoculation* for the small-pox. The *point of a lancet* is wetted with the matter taken from one of the *pustules*, and is then gently inserted under the cuticle, and the scratch afterwards rubbed over with the same. Hæmorrhage should be avoided, as the blood is apt to wash away the virus, or to form a cake which shields the living organism from its action.

The *leading symptoms* of cow-pox are as follows:—About the *third day* the puncture usually becomes red and elevated, and continues to enlarge and become vesicular, until at about the *eighth* or *ninth day*, it is at its height, and the vesicle is surrounded with a florid areola. About the *eleventh* or *twelfth day* the symptoms decline; the centre of the pustule becomes brown, and a dark scale gradually forms and separates, leaving the arm as heretofore.

This disease seldom requires *medical treatment;* but should febrile symptoms come on, a mild aperient may be given. In all cases great care should be taken to avoid the rupture of the pustule before its maturity, or until between the *seventh* and *ninth* day.

In some cases, owing to peculiar conditions of the system, vaccination fails to produce the effect intended. When this happens, the child should be re-vaccinated after the lapse of a few weeks; or earlier, if altered circumstances appear to justify it. When the patient has taken the disease, but the pustules have not been fully and satisfactorily developed in the usual manner, it is also wise to repeat the vaccination in a twelvemonth.

"If, when the vaccine virus has been inserted, and a *genuine vesicle* has risen, the virus be again inserted on the fourth, fifth, or sixth day, the vesicle arising from this second insertion will be hurried in its progress, so that, on the *ninth day*, it will be *surrounded by an areola*, and *appear as mature* as the first. This affords conclusive evidence of the constitution being fully under the influence of the disease." This is known as "*Bryce's Test*," from having been proposed by Mr. Bryce, of Edinburgh, in 1802. Prudence suggests vaccination in early infancy. See *Small-pox* and *Vaccine Matter.*

POX (Small). Syn. *Variola*, — Lat. This disease comes on with the usual *symptoms* of inflammatory fever. About the *third day*, red spots, resembling flea-bites, make their appearance on the face and head, and gradually extend over the whole body. About the *fifth day* small circular vesicles, depressed in the centre, surrounded by an areola, and containing a colourless fluid, begin to form, when the feverish symptoms abate; about the *sixth day* the throat becomes sore; about the *eighth day* the face is swollen, and about the *eleventh day* the pustules acquire the size of a pea, and cease to enlarge, the matter which they contain becomes opaque and yellow, a dark central spot forms on each, the swelling of the face subsides, and secondary symptoms of fever come on; the pustules become rough, break and scab over, and a dark spot remains for some days, often followed by permanent indentations, popularly known as "*pock-marks.*" At the end of the *sixteenth* or *eighteenth* day, the symptoms usually disappear. In the *confluent small-pox*, a severer form of the disease, the pustules coalesce, the eruption is irregular in its progress, and the inflammatory symptoms are more severe.

The *treatment* of *ordinary cases* of *small-pox* resembles, for the most part, that mentioned above for *chicken-pox.* As soon as the febrile symptoms become marked, the patient should not be suffered to lie in a hot bed, but on a mattrass, in a cool and well-ventilated apartment, and antiseptic cooling drinks should be freely administered. When convulsions occur, or *great irritability exists*, small doses of morphia, opium, or camphor, may be administered, and *obstinate vomiting* arrested by effervescing saline draughts. When the skin is pale and cold, the pulse weak, and the eruption languidly developed, the warm or tepid bath is often serviceable. The application on the third day of a *mask* formed of *thick muslin* covered with *mercurial ointment*, and having holes cut in it for the nostrils, eyes, and mouth, will effectually prevent "*pitting.*" (Dr. Stewardson.) *Gold leaf* is also applied for the same purpose, the object being to exclude the light and air. With the same intention some persons recommend the puncture of the pustules as soon as they are mature. To *remove* the *pock-marks*, whether recent or old, nothing appears to be better than *warm* *sea-bathing*, or the use of *tepid ioduretted lotions.*

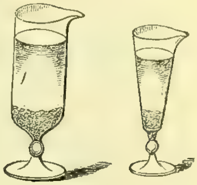
The *small-pox* is *eminently contagious*, but only attacks the same person once during life. Formerly, a milder form of the disease was propagated by *inoculation;* a practice introduced into England from Turkey, by Lady Mary Wortley Montague, about the year 1721. At the present day, in England, inoculation, as well as the exposure of a patient labouring under small-pox, is penal, the punishment being either by fine or imprisonment.

"The proportion of deaths from small-pox in *London* is three times, and in *Glasgow*, six times what it is in *Brussels, Berlin*, or *Copenhagen.* Of each thousand persons who die in England and Wales, twenty-two die of small-pox. Of each thousand persons who die in *Ireland*, forty-nine die of small-pox; while of each thousand persons who die in *Lombardy*, two only die of small-pox. The *proportionate mortality*, then, *from small-pox*, in *England and Wales*, is eleven times, and in *Ireland*, twenty-four times greater than it is in *Lombardy.* Whence comes this difference? In England those who please take their children to be vaccinated; in Lombardy vaccination is compulsory. The proportionate mortality from small-pox in England and Wales is three times greater than what it is in any country in which the inhabitants are compelled, by law, to have their children vaccinated. In our *metropolis* alone, *one thousand persons die annually of small-pox.* If vaccination were compulsory, it is indisputable that the number of deaths from this disease, in London, would be reduced to two or three hundred per annum. From six to eight hundred persons thus die yearly in this metropolis alone, whose lives might be saved by an Act of the Legislature." (*Med. Times.*) See *Cow-pox.*

PRECIPITATE. Any substance which has separated from its solution in a solid, and usually, a pulverulent or flocculent form. The substance by which such a change is produced is called the "*precipitant;*" and the act or operation by which it is effected is called "*precipitation.*" The old chemists gave this name to several compounds. *Red precipitate*, or *precipitate per se*, is the nitric oxide of mercury prepared by heat. *White precipitate* is ammonio-chloride of mercury.

PRECIPITATION. The formation or subsidence of a precipitate. (See *above.*) When the precipitate is the chief object of the process, it is necessary to wash it, after it is separated by filtration. This operation requires little attention when the substance thrown down is insoluble in water; but when it is in some degree *soluble* in that liquid, great attention is required to prevent the loss which might result from the use of too much water. Precipitates soluble in water, but insoluble in alcohol, are frequently, on the small scale, washed with spirit more or less concentrated.

The *best precipitating vessel* is a very tall glass jar, furnished with a lip and spout, and narrower at the bottom than at the mouth, so that the precipitate may readily collect by subsidence, and the supernatant liquor be decanted off with more ease.



PREGNANCY. For the preservation of the health, and the prevention of the numerous discomforts and dangers which so frequently attend this condition, nothing is so effective as *exercise.* It is this that is so favorable to the humble peasant; and it is its absence that inflicts such calamities on the wealthier classes. *Exercise*, moderate and unfatiguing, when assisted by regular habits, and a diet nutritious, but not too liberal, is indeed, capable of not only affording pleasure and increasing the comforts of existence, but is also generally sufficient to greatly lessen the severity of the sufferings, and to ward off the not unfrequently fatal results which terminate this interesting condition. The daughter of nature yields her bosom's treasure to the world with little more than a passing pang and tear; whilst the poor sempstress and the high born lady, debased by sedentary or luxurious habits, perform the same duty only at the cost of frightful sufferings; and, in many cases, find it an ordeal that leads them prematurely to the tomb.

The *sickness of pregnancy* may be greatly ameliorated, if not removed, by the occasional use of a *saline aperient*, and by *effervescing draughts* formed with the *bicarbonate of potassa* and *citric acid.*

The *physical signs* of *pregnancy* do not come within the province of this work. MM. Nauche and Eguiser have given the name of "*Kisteine*" to a peculiar substance which forms upon the surface of the urine of pregnant females after the first month, when that fluid is allowed to stand exposed to the air from 2 to 6 days. It is distinguished during its formation, by the appearance and gradual agglomeration of minute opaque bodies, which ultimately form a whitish, opalescent, and slightly granular layer, so consistent, that it may be almost lifted off by one of its edges. It bears no inconsiderable resemblance to the fatty pellicle that generally swims on the surface of soup. It disappears as the urine becomes turbid. These properties are said to be well marked, and characteristic.

PRESCRIBING (Art of). Besides a knowledge of diseases and their treatment, much of the success of the physician depends on circumstances connected with the form in which the remedies are exhibited. In *writing a prescription*, it is necessary to consider the *age*, *sex*, *temperament*, *habits*, and *idiosyncrasy* of the patient, as well as the *conditions of climate* and *season*, before the selection of the leading medicament, and the apportioning of the dose. The most convenient form of exhibiting it, whether it should be given alone or in some simple form, or combined with other ingredients, the compatibility of the latter, and how far these are likely to assist, impede, or modify, its operation, must also receive the consideration of the practitioner. Without a careful attention to all these circumstances the most valuable remedies may be rendered worthless, and the highest medical skill, and the best intentions frustrated.

A *prescription* generally *contains* several *medicinal substances*, which are distinguished by medical writers by names indicative of the office which each of them performs. These are—1. The *basis*, which is the principle or most active ingredient;—2. The *adjuvans*, or that which is intended to promote the action of the base;—3. The *corrigens* or *corrective*, intended to correct, modify, or control its action, or to cover its odour or taste, as when we add carminatives or diaphoretics to cathartics, or aromatics or liquorice to nauseous substances;—4. The *constituens*, *excipiens*, or *vehiculum*, or that which gives the whole a commodious or agreeable form, and which, consequently, gives the prescription its peculiar character, as that of draught, mixture, pills, &c. To these, certain Continental writers add a 5th,—The *intermedium*, which is the substance employed to unite remedies which are not, by themselves, miscible with each other, or with the excipient. Of this character are the *yelk of egg*, and *mucilage*, employed in the preparation of emulsions.

The medicinal substances, with the quantities to be taken, generally arranged as above, are said to form the "*inscription*,"—the directions as to their combination or dispensing, which usually come next, the "*subscription*," and—the orders for the exhibition of the compound medicine, which follow these, the "*instructions*." These distinctions are, however, in many cases more technical than useful.

In *choosing* the *form of a prescription*, it should be recollected that solutions and emulsions generally act with more certainty and rapidity than powders diffused through water; and these, again, than the semi-solid and solid forms of medicine represented by electuaries, boluses, and pills. On these matters, however, the taste and wishes of the patient should not be disregarded. For this purpose, the *taste* of *nauseous medicines* should be disguised, as much as possible, by the judicious selection of an appropriate *corrective* or *excipient*. Thus, the disagreeable flavour of *Epsom salt* may be in a great measure covered by dissolving it in peppermint water; that of *aloes*, by liquorice; that of *castor oil* and *copaiba*, by orange peel; and that of *powdered bark*, by mixing it with milk immediately before taking it; whilst the *bitterness* of all *bitter substances* is concealed by strong coffee.

In order that a prescription may be well made, it is not necessary to unite *all* the elements above referred to. The *basis* and the *excipient* are the only two which are absolutely necessary, since there are many medicines which have no need of an adjuvant. The agreeable flavour and odour of some, and the mild and harmless nature of others, often render the intervention of a corrigent unnecessary when they are employed. A single substance may also "be capable of answering two or more purposes. Thus, the adjuvant may also act as a corrigent, as when the addition of soap to aloes, or to extract of jalap, lessens their griping properties, and at the same time promotes their action. In the same way neutral salts correct the colic which follows the use of resinous purgatives, and accelerate their action." According to Gaubius, the number of ingredients in a prescription should scarcely ever exceed three or four. See *Dose*, *Medicines*, *Incompatibles*, *Pills*, *&c.*

PRESCRIPTION. A recipe or formula for the preparation and exhibition of medicines intended, generally, for immediate use. See *Prescribing* (above), and *Appendix*, II.

PRESERVES. A general term under which are included the various *fruits* and *vegetables* which are seasoned and kept in *sugar* or *syrup;* more especially those which are so preserved whole, or in slices. See *Candies*, *Jams*, *Marmalades*, *&c.*

PRESS (Correcting). See *Proofs*.

PREVENTIVE (Royal). Syn. *White Wash, Lotio Alba.* A quack lotion, formed of *solution of diacetate of lead* and *proof spirit*, each, 1 *oz.; water*, 1 pint. *Used* to prevent infection. See *Disinfectants* and *Patent Medicines.*

PRICKLY HEAT. See *Eruptions.*

PRIMING (Chlorate). *Prep.* Pulverize the *best gunpowder*, and make it into a paste with *water;* then add half its weight of *chlorate of potassa*, and, whilst semi-fluid, drop the composition into the empty *copper caps;* place them aside in a warm situation to dry. *Used* for guns and matches. A little sulphur is sometimes added. For the first of these it is now superseded by fulminating mercury. See *Percussion Caps.*

PRINCE'S METAL. See *Mosaic Gold.*

PRINCIPLE. Syn. *Principium*,—Lat. A term rather loosely applied by chemical writers to the component parts of bodies, to the distinct compounds or elements of which they are composed, and to any substance presumed to be capable of bestowing certain qualities which are common to a number of bodies. Thus, we read of *constituent, proximate, ultimate, acidifying*, and *alkalizing principles, &c.*, which sufficiently explain themselves.

PRINTING (Anastatic). A method of zincography, patented in 1845, having for its object the reproduction of drawings, engravings, and letter-press, from copies however old. To describe briefly the *preparation* of a *plate* or *cylinder*, let us suppose a newspaper about to be reprinted by this means. The *sheet* is first moistened with *dilute acid* and placed between sheets of *blotting-paper*, in order that the superfluous moisture may be absorbed. The ink neutralizes the acid, which is pressed out from the blank spaces only, and etches them away. In all cases where the letter-press is of recent date, or not perhaps older than half a year, a few minutes suffice for this purpose. The *paper* is then carefully placed upon the *plate* with which the letter-press to be transferred is in immediate contact, and the whole passed under a press, on removal from which, and on carefully disengaging the paper, the letters are found in reverse on the plate. The latter is then rubbed with a *preparation of gum*, after which the letters receive an addition of *ink*, which is immediately incorporated with that by which they are already formed. These operations are effected in a few minutes. The surface of the plate round the letters is next bitten in a very slight degree by the *acid*, and on the fresh application of the *ink* it is rejected by the zinc, and received only by the letters, which are charged with the ink by the *common roller* used in hand-printing. Each letter comes from the press as clear as if it had been imprinted by type metal; and the copies are fac-similes, which cannot be distinguished from the original sheet.

When *pen-and-ink drawings* are to be reproduced, they are made on any *paper free from hairs* or *filaments*, and *well sized.* The *ink* used is a preparation made for the purpose, closely resembling lithographic ink, and may be mixed to any degree of thickness in *pure distilled water.* It should be used fresh and slightly warm when a fine effect is to be given. In *making* or *copying a design* a *pencil* may be used; but the marks must be left on the paper, and by no means rubbed with india-rubber or bread. It is necessary to add, that the paper should be kept quite clean and free from friction, and should not be touched by the fingers; inasmuch as it will retain marks of very slight touches.

Before closing this notice of *anastatic printing* it may be proper to remark, that the great pretensions originally set up by the patentees, have not been fulfilled by its extensive, if not general, adoption in trade. Whether this arises from the power of invested or rival interests, or on account of any practical difficulties attending the application of the new process on the large scale, we are unable to state. We have certainly seen reproductions by this method, which to the inexperienced observer, appeared only very slightly inferior in beauty to the original copy.

PRINTING (Galvanic). See *Voltaic Engraving.*

PRINTING INK. *Prep.—a.* The VARNISH. *Linseed* or *nut oil*, 10 or 12 gall., is set over the fire in an *iron pot* capable of containing *fully* as much more; when it boils it is kept stirred with an *iron ladle*, and if it does not take fire of itself soon after the smoke begins to rise, it is kindled by means of a piece of burning paper, stuck in the cleft end of a long stick; the pot is shortly afterwards removed from the fire, and the oil is suffered to burn for about half an hour, or until a sample of the varnish cooled upon a pallet knife, may be drawn into strings of about ½ inch long, between the fingers; the flame is now extinguished by the application of a *closely fitting tin cover*, and as soon as the froth of the ebullition has subsided, *black resin* is added, in the proportion of ¾ *lb.*, to 1 *lb.*, for *every quart of oil* thus treated; the mixture is next stirred until the resin is dissolved, when *dry brown soap*, cut into slices, 1¾ *lb.*, is further added (cautiously), and the ingredients are again stirred with the spatula until the whole is united, the pot being once more placed over the fire to promote the combination; when this is effected, the varnish is removed from the heat, and after a good stirring, is covered over and set aside.

b. The INK. *Indigo* and *Prussian blue*, of each, in fine powder, 2½ *oz.; mineral lampblack* (finest), 4 *lb.; vegetable lampblack*, 3½ *lb.;* stir them gradually into the warm varnish, and submit the mixture to careful grinding, either in a mill, or by means of a slab and muller. On the *large scale* steam power is now generally employed for this purpose.

An *extemporaneous superfine black ink* may be made by the following formula:—Take of *balsam of copaiba*, (pure), 9 *oz.; lampblack*, 3 *oz.; indigo* and *Prussian blue*, of each, ½ *oz.; Indian red*, ¾ *oz.; yellow soap* (dry), 3 *oz.;* grind the mixture to an impalpable smoothness by means of a stone and muller. *Canada balsam* may be substituted for balsam of copaiba where the smell of the latter is objectionable, but the ink then dries very quickly.

Coloured Printing Inks are made in a *similar* way from the following pigments:—*Carmine, lakes, vermilion, chrome red, red lead, orange red, Indian red, Venetian red*, for RED; *orange chrome, chrome yellow, burnt terra di sienna, gall stone, Roman ochre, yellow do.*, for ORANGE and YELLOW; *verdigris, Scheele's green, Schweinfurth's do., blues and yellows mixed*, for GREENS; *indigo, Prussian blue, Antwerp do., cobalt do., charcoal do.*, for BLUE; *lustre, bronze powders, &c.*, for METALLIC COLOURS; and *umber, sepia, &c.*, for BROWN.

Obs. It is necessary to prepare two kinds of varnish, varying in consistence, from more or less boiling, to be occasionally mixed together as circumstances may require; that which answers well in hot weather being too thick in cold, and vice versâ. Large characters also require a thinner ink than small ones. *Old* linseed oil is preferable to new. *Yellow-resin soap* is preferred for black and dark coloured inks, and *white curd soap* for light ones.

A *good varnish* may be drawn into threads like glue, and is very thick and tenacious. The *oil loses* from 10% to 14% by the boiling. Mr. Savage obtained the large medal of the Society of Arts for his black ink made as above. It is said to be unrivalled.

PRINTS (Ackerman's Liquor for). *Prep.* Take of the finest *pale glue* and *white curd soap*, of each, 4 *oz.; boiling water*, 3 pints; dissolve, then add of *powdered alum*, 2 *oz.* *Used* to size prints and pictures before colouring them.

PROLAPSUS. See *Surgery* (Popular) and *Truss.*

PROMETHEANS. See *Matches.*

PROOF. See *Acetimetry, Alcoholmetry, &c.*

PROOFS (Correcting). The specimen on the opposite page, with the notes, will, if carefully perused, put the reader into possession of all the secrets of this most useful art.

PROPIONE. See *Metacetone.*

PROPIONIC ACID. See *Metacetonic Acid.*

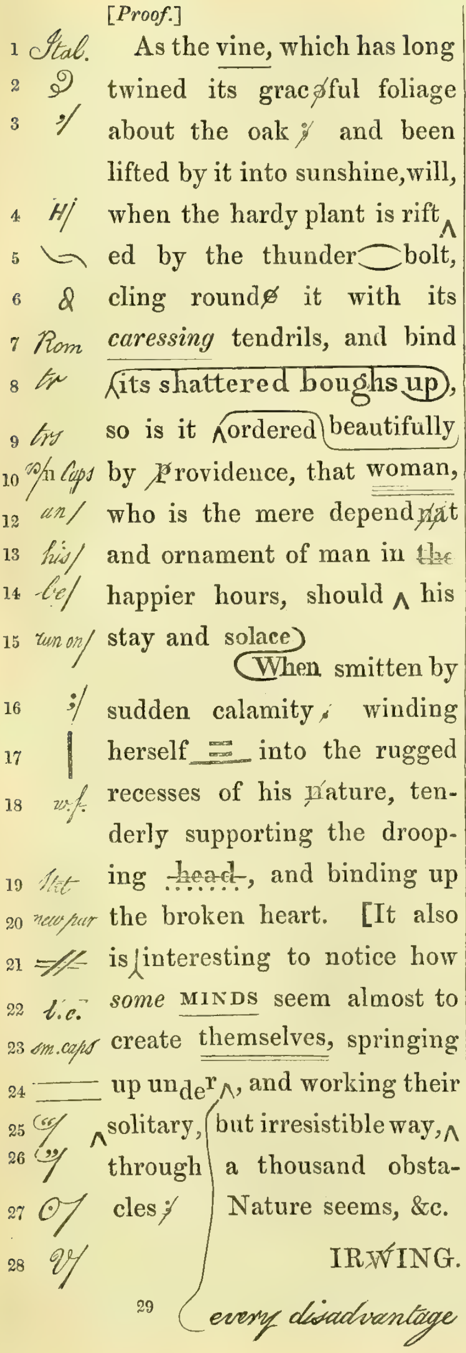
PROPYLENE. A gaseous substance which is formed, along with other gases, when the *vapour of fusel-oil* is passed through a *glass* or *porcelain tube* heated to redness. In this form it cannot be isolated; but by bringing the gaseous mixture in contact with *gaseous chlorine*, a *chloride of propylene* subsides as a heavy liquid, analogous to *Dutch liquid* noticed at *p.* 905. This chloride boils at 218° Fahr.

PROTEINE. An important compound of carbon, hydrogen, nitrogen, and oxygen, discovered by Mülder, and so named because it forms the original matter from which albumen, caseine, and fibrine are derived.

Prep. (Liebig.) *Albumen, caseine*, or *fibrine* is dissolved in moderately strong *liquor of potassa*, the solution heated for some time to 120° Fahr., and *acetic acid* added; a gelatinous precipitate subsides, which, after being washed and dried, is *proteine.*

Prop., &c. Proteine is insoluble in water and alcohol. With sulphuric acid it forms *sulphoproteic acid*, and with chlorine, *chloroproteic acid.* When digested in nitric acid *xanthoproteic acid* is formed along with ammonia and oxalic acid. The names *binoxide* and *teroxide of proteine* have been given by Mülder to products of the long-continued action of boiling water upon fibrin in contact with the air.

Obs. Proteine is produced by vegetables alone, and cannot be formed by animals, although the animal organism possesses the power of converting one modification of proteine into another, fibrine into albumen, or vice versâ, or both into caseine. Vegetable albumen, caseine, and fibrine are therefore the only sources of proteine for animal life, and consequently of nutrition, strictly so called, or the growth in mass of the body. (Liebig.)



[*Proof.*]

1 Ital. As the vine, which has long
2 ∂ twined its gracəful foliage
3 ,/ about the oak ;/ and been
lifted by it into sunshine,will,
4 -/ when the hardy plant is rift ^
5 ed by the thunder bolt,
6 ∂ cling roundø it with its
7 Rom *caressing* tendrils, and bind
8 tr its shattered boughs up),
9 tr so is it ordered beautifully
10 P/ 11 caps by ~~p~~rovidence, that woman,
12 an/ who is the mere dependnat
13 his/ and ornament of man in ~~the~~
14 be/ happier hours, should ^ his
15 run on/ stay and solace
When smitten by
16 ;/ sudden calamity, winding
17 | herself ▬ into the rugged
18 w.f. recesses of his nature, ten-
derly supporting the droop-
19 stet ing ~~head~~, and binding up
20 new par the broken heart. [It also
21 #/ is ^ interesting to notice how
22 l.c. *some* MINDS seem almost to
23 sm.caps create themselves, springing
24 ——— up under ^, and working their
25 ‘‘/ ^solitary, but irresistible way,^
26 ’’/ through a thousand obsta-
27 ⊙/ cles ;/ Nature seems, &c.
28 V/ IRWING.
29 every disadvantage

[*The same corrected.*]

As the *vine*, which has long twined its graceful foliage about the oak, and been lifted by it into sunshine, will, when the hardy plant is rifted by the thunderbolt, cling round it with its caressing tendrils, and bind up its shattered boughs, so is it beautifully ordered by Providence, that WOMAN, who is the mere dependant and ornament of man in his happier hours, should be his stay and solace when smitten by sudden calamity; winding herself into the rugged recesses of his nature, tenderly supporting the drooping head, and binding up the broken heart.

It also is interesting to notice how *some* minds seem almost to create THEMSELVES, springing up under every disadvantage, and working their "solitary, but irresistible way," through a thousand obstacles. Nature seems, &c.

IRVING.

Explanation of the marks:

1. When a letter or word is to be in *italics*.
2. When a letter is turned upside down.
3. The substitution of a comma for another point or letter.
4. The insertion of a hyphen; also marked (-)
5. When letters should be close together.
6. When a letter or word is to be omitted.
7. When a word is to be changed to roman.

8, 9. Two methods of marking a transposition: when there are *several* words to be transposed, and they are much intermixed, it is a common plan to number them, and to put the usual mark in the margin.

10. Substitution of a capital for a small letter.
11. When a word is to be changed from small letters to capitals.
12. The transposition of letters in a word.
13. The substitution of one word for another.
14. When a word or letter is to be inserted.
15. When a paragraph occurs improperly.
16. The insertion of a semicolon.
17. When a space or quadrat stands up, and is seen along with the type.
18. When letters of a wrong fount are used.
19. When words crossed off are to remain.
20. The mark for a paragraph, when its commencement has been neglected. Sometimes the sign [, or ¶, or the word "*break*" is used instead of the syllables "*New Par.*"
21. For the insertion of a space when omitted or insufficient.
22. To change capitals to small letters.
23. To change small letters to small capitals.
24. When lines or words are not straight.

25, 26. The insertion of inverted commas. The apostrophe is similarly marked.

27. The insertion of a period when omitted, or in place of another point or letter.
28. Substitution of one letter for another.
29. The method of marking an omission or insertion when too long for the side margin.

PROTIDE. A soluble, straw-yellow substance, formed, along with other products, by the action of *liquor of potassa* on *albumen, fibrine,* or *caseine.* See *Erythroprotide.*

PROTO-. See *Nomenclature.*

PROVISIONS (Preservation of). See *Putrefaction.*

PRUNES. The *fruit* of cultivated varieties of *prunus domestica* (Linn.) The dried fruit (*French prunes* or *plums; prunum,*—Ph. L.; *pruna,*—Ph. E. & D.) is cooling and gently laxative, and as such is useful in habitual costiveness and fevers.

PRUNES (Pulp of). Syn. *Prepared Prunes; Pulpa Prunorum; Prunum Præparatum,*—Ph. L. *Prep.* The imported dried fruit is boiled gently for four hours with *water,* q. s. to cover them, and then pressed, first through a fine *cane-sieve,* and afterwards, through a fine *hair-sieve*; the pulp is, lastly, evaporated by the heat of a water bath to the consistence of a confection. A *better plan* is to use as *little water as possible,* by which the necessity of subsequent evaporation is avoided. *Used* in the preparation of confection of senna.

PRUNING varies according to the kind of plant or tree operated on, and the particular object in view, and its skilful performance must, therefore, greatly depend on the experience and knowledge of the gardener. "In the *operation* of *pruning,* the shoots are cut off close to the buds, or at a distance not greater than the diameter of the branch to be cut off; because without the near proximity of a bud, the wounds will not heal over. In *shoots* which *produce their buds* alternately, the cut is made at the back of the bud, sloping from it, so that it may be readily covered by the bark in the same, or in the following year; but in the case of *branches* where the *buds are produced opposite each other,* either one bud must be sacrificed or the branch must be cut off at right angles to its line of direction, which is most conveniently done with the *pruning shears.*" (Loudon.) In many cases pruning may be superseded by *rubbing off,* or *pinching out* the *leaf-buds.*

PRURIGO. Syn. *Pruritus.* A papular eruption, remarkable for the incessant itching and irritation by which it is accompanied. In its milder form (*prurigo mitis*) the cuticle is covered with soft and smooth elevations, somewhat larger than those in lichen, and differing from them by generally retaining the natural colour of the skin, and in the absence of a tingling sensation. It chiefly attacks young persons. The *prurigo senilis,* as its name implies, chiefly attacks the aged. It is of a more aggravated and permanent description than the preceding, and as the disease progresses, the skin usually becomes covered with pediculi, which defy every effort made for their extermination, and keep the patient in a constant state of the most frightful irritation. In *prurigo formicans,* or *ant-bite prurigo,* a still severer variety of this distressing malady, the sensations experienced have been compared to that of having the flesh devoured by myriads of ants, or the skin pierced with an equal number of red-hot needles. This often occurs without any obvious reason in elderly persons, rendering their existence one of perpetual torture. Plato, Charles V, and Charles IX of France, are reputed to have thus suffered.

"*Prurigo,* even in its mildest form, is a cruel and relentless disorder; all rest and repose are out of the question, and sleep impossible, until exhaustion conquers suffering." (Eras. Wilson.)

The *treatment* mainly *consists* in the removal of visceral obstructions by alteratives and mild saline aperients. The *tone of the system* may be afterwards raised by a nourishing diet and the use of tonic medicine, and the *irritation* may be often *alleviated* by the *internal use* of dilute sulphuric acid or lemon juice, and the *external employment* of lotions of lemon juice or glycerine, to which a very little morphia or chloroform may be often advantageously added. Warm sea-bathing is frequently had recourse to with advantage.

The terms *prurigo* and *pruritus* are also medically applied to itching and like irritation of various parts of the body from other causes than the above disease; as worms, vermin, &c. See *Eruptions* (Papular).

PRUSSIAN ALKALI. See *Ferrocyanide of Potassium.*

PRUSSIAN BLUE. Syn. *Berlin Blue, Paris do.; Ferrocyanide of Iron; Sesquiferrocyanide of do.; Cyanure Ferroso-ferrique,*—Berzelius. *Ferri Percyanidum,*—Ph. L. 1836. *Ferri Cyanuretum,*—Ph. D. 1826. *Prussiate of Iron, Ferro-prussiate of do., Cyanuret of do.,*—Obs. var. This is the well-known blue pigment of the shops.

Prep. 1. The *crude* but *clear solution of prussiate of potash* (blood lye) is precipitated by a mixed solution of *alum,* 2 parts, and *green sulphate of iron,* 1 part; the dingy greenish precipitate that falls gradually becomes blue by absorption of atmospheric oxygen, which is promoted by exposure and agitation of the liquor; as soon as it has acquired its full colour, the sediment is repeatedly washed with *water*, and is then drained, and dried, at first in a stove, but afterwards on chalk stones. *Product* large, but inferior in quality.

2. Repeatedly digest and wash the precipitate obtained by the above process, in very *dilute hydrochloric acid*, and then in *pure water;* drain and dry it, as before. *Superior.*

3. (*Paris Blue.*)—*a.* Neutralize the solution of *prussiate of potash* (blood lye) with *dilute sulphuric acid*, precipitate the liquid with a solution of any *persalt* or *sesquisalt of iron* (as the persulphate, nitrate, sesquichloride, or peracetate); well wash the precipitate with *water*, and dry it, as before. A very rich and intense colour.

b. (Hochstätter.) *Crystallized ferrocyanide of potassium* and *green sulphate of iron*, of each, 6 parts, are each separately dissolved in *water*, 15 parts; after the admixture of the solutions, and frequent agitation, *oil of vitriol*, 1 part, and *fuming hydrochloric acid*, 24 parts, are stirred in; after some hours have elapsed, a *strained solution* of *chloride of lime*, 1 part, dissolved in *water*, 80 parts, is *gradually* added, the addition being stopped as soon as an effervescence from the escape of chlorine is perceived; the whole is now left for 5 or 6 hours, when the precipitate is thoroughly washed in *pure soft water*, drained, and dried. Or, *instead* of the above, the precipitate is at once washed in *dilute nitric acid*, until its colour ceases to be improved by the process. The *product* is of the *finest quality.*

Prop. Insoluble in water, and in dilute acids, except the oxalic, in solutions of which it dissolves freely, when pure; oil of vitriol dissolves it to a white pasty mass, which is again precipitated of the usual blue colour by water; alkalies instantly decompose it, and so do red oxide of mercury, and some other oxides when boiled with it; it burns in the air like tinder, leaving an ash of oxide of iron. It is not poisonous.

Pur., *&c.* The quality of Prussian blue may be estimated by the richness of its colour, and by the quantity of potash or soda required to destroy this. If it effervesces with acids, it contains *chalk;* and if it forms a paste with boiling water, it is adulterated with *starch.* It is *pure*, if, "after being boiled with dilute hydrochloric acid, ammonia throws down nothing from the filtered liquid." (Ph. L. 1836.) It is distinguished from indigo by exhibiting a coppery tint when broken, but which is removed by rubbing with the nail.

Concluding Remarks. The object in employing *alum* is to prevent or lessen the precipitation of oxide of iron by the free alkali in the blood lye, but a portion of alumina is in consequence thrown down with the blue, and tends to render it paler, and increase the product. The same purpose is effected by neutralizing the alkali with *dilute sulphuric acid*, and omitting the alum from the precipitating solution; but in this case, if green copperas is employed, it is necessary to treat the precipitate with *dilute hydrochloric acid*, to remove the excess of peroxide of iron, before the precipitate can acquire its full richness of colour. The quantity of alum employed may be varied according to the shades of the intended blue. Samples containing this contamination must not be employed medicinally. (See *page* 641.)

PRUSSIAN BLUE (Soluble). *Prep.* 1. *Basic Prussian Blue; Basic Ferrocyanide* or *Sesqui-ferrocyanide of Iron; Ferri Sesqui-ferrocyanidum cum Ferri Oxydo*,—Lat. Obtained by adding a *solution of proto-sulphate of iron* to a *solution of ferrocyanide of potassium;* a *bluish-white* precipitate, turning *dark blue* by free exposure, is formed, which, after it has acquired this colour, is washed until it begins to dissolve in the water, and colour it blue; it is then either collected and dried, or is at once dissolved in *pure* water. This variety is *not* precipitated from its solution by alcohol.

2. *Ferrocyanide of Potassium and Iron, Soluble do.; Ferri Ferro-cyanidum cum Potassii Ferrocyanido, F. Sesqui-ferrocyanidum c. P. F.*,—Lat. This is made by precipitating a solution of a *sesquisalt* or *persalt of iron* (as the persulphate, pernitrate, peracetate, or sesquichloride) with a *stronger solution of ferrocyanide of potassium*, so that the latter may be in considerable excess. A blue precipitate is formed, which is treated as before. This variety is precipitated by alcohol. Both are freely soluble in *pure water*, but not in water which has the *slightest* saline contamination. Hence it is that lengthened exposure to the atmosphere, and the use of the common steel pen, causes the gradual precipitation of this substance from its solution when used as ink. See *Writing Fluids.*

PRUSSIATE. Syn. *Prussias*,—Lat. See *Cyanide* and *Hydrocyanic Acid.*

PRUSSIC ACID. See *Hydrocyanic Acid.*

PRUSSINE. See *Cyanogen.*

PSEUDO-ERYTHRINE. Syn. *Orsellinic Ether, Orsellinate of Ethyle.* See *Erythrine.*

PSEUDO-MORPHIA. Syn. *Pseudo-Morphine.* A substance of little importance, occasionally found in opium. It differs from morphia chiefly in not decomposing iodic acid. It is said to contain nitrogen.

PSORIASIS. Syn. *Irregular Dry Tetter.* A rough, scaly eruption, sometimes continuous, and sometimes in patches of various sizes, but of an irregular figure, and, for the most part, accompanied by fissures of the skin. It is distinguished from lepra, "not only by the distribution of the patches, but also by its cessation and recurrence at different periods of the year."

There are several *varieties* of this *disease*, as—*psoriasis guttata, p. diffusa, p. gyrata, p. inveterata, p. palmaria, p. labialis, p. scrotalis, p. infantilis, &c.* In the more aggravated form (*inveterata*) the skin becomes red, deeply furrowed or wrinkled, and so stiff and rigid, that the motion of the muscles and the joints is seriously impeded. The production and separation of the scales is also so remarkably rapid, that a large quantity of them is found on the bed, and confined within the linen of the patient.

The "*baker's itch*" is psoriasis diffusa of the back of the hand, and certain portions of the fingers. *Washerwomen* are often troubled with a like affection. The "*grocer's itch*" differs from the preceding in being pustular at its commencement, or of a mingled character.

The *general treatment* of *this disease* has been noticed under "*Scaly eruptions*," and, for the most part, may resemble that for *leprosy*, and for the other *dry tetters.* A light and nutritious diet, with good ripe fruits, exercise in the open air, warm sea-bathing, and the *internal use* of the *bicarbonate* or *citrate of potassa* combined with *sulphur*, or with *cinchona*, generally prove useful. *Decoction of bran, butter-milk*, or *lotions containing glycerine*, may be employed to allay itching and irritation. When the disease is local (as *baker's itch*, &c.), the application of the *ointment of nitrate of mercury*, diluted with 10 or 12 times its weight of lard, has been highly recommended. Among internal remedies Donovan's solution (*liq. hydriod. arsen. et hydrarg.*) is, probably, the most active and certain.

PSOROPHTHALMIA. Syn. *Ophthalmitis Tarsalis.* An inflammation and ulceration of the eyelids, attended by considerable itching and irritation, and by a copious discharge of viscid and acrimonious matter. The *ointment of nitrate of mercury* or of the *nitric oxide of mercury*, largely diluted with *fresh lard*, is a very excellent application. A single drop of *wine of opium*, or the *fumes of oil of turpentine*, may also be applied nightly. See *Ophthalmia.*

PTISAN. Syn. *Ptisana*,—Lat. A decoction made of *pearl barley, liquorice, raisins*, and other like vegetable matters, either alone, or so slightly medicated as to be taken as a common drink in fevers, catarrhs, &c. Those retained in English pharmacy have been already noticed. The French physicians often employ this form of medicine. The "*tisanes*" of the P. Cod. are numerous. See *Decoctions, Infusions, Juleps, Tisanes, &c.*

PTYALINE. A peculiar animal matter, analogons to diastase, obtained from the saliva. It is soluble in water, but insoluble in alcohol.

PUCHA PAT. Syn. *Patchouli, Patchoulie.* Puchá pât is the dried foliaceous tops of an Indian species of *labiatæ.* It is much *used* in perfumery, particularly for making *sachets;* but its odour, although very durable, is not so agreeable as that of many other substances, unless it is combined with lavender, bergamot, ambergris, musk, or some other like perfume.

PUDDINGS. Every English female can make a pudding; and every Englishman seems to have an intuitive talent in the same direction, as evinced by the excellent compounds of this kind which he produces when "pinched for a meal" by either sea or land,—on the steppes of Asia, the deserts of Africa, the prairies of North America, on the mountain sides of either the Old or New world, or in the camp or trench, anywhere. Pudding is, in truth, a national dish in England, and its varieties are legion, extending over an almost infinitude of classes, orders, genera, and species, which it would occupy a whole life to digest and classify. Every county, every district, in this country, has its particular kind of pudding; and even the genius of our friend Alexis feels a proud self-complacency as he regards his numerous progeny of this description.

The *instructions* given under *Cakes, Pies, &c.*, will be found, with some slight modifications, also to apply to puddings, and, therefore, need not be repeated here. Soyer tells us that every sort of pudding, if sweet or savoury, is preferably dressed in a *basin,* instead of in a *cloth.* If boiled in a basin, the paste receives all the nutriment of the materials, which, if boiled in a cloth, are dissolved out by the water, when by neglect it *ceases boiling.* To cause them to turn well out, the inside of the basin should be thoroughly "larded" or rubbed with butter.

In the *preparation* of *meat-puddings* the "first and most important point is *never to use any meat* that is *tainted;* for in pudding, above all other dishes, it is least possible to disguise it by the confined process which the ingredients undergo. The gradual heating of the meat, which alone would accelerate decomposition, will cause the smallest piece of tainted meat to contaminate all the rest. Be particular, also, that the *suet* and *fat* are *not rancid,* ever remembering the grand principle, that everything which gratifies the palate nourishes."

"A *pudding-cloth,* however coarse, ought *never* to be *washed with soap;* it should be simply dried as quickly as possible, and kept dry and free from dust, and in a drawer or cupboard free from smell." (A Soyer.)

PUDDLING. See *Iron.*

PUERPERAL FEVER. Syn. *Febris Puerperalis,*—Lat. This is a term which is differently applied by pathologists. That here referred to is a febrile affection of lying-in women, and may be regarded as a malignant form of milk fever, complicated with peritonitis, or inflammation of the peritoneum. It usually attacks the patient about the third day after delivery, and is marked by great tenseness and tenderness of the abdomen, suppression of the milk and lochia, a quick, small, and sharp pulse, hot skin, frequent vomiting, difficult respiration, inclination to belch, aphthous fauces, &c. In fatal cases death usually occurs in from 5 to 8 days.

The *treatment,* to be serviceable, must be prompt and skilful. In *full habits,* bleeding, mercurial purgatives, and saline sudorifics, with occasional doses of henbane, opium, or morphia, to induce sleep, are most relied on. When there is incessant vomiting or purging, and the fever assumes a typhoid character, the system must be supported with cordials and mild stimulants.

"If the pulse continue above a hundred in the minute for 24 hours after delivery, there is reason to apprehend that serious mischief is about to happen; and, therefore, unless the frequency depend, *decidedly,* on debility, produced by great hæmorrhage, &c., we ought to open the bowels, and give a diaphoretic." "If the belly be full or painful on pressure, or if the patient be inclined to vomit, we ought instantly to open a vein, and give a purgative. *One* copious bleeding on the very invasion of the disease, is more useful than *ten* afterwards; and the delay of two hours may be the loss of the patient, whose danger, even under the most active practice, is extreme." (*Lex. Med.*)

PUGGING. The stuff made of plaster, put between floors to deaden the sound.

PULMONITIS. Inflammation of the lungs. See *Pneumonia.*

PULP. Syn. *Pulpa,*—Lat. The softer parts of plants, more particularly, of fruits, separated from the fibrous and harder portions.

"*Pulpy fruits,* if they be *unripe,* or *ripe and dried,* are to be placed in a damp situation, until they become soft: then the pulp is to be pressed out through a hair sieve; afterwards, it is to be boiled with a gentle heat, frequently stirring; and, finally, the (excess of) water is to be evaporated in a water bath, until the pulp acquire a proper consistence."

"Press the *pulpy fruits* which are *ripe* and *fresh* through a *hair sieve,* without boiling them." (Ph. L. 1836.)

PULVERIZATION. The reduction of any substance to dust or powder.

On the *small scale,* pulverization is usually performed by means of a pestle and mortar; on the *large scale,* by stamping, grinding, or cutting the substance in a mill. A few *soft substances,* as carbonate of magnesia, carbonate of lead, &c., may be pulverized by simply rubbing them through a fine sieve, placed over a sheet of paper; whilst many *hard, gritty substances* can only be reduced to fine powder by porphyrization or levigation. *Elutriation,* or "*washing over,*" is adopted for several substances, as chalk, antimony, &c., which are required to be reduced to fine powder on the large scale. For some articles which are very tough, fibrous, or resisting, a rasp or file is employed. Whichever of these methods is adopted, the *body to be powdered* must be *very dry,* and where spontaneous drying is insufficient, *artificial desiccation* in a stove or oven, gently heated, is employed. To facilitate this, the substance should be first cut into pieces or crushed small. On the other hand, a few substances, as *rice, sago, nux vomica,* and *St. Ignatius's bean,* are often soaked in water, or steamed, before being further operated on. Whenever a *substance cannot be dried completely,* without an *alteration of its properties,* an *intermedium* is had recourse to, by which the moisture may be absorbed, or its state of aggregation modified. Thus, sugar is employed in pulverizing *civet, musk, nutmeg,* and *vanilla.* When *camphor* is to be pulverized, the addition of a very small quantity of alcohol renders the operation easy. In other cases, the *intermedium* is of so hard a nature as to assist in breaking-down the substance to be powdered; thus, *gold-leaf* is reduced to powder by rubbing it with sulphate of potassa, and afterwards removing this last by means of water. *Fusible metals,* as *zinc* and *tin,* are powdered by pouring them into a mortar, and stirring them rapidly whilst cooling; or, by briskly agitating them, in the melted state, in a wooden box covered with chalk or whiting. *Phosphorus* is powdered by melting it in urine or lime-water, and then shaking the bottle until its contents have become quite cold. *Glass, quartz,* and *silicated stones,* require to be heated red hot, and in this state to be thrown into cold water, by which they become sufficiently friable to admit of pulverization. Many *salts* which are reduced to fine powder with very great difficulty, and do not dissolve in spirit of wine, are easily obtained in a pulverulent form, by agitating their concentrated aqueous solution with a considerable quantity of rectified spirit; the disengaged fine crystallized powder may then be dried, and further divided by trituration. *Potassio-tartrate of antimony* may be advantageously thus treated. A *large number* of *salts,* including *nitre, sal ammoniac,* and *carbonate of potash,* may also be reduced to powder by keeping their solutions in a state of constant and violent agitation during their rapid evaporation.

The following rules should be observed in the preparation of powders:—

1. If possible, *perfectly dry articles* should alone be operated on, and only in *dry weather.*

2. The *nature of the mortar,* and the *mode of operating,* should be adapted to the nature of the substance. Thus *woods* and *barks* should be pulverized in an iron mortar; *sugar, alum,* and *nitre,* in one of marble or wedgewood-ware; and *corrosive sublimate,* only in one of glass.

3. The mortar should be provided with a cover to prevent *loss* and *annoyance* to the operator. If *much powder escapes,* or if it is *dangerous* or *disagreeable when breathed,* or if the *substance* is *rare or costly,* the mortar should be covered with a *skin of leather,* to which the pestle is attached, so that the latter may be freely moved without causing the slightest opening for the escape of the dust occasioned by the process. When *aloes* or *gamboge* is powdered, a few drops of olive oil are commonly added, with the same intention.

4. The pulverized portions should be separated from time to time, by aid of a sieve, the coarser particles being returned to the mortar to be again beaten and triturated; and this *alternate pulverization* and *sifting* is to be repeated until the process is complete.

PUMICE STONE. Syn. *Pumex, Lapis Pumiceus, L. Pumicis,*—Lat. Found in the neighbourhood of volcanoes. *Used,* in the solid form, to polish wood, paint, &c.; also, when pulverized, as a polishing powder for glass, bone, ivory, marble, metals, &c.

PUNCH. An acidulous, intoxicating beverage, composed of water sweetened with sugar, with a mixture of lemon juice and spirit, to which some aromatic, as nutmeg, mace, or cinnamon, is occasionally added. Wine is sometimes substituted for spirit. It is much less drank than formerly. *Rum punch* is the most popular amongst sailors, who are now the principle consumers of this beverage.

Prep. 1. *Juice of* 3 or 4 *lemons; yellow peel of* 1 *lemon; lump sugar,* ¾ *lb.; boiling water,* 3½ pints; infuse ½ an hour, strain, and add of *bitter ale,* ½ pint; *rum* and *brandy,* of each, ¾ to 1 pint (or *rum* alone, 1½ to 2 pints). More *hot water* and *sugar* may be added if the punch is desired either *weaker* or *sweeter.*

2. (*Cold Punch.*) From *arrack, port wine,* and *water,* of each, 1 pint; *juice of* 4 *lemons*; *white sugar,* 1 *lb.*

3. (*Gin Punch.*) From the *yellow peel* of ½ a *lemon; juice of* 1 *lemon; strongest gin,* ¾ pint; *water,* 1¾ pint; *sherry,* 1 glassful.

4. (*Iced Punch.*) From *champagne* or *Rhenish wine,* 1 quart; *arrack,* 1 pint; *juice of* 6 *lemons; yellow peel* of 3 *lemons; white sugar,* 1 *lb.; soda water,* 1 or 2 bottles; to be iced as cream.

5. (*Milk Punch; Verder.*) Steep the *yellow rinds* of 18 *lemons* and 6 *oranges,* for 2 days in *rum* or *brandy,* 2 quarts; then add 3 quarts more of either *spirit; hot water,* 3 quarts; *lemon juice,* 1 quart; *loaf sugar,* 4 *lb.*; 2 *nutmegs,* grated; and *boiling milk,* 2 quarts; mix well, and in 2 hours strain the liquor through a jelly-bag.

6. (*Norfolk Punch.*) Take of *French brandy,* 20 quarts; *yellow peels* of 18 *oranges* and 30 *lemons;* infuse for 12 hours; add of *cold water,* 30 quarts; *lump sugar,* 20 *lb.;* and the *juice* of the *oranges* and *lemons;* mix well, strain through a hair sieve, add of *new milk,* 2 quarts, and in 6 weeks bottle it. Keeps well.

7. (*Orange Punch.*) As No. 1, using *oranges,* and adding some *orange wine,* if at

hand. A little *Curaçoa, Noyau,* or *Maraschino* improves it.

8. (*Raspberry Punch.*) As the last, but using *raspberry juice* or *raspberry vinegar,* for the oranges or lemons.

9. (*Regent's Punch.*) From *strong hot green tea, lemon juice,* and *capillaire,* of each, 1½ pint; *rum, brandy, arrack,* and *Curaçoa,* of each, 1 pint; *Champagne,* 1 bottle; mix, and slice a *pineapple* into it.

10. (*Tea Punch.*) From *strong hot tea,* 1 quart; *arrack,* ½ bottle; *white sugar,* 6 *oz.: juice of* 8 *lemons;* and the *yellow rinds* of 4 *lemons;* mixed together.

11. (*Wine Punch.*) From *white sugar,* 1 *lb.; yellow peel* of 3 *lemons; juice* of 9 *lemons; arrack,* 1 pint; *port* or *sherry* (hot), 1 gall.; *cinnamon,* ¼ *oz.; nutmeg,* 1 *dr.;* mix.

12. (*Yankee Punch.*) Macerate *sliced pineapple,* 3 *oz.; vanilla,* 6 gr.; and *ambergris* (rubbed with a little sugar), 1 gr., in the strongest *pale brandy,* 1 pint, for a few hours, with frequent agitation; then strain with expression, add of *lemon juice,* 1 pint; *lemon syrup,* and either *claret* or *port wine,* of each, 1 bottle; with *sugar,* ½ *lb.,* dissolved in *boiling water,* 1½ pint. See *Shrub.*

PURGATIVES. Syn. *Dejectoria, Purgantia, Purgativa,*—Lat. These have been divided into *five orders* or *classes,* according to their particular actions. The following are the principal of each class:—

1. (*Laxatives, lenitives,* or *mild cathartics.*) Manna, cassia pulp, tamarinds, prunes, honey, phosphate of soda; castor, almond and olive oils; ripe fruit.

2. (*Saline* or *cooling laxatives.*) Epsom salt, Glauber's salt, phosphate of soda (tasteless salt), seidlitz powders, &c.

3. (*Active cathartics,* occasionally *acrid,* frequently *tonic* and *stomachic.*) Rhubarb, senna, aloes, &c.

4. (*Drastic* or *violent cathartics.*) Jalap, scammony, gamboge, croton oil, colocynth, elaterium, &c.

5. (*Mercurial purgatives.*) Calomel, blue-pill, quicksilver with chalk, &c.

In *prescribing purgatives,* regard should be had to the particular portion of the alimentary canal on which we desire more immediately to act, as well as to the manner in which the medicine effects its purpose. Thus, Epsom salt, sulphate of potassa, and rhubarb, act chiefly on the *duodenum;* aloes, on the *rectum;* blue-pill, calomel, and jalap, on the *larger intestines* generally; and tartrate and bitartrate of potassa, and sulphur, on the *whole length* of the intestinal canal. Again, others are *stimulant,* as aloes, croton oil, jalap, scammony, &c.; others are *refrigerant,* as most of the saline aperients; magnesia and its carbonate is both *aperient* and *antacid;* whilst another class, including rhubarb, damask roses, &c., are *astringent.* Further, some produce only *serous* or *watery dejections,* without greatly increasing the peristaltic action of the bowels; whilst a few occasion a copious discharge of the fæces in an apparently natural form. See *Draughts, Mixtures, Pills, Prescribing,* &c.

PURL. *Prep.* To *ale* or *beer,* ½ pint, gently warmed, add of *bitters,* 1 wine-glassful, or q. s. Some add a little *spirit.* A favorite beverage with hard drinkers early in the morning.

PURPLE. A rich compound colour, produced by the admixture of *pure blue* and *pure red.* This colour has always been the distinguishing badge of royalty and distinction. The celebrated *Tyrian dye* was produced by a shell-fish called *murex* or *conchyllium,* a species of *gasteropoda.*

PURPLE OF CASSIUS. Syn. *Purple Precipitate of Cassius, Gold Purple, Gold prepared with Tin; Aurum Stanno paratum, Purpura Mineralis Cassii,*—Lat. *Prep.* 1. *Crystallized protochloride of tin,* 1 part; *crystallized perchloride of tin,* 2 parts; dissolve each separately, mix the solutions, and add of *crystallized terchloride of gold* (in solution), 1 part; carefully wash, and dry the precipitate. Very fine.

2. (Frick.) Dissolve *pure grain-tin* in *cold dilute aqua regia,* until the fluid becomes faintly opalescent, then take the metal out and weigh it; next, dilute the solution largely with *water,* and add, simultaneously, a *dilute solution of gold,* and *dilute sulphuric acid,* in such proportion, that the *tin in the one* shall be to the *gold in the other,* in the ratio of 10 to 36.

3. (P. Cod.) *Terchloride of gold,* 1 part, is dissolved in *distilled water,* 200 parts; *another solution* is made by dissolving, in the cold, *pure tin,* 1 part, in a *mixture* of *nitric acid,* 1 part, and *hydrochloric acid,* 2 parts; this last solution is diluted with *distilled water,* 100 parts, and is then added to the *solution* of *terchloride of gold* until precipitation ceases to take place; the powder is, lastly, washed by decantation, and dried by a very gentle heat.

4. *Silver,* 150 parts; *gold,* 20 parts; *pure grain-tin,* 35 parts; fuse them together under charcoal and borax, cool, laminate, and dissolve out the silver with *nitric acid.*

Obs. Purple of Cassius is *used* as a purple in porcelain painting, and to communicate a ruby red colour to glass, when melted in *open* vessels.

PURPURA. An eruption, or efflorescense, consisting of small specks and patches, caused by extravasation of blood under the cuticle, and so named from its colour. *Saline aperients*, and *mild tonics*, appear to be the *best remedies.* Although it is not a severe affection, it is often very little influenced by medicine.

PURPURATE OF AMMONIA. See *Murexide.*

PURPURIC ACID. See *Murexan.*

PURPURINE. Syn. *Madder Purple.* The name given by Robiquet and Colin to pure madder-red.

Prep. Coarsely powdered *madder* is allowed to ferment with *water*, after which it is boiled in a *strong solution of alum ;* the *decoction* is next mixed with *sulphuric acid*, and the resulting red precipitate is purified by one or more crystallizations from *alcohol.*

Prop., &c. Crystalline red needles, insoluble in cold water, but soluble in hot water, and in alcohol, ether, and solutions of alum and the alkalies. It differs from alizarine or garancine prepared by the direct action of oil of vitriol on madder, in containing 2 equiv. less of carbon. (See *p.* 734.)

PURREE. Syn. *Indian Yellow.* A yellow substance, of doubtful origin, imported from China and India, and now extensively used in both oil and water-colour painting. According to the researches of Stenhouse and Erdmann, it consists of *purreic acid*, a strongly tinctorial vegetable substance, united to *magnesia.*

PURREIC ACID. Syn. *Euxanthic Acid.* This substance is obtained from *purree.* It crystallizes in nearly colourless needles, which are only sparingly soluble in cold water, and forms rich yellow-coloured compounds with the alkalies and earths. Heat converts it into a neutral, crystallizable substance, called *purrenone.*

PURRENONE. Syn. *Euxanthone, Pyropurreic Acid.* See *Purree*, and *Purreic Acid.*

PUS. The cream-like, white or yellowish liquid secreted by wounded surfaces, abscesses, sores, &c.

PUTREFACTION. Syn. *Putrefactio,*—Lat. *Putrefactive Fermentation, Putrid do.*, —*Obs.* The spontaneous decomposition of animal and nitrogenized vegetable substances, under the joint influence of warmth, air, and moisture. The solid and fluid matters are resolved into gaseous compounds and vapours, which escape, and into earthy matters, which remain. The most striking characteristic of this species of decomposition, is, the ammoniacal or fœtid exhalations that constantly accompany it.

The *nature* of *putrefaction*, and the *conditions essential* to *its occurrence*, have been briefly alluded to at *pages* 451-3, to which we must refer the reader. It may here, however, be useful to reiterate that *this change* can only be *prevented* by the abstraction or exclusion of the conditions essential to its occurrence. This may be effected by—*reduction of temperature*,—*exclusion of atmospheric air*, or—*the abstraction of moisture.* The antiseptic processes in common use, are effective in precisely the same degree as these preventive means are carried out. *Frozen meat* may be preserved for an unlimited period, while the same substance will scarcely keep for more than a few days at the ordinary heat of summer. *Animal substances* will also remain uninjured for a long period if kept in vessels from which the *air* is *entirely excluded*, as in the process now so extensively adopted for the preservation of fresh meat for the use of our army and marine. The *third condition* is fulfilled when nitrogenized matter is preserved in *alcohol, brine*, or any similar fluid, and when it is *dried.* In either case water is abstracted from the surface, which then loses its propensity to putrefy, and forms an impervious layer, which excludes atmospheric oxygen from the interior and softer portion of the substance. *Creasote*, and most of the *antiseptic salts*, also act in this way.

Among special antiseptic processes are the following:—

Application of Cold. The accession of putrefaction is prevented, and its progress arrested, by a temperature below that at which water freezes. In the colder climates of the world, *butcher's meat, poultry*, and even *vegetables*, are preserved from one season to the other in the frozen state. In North America millions are thus supplied with animal food, which, we can state, from personal experience, is often superior in flavour, tenderness, and apparent freshness, to that from the recently killed animal. In temperate climates, and in cold ones during their short summer, *ice-houses* and *ice-safes* afford a temperature sufficiently low for keeping meat fresh and sweet for an indefinite period. Substances preserved in this manner should be allowed to gradually assume their natural condition before cooking them; and on no account should they be plunged into hot water, or put before the fire, whilst in the frozen state. (See *p.* 591.)

Bucaning. A rude kind of drying and smoking meat, cut into thin slices, practised by hunters in the prairies and forests.

Desiccation or *Drying.* In this way every article of food, both animal and vegetable, may be preserved, without the application of salt or other foreign matter. The proper method is to expose the substances, cut into slices or small fragments, in the sun, or in a current of warm dry air, the temperature of which should be under 140° Fahr. Articles so treated, when immersed for a short time in cold water, to allow the albumen and organic fibres to swell, and then boiled in the *same* water, are fully as nutritious as fresh meat cooked in the same manner. If a higher degree of heat than 140° be employed for animal substances, they become hard, and insipid. Owing to the practical difficulties in the way of applying the above process to fresh meats, it is usually employed in conjunction with either salting or smoking, and, frequently, with both of them.

Exclusion of Atmospheric Oxygen. This is effected by the method of "preserving in sugar," "potting in oil," and, more particularly, by the method known as "M. Appert's process," as improved by Messrs. Donkin & Gamble. (See *below.*)

Fresh meat may be preserved for some months in that state, by keeping it in water *perfectly* deprived of air. In practice, some iron filings and sulphur may be placed at the bottom of the vessel, over which must be set the meat; over the whole is gently poured recently boiled water, and the vessel is at once closed, so as to exclude the external air.

Immersion in Antiseptic Liquids. One of the commonest and most effective liquids employed for this purpose is *alcohol* of 60 to 70%, to which a little camphor, ammonia, sal ammoniac, or common salt is occasionally added. A *cheaper* and *equally efficient* plan is to employ a weak spirit holding a little creasote in solution. A weak solution of *sulphurous acid* may be substituted for alcohol. Weak solutions of *alum*, with or without the addition of a few grains of corrosive sublimate, or of arsenious acid, are also highly antiseptic. These are chiefly employed for *anatomical specimens, &c.* A *solution* containing only $\frac{1}{800}$th part of *nitrate of silver* is likewise very effective; but, from this salt being *poisonous*, it cannot be employed for preserving articles of food. *Butcher's meat* is occasionally pickled in vinegar. By immersing it for 1 hour in water holding $\frac{1}{400}$th part of *creasote* in solution, it may be preserved unchanged for some time, even during summer.

Injection of Antiseptic Liquids into the veins or arteries of the recently killed animal. It is found that the sooner this is done after the slaughter of the animal the more effective it becomes, as the absorbent power of the vessels rapidly decrease by age. See *M. Gannal's Process* (below).

Jerking, is a method of preserving flesh sometimes adopted in hot climates. It consists in cutting the lean parts of the meat into thin slices, and exposing these to the sunshine until quite dry and brittle, when they are bruised in a mortar, and pressed into pots.

Pickling in Vinegar. In this method the substances, rendered as dry as possible by exposure to the air, are placed in glass or stoneware jars (not salt-glazed), or wooden vessels, when *strong vinegar*, either cold or boiling hot, is poured over them, and the vessel at once closely corked, or otherwise covered up, and preserved in a cool situation. *Meat* is occasionally thus treated; *vegetables* frequently so. (See *p.* 974.)

Potting in Oil. In this case *salad* or *olive oil* is substituted for vinegar, (see above,) and is always used cold.

Salting acts chiefly by abstracting water from the albuminous portions of the meat, by which its disposition to change is lessened.

Smoking. This process, which, as well as the last, is referred to further on, acts both by the abstraction of moisture, and the antiseptic properties of certain substances (*creasote, &c.*) contained in wood smoke. *Fresh meat* and *fish* are occasionally smoked; but, in general, substances intended to be thus treated, are first salted.

In *Messrs. Donkin & Gamble's patent process*, the substances, previously parboiled, are placed in small tin cylinders, which are then filled up with rich soup; the lids are next soldered on quite air-tight, and a small hole is afterwards made in the centre; the cylinders are then placed in a bath of strong brine, or a strong solution of chloride of calcium, which is at once heated to the boiling point, to nearly complete the cooking process; after which the small hole in the lid is hermetically sealed, by covering it with solder while the vessel still remains boiling hot; the tins are, lastly, again submitted to heat in the heated bath, the duration of which is proportioned to the quantity and character of their contents, the "dressing" of which is to be perfected by this operation. The ends of the tins on cooling assume a concave form, from the pressure of the atmosphere, without which they cannot be air-tight, and the process has been unsuccessful. To determine this, the patentees expose the canisters, prepared as above, for at least a month, in an apartment heated to about 100° Fahr.; when, if the process has failed, putrefaction commences, and the ends of the cases, instead of remaining concave, *bulge*, or become *convex*. This is called the "*test*." By this process, which was invented by M. Appert in France, about the year 1808, *fish*, *flesh*, *poultry*, and *vegetables*, may be preserved for years, or even centuries, in any climate.

The *process of Mr. Goldner* differs somewhat from the preceding, in the employment of a higher degree of heat, more hastily applied, and not prolonged or repeated after the tins are soldered up. The results, whether from careless manipulation, or otherwise, have not been so satisfactory as those of the preceding method under the personal direction of Mr. Gamble.

The *process of M. Gannal*, having for its object the preservation of *butcher's meat* in the *fresh state*, depends on the peculiar absorbent property of the flesh of recently killed animals, above referred to. This process consists in injecting a *solution* of *sulphate of alumina*, or, better, of *chloride of aluminium*, of the sp. gr. 1·070 to 1·085 (10° to 12° Baumé), into the carotid artery, by means of a syphon, as soon as the blood ceases to flow from the slaughtered animal; both extremities of the jugular vein being previously tied. 9 to 12 quarts of the solution are sufficient for an ox, and a proportionate quantity for smaller animals. A less quantity is also required in winter than summer. When the animal has been well bled, and the injection skilfully performed, it is scarcely perceptible that the animal has undergone any preparation. The *injected animal* is cut up in the usual way; and when intended to be eaten within 2 or 3 weeks merely requires to be hung up in a dry, airy situation, free from flies; but if it is to be kept for a longer period, it is directed to be washed with a mixed *solution* of *common salt* and *chloride of aluminium* at 10° Baumé, and then simply dried and packed in clean *air-tight* barrels, and kept in a cool, dry place. If the air cannot be *perfectly excluded*, it should be packed in dry salt, not for the purpose of preserving it, but to prevent the vegetation of bissus; as without this precaution, the meat becomes musty, from exposure, and the action of moisture. Meat preserved by this process may be kept for several years, and merely requires soaking for 24 hours in water, for the purpose of swelling its pores, to give it the appearance and taste of fresh meat, fit for either roasting or boiling. For hot climates a somewhat stronger solution, or a larger quantity of the usual one, may be injected. The use of the strong solutions ordered in some recent works, however, deprives the flesh of a portion of its apparent freshness, and makes it more nearly approach in flavour to that which has been slightly salted in the ordinary manner.

In addition to the above it may be added, that both *flesh* and *fish* may be preserved by dipping them into, or brushing them over with *pyroligneous acid*, and then drying them. This gives them a smoky flavour, but if *pure acetic acid* (Ph. L.) be used, no taste will be imparted. These fluids may be applied by means of a clean painter's brush, or even a stiff feather. A table-spoonful is sufficient to brush over a large surface. Fish and flesh so prepared will bear a voyage to the East Indies, and back, uninjured.

Fish may also be preserved in a dry state, and perfectly fresh, by means of *sugar* alone. Fresh fish may be thus kept for some days, so as to be as good when boiled as if just caught. If dried and kept free from mouldiness there seems no limit to their preservation; and they are much more nutritious in this way than when salted. This process is particularly valuable in making what is called "*kippered salmon*;" and the fish preserved in this manner are far superior in quality and flavour to those which are salted or smoked. A few table-spoonfuls of *brown sugar* are sufficient for a salmon of five or six pounds weight; and if *salt* be desired, a tea-spoonful or two may be added. *Saltpetre* may be used, instead of salt, if it be wished to make the *kipper* hard.

According to Prechtl, *fish* may be preserved in a *living state* for 14 days, or longer, *without water*, by stopping their mouths with crumb of bread steeped in brandy, pouring a little brandy into them, and then placing them in straw in a moderately cool situation.

The well-known property possessed by *ether*, *alcohol*, *pyroxilic spirit*, *chloroform*, and certain other *hydrocarbons*, of averting putrefaction, has been thus applied by M. Robin:—He encloses the meat or other substances to be preserved in a glass case, along with a sponge or a capsule, containing the preservative liquid, which latter is continually evolved in a vaporous condition, and exercises the preservative agency. In this way the vapours of hydrocyanic acid are found to be very efficacious. *Camphor* is thus employed in the *mummy cases* in the British Museum.

It has been recently asserted by Mr. George Hamilton, that in an atmosphere of *binoxide of nitrogen*, in the dark, flesh preserves its natural colour and freshness for about 5 months; and eats well, provided it be boiled in open vessels, to expel nitrous fumes. See *Animal Substances, Candies, Eggs, Fish, Fruit, Meat, Milk, Pickles, Potting, Preserves, Salting, Skins, Smoking, Stuffing, Tanning, Tawing, Vegetables, &c., &c.*

PUTRID FEVER. See *Typhus.*

PUTTY (Glazier's). From *whiting,* made into a stiff paste with *drying oil.* It is used to fix panes of glass in sashes, to fill holes and cracks in wood before painting it, &c.

PUTTY (Plasterer's). A fine cement used by plasterers, made of *lime* only. It differs from "*fine stuff*" in the absence of hair.

PUTTY (Polisher's). Syn. *Putty Powder, Calcine; Cineres Stanni, Stanni Oxydum Crudum,*—Lat. A crude peroxide of tin, obtained by exposing *metallic tin* in a reverberatory furnace, and raking off the dross, as it forms; this is afterwards calcined until it becomes whitish, and is then reduced to powder. *Another method* is to melt *tin* with rather more than an equal weight of *lead,* and then to rapidly raise the heat so as to render the *mixed metal* red hot, when the tin will be immediately flung out in the state of *putty* or *peroxide.* The *products* of both these processes are very hard, and are *used* for polishing glass and japan work, and to colour opaque white enamel.

PUZZOLANA, *Puozzolana,* or more correctly, *Puzzuolana,* is a volcanic ash, found at Puzzuoli, near Naples. When mixed with *lime* it forms an excellent hydraulic cement. A good factitious *puzzolene* may be made by heating a mixture of 3 bushels of *clay* and 1 bushel of *fresh-slaked lime,* for some hours, to redness. (M. Bruyere.) See *Cements and Mortars.*

PYRETHRINE. An acrid, resinous principle, extracted by *alcohol* and *ether* from the *bark* and *root* of pellitory of Spain, (*anthemis pyrethrum,*—Linn.) It is also soluble in acetic acid.

PYRITES. A term applied to several native metallic sulphurets. *Iron pyrites,* the best known of these, is a *bisulphuret* of that metal.

PYRO-. This term is applied to several acids that are obtained by the action of heat on other substances; as, *pyrogallic acid, pyroligneous do., &c.*

PYROACETIC ETHER. See *Acetone.*

PYROACETIC SPIRIT. See *Acetone.*

PYROBENZOLINE. See *Benzoline.*

PYROCITRIC ACID. Syn. *Citricic Acid.* Obtained by the action of heat on *citric acid.* It appears to be identical with the *aconitic* or *itaconic acid.*

PYROCONIA. Obtained by the action of heat on *hemlock.* (See *p.* 839.)

PYRODIGITALINE. A semi-solid, poisonous, empyreumatic oil, obtained by Dr. Morries, by the destructive distillation of the *dried leaves of foxglove.*

PYROGALLIC ACID. Syn. *Acidum Pyrogallicum,*—Lat. *Prep.* 1. From either *gallic* or *tannic acid* heated in a retort, by means of an oil bath, and steadily maintained at a temperature of about 420° Fahr. as long as crystals are formed in the neck of the retort, or in the receiver, both of which should be kept well cooled. If a much higher heat is employed the product consists chiefly of *metagallic acid.* Pure.

2. From *Aleppo galls,* in very coarse powder, heated in a dish covered with thin filtering paper pasted to its edge, and connected with a well-cooled receiver. Dr. Ure says, that the so-called *Chinese galls,* furnish, by dry distillation, a "very concentrated solution of pyrogallic acid, which, evaporated on the water bath, yields of brown crystalline pyrogallic acid nearly 15% of the weight of the galls."

3. (Dr. Stenhouse.) By sublimation from the *dry aqueous extract of nut-galls,* in a Mohr's apparatus, in the same way that benzoic acid is obtained from benzoin resin, (see *p.* 126,) observing the precautions referred to in No. 1, (above.) Nearly pure. The *product* is fully 10% of the weight of extract operated on.

Prop. Light crystals, which when perfectly pure are quite white; freely soluble in water, but the solution cannot be evaporated without turning black, and suffering decomposition; it strikes a rich blackish blue colour with the proto-salts of iron, and reduces those of the sesquioxide to the state of protoxide; when heated to from 460° to 480° Fahr. it is converted into *metagallic acid* and water. The nature of its compounds with the bases have not been determined.

Uses, &c. Pure pyrogallic acid is now very extensively employed in photography. A solution of the *crude acid* mixed with a little spirit is used to dye the hair, to which it imparts a fine brown colour, but has the disadvantage of also staining the skin when applied to it.

PYROGEN ACIDS. Those generated by heat.

PYROKINIC ACID. From *kinic acid* by heat.

PYROLA. See *Winter Green.*

PYROLIGNEOUS ACID. Syn. *Vinegar of Wood, Spirit of do., Smoking Liquor, Essence of Smoke; Acidum Pyrolignosum*—Lat. Impure acetic acid obtained by the destructive distillation of *wood* in close vessels. It comes over along with *tar, creasote*, and other liquid and gaseous matters. In this state it contains much empyreumatic matter in solution; but by separation from the tar, saturation with *slaked lime* or *chalk*, defecation, and evaporation, an *impure acetate* or *pyrolignate of lime* is obtained, which, after being gently heated, to destroy part of its empyreumatic matter, without injuring its acetic acid, is again dissolved and defecated, and then precipitated by a *solution of sulphate of soda*, when a solution of acetate of soda and a precipitate of sulphate of lime are formed by double decomposition. The solution is next evaporated to dryness, the dry mass (*pyrolignite of soda*) dissolved in *water*, and the new solution filtered, and recrystallized. The *crystals of acetate of soda*, obtained by the last process, yield nearly PURE ACETIC ACID by distillation along with *sulphuric acid*. See *Acetic Acid* and *Vinegar*.

PYROLIGNEOUS SPIRIT. See *Spirit* (Pyroxilic).

PYROLITHIC ACID. Syn. *Pyro-uric Acid*. From *uric acid concretions*, by heat; the silvery white crystalline plates (*pyrolithate of ammonia*) which sublime, are decomposed, in solution, by *solution of diacetate of lead*; the precipitate (*pyrolithate of lead*) is next washed, and decomposed with *sulphuretted hydrogen*; the supernatant liquor, on evaporation, yields *pyrolithic acid*, in acicular crystals.

PYROMALIC ACID. Syn. *Pyrosorbic Acid*. Obtained from *malic acid*, by heat.

PYROMECONIC ACID. From either *meconic acid* or *comenic acid*, by exposing it to a heat about that of 450° Fahr., when the new acid sublimes, and afterwards condenses in brilliant, colourless plates.

PYROMETER. An instrument to measure high degrees of heat. *Wedgewood's pyrometer*, the one best known, depends on the property which clay possesses of contracting when strongly heated. *Prof. Daniell's pyrometer* consists, essentially, of a small rod or bar of platinum, which acts in a precisely opposite manner to the preceding; viz., by its expansion.

PYROMUCIC ACID. Syn. *Pyromucous Acid*. A substance, resembling benzoic acid in appearance, obtained from *mucic acid*. It is soluble in water. See *Mucic Acid*.

PYROPHORUS. Syn. *Luft-Zunder*,—Germ. Any substance that inflames spontaneously when exposed to the air.

Prep. 1. *Neutral chromate of lead*, 6 parts; *sulphur*, 1 part; triturate them with *water* q. s. to form a paste, and make this into pellets; dry these perfectly by a gentle heat, then heat them in a closed tube until the *sulphur* is all driven off; lastly, transfer them to a stoppered phial.

2. (*Homberg's.*) From *alum* and *brown sugar*, equal parts; stir the mixture in an iron ladle over the fire until dry, then put it into an earthen or coated glass phial, and keep it at a red heat so long as flame is emitted; it must then be carefully stopped up and cooled.

3. (Dr. Hare.) *Lamp-black*, 3 parts; *burnt alum*, 4 parts; *carbonate of potash*, 8 parts; as the last.

4. (Gay Lussac.) From *sulphate of potassa*, 9 parts; *calcined lamp-black*, 5 parts; as No. 2.

5. (Göbel.) Heat *tartrate of lead* red-hot in a glass tube, and then hermetically seal it.

6. *Alum*, 3 parts; *wheat flour*, 1 part; as No. 2.

Obs. When the above are properly prepared, a little of the powder rapidly becomes very hot, and inflames on exposure to the air. The accession of the combustion is promoted by moisture, as a damp atmosphere or the breath. With the exception of the first and fifth "they owe their combustibility to the presence of sulphuret of potassium." (Gay Lussac.)

PYROPHOSPHORIC ACID. See *Bibasic Phosphoric Acid* (p. 967).

PYROSIS. Syn. *Black Water, Water Brash, Water-qualm*. An affection of the stomach, attended by a sensation of heat, and the eructation of a thin, sour liquid, often in considerable quantity, especially in the morning. It is a variety of *Heartburn* (which see).

PYROSORBIC ACID. See *Pyromalic Acid*.

PYROTARTARIC ACID. Obtained, along with *pyruvic acid*, by the destructive distillation of tartaric acid. See *Tartaric Acid* (and *below*).

PYROTECHNY. The art of making fire-works. The three principal materials employed in this art are, *charcoal, nitre*, and *sulphur*, along with *filings of iron, steel, copper*, or *zinc*, or with *resin, camphor, lycopodium*, or other substances, to impart colour, or to modify the effect, or the duration of the combustion. GUNPOWDER is used "either in *grain, half-crushed*, or *finely ground*, for different purposes. The longer the *iron filings* are, the brighter red and white spots they give; those being preferred which are made with a coarse file, and quite free from rust. *Steel filings* and *cast-iron borings* contain carbon, and afford a more brilliant fire, with wavy radiations. *Copper filings* give a *greenish* tint to flame; those of *zinc*, a fine *blue colour;* the *sulphuret of antimony* gives a less greenish blue than zinc, but with much smoke; *amber* affords a *yellow fire*, as well as *colophony* (resin), and *common salt;* but the last must be very dry. *Lamp-black* produces a very *red colour* with gunpowder, and a *pink one* with nitre in excess; it serves for making golden showers." When this substance is lightly mixed with gunpowder and put into cases, it throws out small stars resembling the rowel of a spur; this composition has hence been called SPUR FIRE. "The *yellow sand*, or *glistening mica*, communicates to fire-works *golden radiations. Verdigris* imparts a *pale green; sulphate of copper* and *sal ammoniac* give a *palm-tree green. Camphor* yields a very *white flame* and aromatic fumes, which masks the bad smell of other substances. *Benzoin* and *storax* are also used on account of their agreeable odour. *Lycopodium* burns with a *rose colour* and a magnificent flame; but it is principally employed in theatres to represent lightning, or to charge the torch of a fury." (Ure.) See *Fires* (Coloured), *Gunpowder, Rockets, Stars*, &c.

PYROTHONIDE. See *Paper Oil* (p. 839).

PYRO-URIC ACID. See *Pyrolithic Acid.*

PYROXANTHINE. Syn. *Eblanine*,—Scanlan; *Pyroxiline*,—Ure. An orange-red, crystalline substance, obtained by Scanlan from *raw pyroxilic spirit*, by adding *liquor of potassa*, pressing the precipitate, washing it with *cold alcohol* of the sp. gr. 0·840 and crystallizing from *boiling alcohol.* With oil of vitriol it gives a rich crimson, and with hydrochloric acid a deep purple colour. "Its alcoholic or turpentine solution imparts a permanent yellow dye to vegetable and animal matter."

PYROXYLIC SPIRIT. See *Spirit* (Pyroxylic).

PYROXYLINE. Syn. *Fulminating Cotton, Gun do., Pyroxyle, Pyroxylon, Nitrate of Lignine; Hyponitrite of Lignea*,—Porret. A highly inflammable and explosive compound, discovered by Schönbein. It is obtained by the action of nitric acid on cotton, in the presence of sulphuric acid.

Prep. 1. *Concentrated nitric acid* (sp. gr. 1·500), and *concentrated sulphuric acid* (sp. gr. 1·845), are mixed together in about equal measures; when the mixture has become cold, it is poured into a *glass* or *wedgwood-ware mortar* or *basin*, and *clean, dry carded cotton*, in as loose a state as practicable, is immersed in it for 4 or 5 minutes, the action of the liquid being promoted by incessant stirring with a glass rod; the acid is next poured off, and the cotton, after being squeezed as dry as possible, by means of the *glass stirrer*, or between two plates of glass, is thrown into a large quantity of *clean soft water*, and again squeezed to free it from superfluous moisture; it is then washed in a *stream* of *pure water* until it becomes *perfectly free from acid*, and is, lastly, carefully dried by the heat of hot water or steam, at a temperature not higher than about 180° Fahr. The *product* is *pure pyroxyline.*

2. (Schönbein.) *Nitric acid* (1·45 to 1·50), 1 part; *sulphuric acid* (1·85), 3 parts; (both by volume;) proceed as above, but, after the cotton has been squeezed from the acid, allow it to remain in a covered vessel for an hour *before* washing it; and *after* washing it, dip it into a *solution* of *carbonate of potassa*, 1 *oz.*, in *pure water*, 1 gall., then squeeze, and partially dry it; next dip it into a *weak solution of nitre*, and dry it in a room heated by hot air or steam to about 150° Fahr. (See *Patent Specif.*)

3. (Bulletin de St. Pétersbourg.)—*a.* Take of *powdered nitre*, 20 parts; *sulphuric acid* (1·830 to 1·835), 31 parts; dissolve in a glass vessel, and whilst the solution is still warm (122° Fahr.), add of *dry carded cotton*, 1 part, and employ agitation until this last is well saturated; then cover over the vessel with a *plate of glass*, and let it stand, for 24 hours, at a temperature of about 86° Fahr.; next well wash the cotton, as above, first with *cold*, and afterwards with *boiling water*, aud dry it carefully at a very low temperature.

b. From *sulphuric acid* (containing 3 equiv. of water), 13 parts; *nitric acid* (monohydrated), 12 parts; *carded cotton*, 1 part; the immersion being limited to one hour at a temperature of from 104° to 122° Fahr. (See *Pharm. Journ.*, vol. xiii, No. 2.)

Prop., &c. Pyroxyline explodes, with a very sudden flash, and the development of very little heat, without either smoke or residue, at a temperature of about 300° Fahr. Its power is fully four times that of the best gunpowder. It is soluble in ether, forming a glutinous solution which is used in surgery under the name of *collodion*, and is also extensively used in photography. It is *distinguished from xyloidine*, with which it was formerly confounded, by the mode of its combustion, and being insoluble, when quite pure, in ether containing a little alcohol. That prepared by the formula 3, *a*, (above,) is, however, soluble in a mixture of 7 parts of ether and 1 part of alcohol; whilst the product of 3, *b*, if prepared by 2 hours' digestion, instead of 1, is said to be even soluble in absolute alcohol. As usually prepared it becomes damp by exposure to the atmosphere.

Obs. The *gun cotton* of *commerce*, prepared with oil of vitriol and nitre, or with any but the most concentrated acids, is not *pure pyroxyline*, but a mixture of that substance with another compound to which the name of *cotton xyloidine* has been given by Dr. Gladstone. The former is insoluble in ether; the latter, freely soluble in that menstruum. This accounts for the different degrees of solubility possessed by pyroxyline, as prepared by different processes and makers. For the manufacture of collodion it is best used in the recently prepared, and scarcely dry state, as it is then much more soluble than when perfectly dry; a condition, however, which can be afterwards reproduced by dipping it into distilled water, and submitting it to strong pressure, to remove superfluous moisture.

When first gun cotton became known, it was thought likely that it would soon supersede the use of common gunpowder; but from the extreme suddenness of its explosion it is apt to burst the gun, or to only partly explode, a considerable portion of the charge being blown out of the piece in an unaltered state. The last inconvenience we have found to be nearly always the case with small-arms when hastily loaded with gun cotton in the common state; and, hence, after experiments, extending over some months, at the time of the first introduction of this substance to this country, we became convinced, and publicly stated our opinion, that it would never supersede gunpowder for general purposes. As yet, this assertion has not been disproved. The product of Schönbein's formula is rather less objectionable on this point than that prepared in any other manner.

The proportions of the two acids (see *above*) ordered by different authorities, vary so greatly, that extreme nicety in that respect would not appear to be essential to success. A mixture of 2 parts of *nitric acid* with 1 part of *sulphuric acid*, has been highly recommended by some; whilst the proportions ordered in the specification of Schönbein give a vast preponderance to the sulphuric acid. Immersion of the *cotton* in highly *concentrated nitric acid* (sp. gr. 1·50 to 1·52) also produces a highly explosive pyroxyline, but is more expensive, and less convenient in practice than the other formulæ. On the *large scale*, the principal object is to reduce the quantity of nitric acid as low as possible to produce the necessary results.

Gun cotton may be dried at 212° Fahr., with care, without suffering decomposition; but at a few degrees above this temperature it becomes brown and disintegrated, and is then explosive at a much lower temperature than previously, and is subject to spontaneous decomposition, if not spontaneous explosion. See *Collodion* and *Xyloidine.*

PYRUVIC ACID. A compound, resembling acetic acid, discovered by Berzelius among the products of the destructive distillation of *racemic acid* and *tartaric acid.*

QUACK MEDICINES. See *Patent Medicines*, *Ointments*, *Pills. &c.*

QUADRI-. See *Nomenclature.*

QUAIL. The *tetrao coturnix* (Linn.), a gallinaceous bird, allied to the partridge, but of smaller size. Its flesh is highly esteemed by epicures. It is imported from Turkey, preserved in oil; and from Italy, potted with clarified butter.

QUARTAN. See *Ague.*

QUARTATION. The practice, among assayers, of alloying 1 part of *gold* with 3 parts of *silver*, before submitting it to the operation of "*parting;*" in order that its particles may be too far separated to protect the copper, lead, palladium, silver, or other metals with which it is contaminated, from the solvent action of the *nitric* or *sulphuric acid*, as the case may be. See *Assaying.*

QUARTZ. Pure native silica. It is an essential constituent of granite and many other rocks. Its crystalline, transparent varieties are known as *Rock crystal.* See *Glass*, *Powders*, *&c.*

QUASS. Syn. *Posca Venalis*, — Lat. *Prep.* Mix *rye-flour* and *warm water* together, and keep the mixture by the fireside until it has turned sour. *Used* as vinegar in Russia.

QUASSIA. Syn. *Quassia*,—Ph. L. E. & D. The "*wood* of *picræna* (quassia) *excelsa*, Lindl." (Ph. L.), or *Jamaica quassia;* and also of the "*quassia amara*, Linn." (Ph. E.) It is characterised by its intense bitterness. It is reputed tonic and stomachic, assisting digestion, and giving tone and vigour to the system. Its name was given to it by Linnæus, in honour of a negro slave who had long employed it as a remedy for the malignant endemic fevers of Surinam. When sliced, it forms the "*quassia chips*" of the shops. It is generally taken in the form of *infusion.* This last, sweetened with sugar, forms a safe and effective poison for flies. *Dose.* (In powder) 10 to 20 gr. See *Infusions.*

Roasted Quassia, reduced to powder, is largely employed, instead of hops, to embitter porter; and the unroasted powder is used for the same purpose in the manufacture of the bitter varieties of ale.

QUASSINE. Syn. *Quassite, Quassina.* A peculiar bitter principle, obtained by evaporating *tincture of quassia.* In this state it is a brownish-yellow, semi-transparent, amorphous mass; but by purification it assumes the form of small, opaque, white, prismatic crystals, which are freely soluble in alcohol, less so in ether, and in not less than 200 parts of cold water.

QUEEN'S BLUE. See *p.* 146.

QUEEN'S METAL. A species of pewter used for *teapots, &c.*, made by fusing under charcoal a *mixture* of *tin*, 9 parts; and *antimony, bismuth*, and *lead*, of each, 1 part; or, *tin*, 100 parts; *antimony*, 8 parts; *copper*, 4 parts; *bismuth*, 1 part. See *Britannia Metal* and *Pewter.*

QUEEN'S YELLOW. Yellow subsulphate of mercury.

QUERCITANNIC ACID. See *Tannic Acid.*

QUERCITRINE. The yellow colouring principle of *quercitron bark.* It is soluble in alcohol, but only sparingly so in ether and water. It is crystallizable, forming pale yellow, micaceous scales.

QUERCITRON. The *bark* of *quercus nigra* or *tinctoria*, a species of oak indigenous in North America. With alum mordants it yields a very permanent yellow dye.

QUICKSILVER. See *Mercury.*

QUILLS. *Prep.* 1. The *quills* or *wing-feathers* of the goose are separately plunged, for a few seconds, into *hot ashes, cinders*, or *sand*, of a temperature about equal to that of boiling water, after which they are scraped with a blunt knife, strongly rubbed with a piece of *flannel* or *woollen cloth*, and gently "stoved;" they are, lastly, tied up in bundles by women or children. A *yellow tinge* is often given to them by dipping them for a short time into *dilute hydrochloric* or *nitric acid*, or into an *infusion of turmeric.*

2. Suspend the *quills* in a copper over *water* sufficiently high to nearly touch the nibs; then close it steam tight, and apply three or four hours' hard boiling; next, withdraw the *quills*, and dry them, and in 24 hours cut the nibs and draw out the pith; lastly, rub them with a piece of cloth, and expose them to a moderate heat in an oven or stove. Quills prepared in this way are as hard as bone, without being brittle, and nearly as transparent as glass. *Crow quills* and *swan quills* may be cured in the same manner.

QUINA. See *Quinine.*

QUINATES. See *Kinic Acid.*

QUINCE. Syn. *Cydonia*,—Lat. The *fruit* of *cydonia vulgaris* (pyrus cydonia, —*Linn.*), or common *quince tree.* Its flavour in the raw state is austere, but it forms an excellent marmalade (*quince marmalade, quiddany; cydonium, mira cydonarium*), and its juice yields an agreeable and wholesome wine. The *seed* or *pips* (*cydoniæ semina; cydonium*, — Ph. L.) abound in a species of gummy matter (*cydonine*), which forms a mucilage with water, and possesses the advantage of not being affected by the salts of iron or alcohol. See *Decoctions* and *Jellies.*

QUINIDINE. Syn. *Quinidia, Quinidina, Quinidinum.* An alkaloid discovered by MM. Henry & Delondre in quinoidine, or amorphous quinine, of which it constitutes from 50 to 60%. It is the *β quina* of M. J. Van Heijningen.

Prep. Saturate *purified quonoidine* with *dilute sulphuric acid*, then add *caustic potassa* or *ammonia*, in slight excess, and afterwards agitate the mixture with *ether* or *benzole;* as soon as the ethereal solution separates, decant it, and distil off the ether; lastly, further purify the residuum by any of the common methods adopted for quinine.

Prop., *&c.* These, together with the means of *distinguishing* it *from quinine*, are fully noticed below. Another marked dissimilarity, is its not striking a green colour when treated with chlorine followed by ammonia, as that alkaloid does. Its *medicinal properties* are said to resemble those of quinine, in character, but not in degree; its powers being comparatively feeble. It is contained in nearly all the ordinary disulphate of quinine of the shops. This contamination generally arises from that article being carelessly made; but, occasionally, it occurs as a wilful adulteration. *Sulphate of quinidine* is now often employed as a substitute, and is even sold for disulphate of quinine, the inducement being its apparent cheapness.

According to M. Roder, *quinidine* may be reduced to the state of ordinary *crystallizable quinine*, by means of protochloride of tin. If true, this would realise the conjectures of Liebig on the nature of this substance, now long since expressed.

QUININE. Syn. *Quina, Quinia, Quinina; Chinine, Quinium, Quininum, &c.*,—Obs. *or* Err. A valuable medicinal alkaloid, discovered by MM. Pelletier & Caventou, in cinchona bark. It is found in the greatest quantity in *yellow* or *Calisaya bark* (cinchona cordifolia *or* flava); just as *cinchonine* forms the principal alkaloid in *pale bark* (cinchona condaminea, lancifolia, *or* pallida). *Red bark* (cinchona oblongifolia *or* rubra) contains both alkaloids.

Prep. 1. By precipitating a *solution of sulphate*, or *disulphate of quinia* with *liquor of ammonia* or of *potassa*, carefully avoiding excess, and washing and drying the precipitate. By solution in alcohol, sp. gr. 0·815, and spontaneous evaporation, it may be procured in crystals. Crystals may also be obtained from "its solution in hot water with a little ammonia." (Liebig.)

2. (*Direct.*) By adding *hydrate of lime*, in slight excess, to a *strong decoction of the ground bark* made with *water* acidulated with *sulphuric acid*, washing the precipitate which ensues, and boiling it in *alcohol;* the solution, filtered while hot, deposits the *alkaloid* on cooling.

Prop., &c. Quinia, when prepared by precipitation, is an amorphous, white powder, but when this precipitate is left in the liquor, it assumes, after some time, the appearance of aggregated crystalline needles; when slowly crystallized from its solution these needles are remarkably fine, and of a pearly or silky lustre. It is freely soluble in rectified spirit, and in ether and liquor of ammonia, but is only sparingly soluble in water, even when boiling; both the fixed and volatile oils dissolve it with the aid of heat, more especially when it has been rendered anhydrous, or is presented to them under the form of an ethereal solution. It fuses by a gentle heat, without decomposition; forms crystallizable salts, which are only slightly soluble in water, unless it be acidulated, and, like the pure alkaloid, are extremely bitter, and possess much of the characteristic flavour of cinchona bark. It is precipitated by the alkalies and their carbonates, by tannic acid, and by most astringent substances.

Pur. See *Disulphate of Quinine* and *Quinometry.*

Tests. Quinia is recognised by—1. Its appearance under the microscope.—2. Its solubility in ether, and in pure ammonia water.—3. Its solubility in concentrated nitric acid, forming a colourless liquid which does not become yellowish until it is heated.—4. The solubility of itself and salts, when pure, in concentrated sulphuric acid forming colourless fluids "which do not acquire any coloration upon being heated to the point of incipient evaporation of the sulphuric acid, but which afterwards become yellow, and finally brown." (Fresenius.)—5. Its solubility in concentrated sulphuric acid to which some nitric acid has been added, forming a colourless, or, at the most, only a faintly yellowish liquid.—6. It is *wholly* destroyed by heat.

A *solution of quinia* in *acidulated water*, and *solutions of its salts*, exhibit the following reactions:—1. Ammonia, potassa, and the alkaline carbonates, give white, pulverulent precipitates, becoming crystalline after some time (see *above*), and which are soluble in ammonia in excess, and which when ether is added after the ammonia, and the whole is agitated, redissolve in the ether, whilst the clear liquid, on repose, presents two distinct layers.—2. Bicarbonate of soda (avoiding excess) gives a similar precipitate, both in acid and neutral solutions of quina, either at once, or after a short time. This precipitate is soluble in excess of the precipitant, and is again precipitated from the new solution upon protracted ebullition. "Vigorous stirring of the liquid promotes the separation of this precipitate." (Fresenius.) — 3. If recently prepared chlorine be added to it, and then ammonia, a (beautiful emerald) green colour is developed. (Ph. L.)—4. A concentrated solution of ferrocyanide of potassium being added, in excess, after the chlorine, instead of the ammonia, a dark-red colour is instantly produced, which, after some time, passes into green, especially when freely exposed to the light. "This reaction is characteristic of quinine." (Ure.)—5. If caustic potassa be used instead of ammonia (see *above*), the solution acquires a sulphur-yellow colour. "These reactions are restricted to this alkaloid." (Dr. Garrod.)

Quinia is *distinguished* from both *cinchonia* and *quinidia*, by its comparatively free solubility in ether; the last of these being very sparingly soluble, and the other wholly insoluble in that menstruum. The *presence of cinchonia* may also be positively determined by reference to the behaviour of that alkaloid, noticed at *page* 261. *Quinidine* is also distinguished from quinine by the different crystallization, greater specific gravity, and freer solubility of its salts in *cold* water. (An extremely elegant and highly sensitive method of testing for quinine and quinidine, by means of the microscope, &c., is described at considerable length, by Dr. Herapath, in the *Pharm. Journ.* for Nov., 1853.)

Estim. See *Quinometry.*

Uses, &c. Pure quinine or quinia is not used in medicine, but several of its salts are employed as remedies, on account of their great stimulant, tonic, and febrifuge powers. As a tonic in dyspeptic affections and for restoring strength and vigour to morbidly weakened habits, and as an antiperiodic or agent to counteract febrile action, it appears to be superior to all other remedies, provided no abnormal irritability of the mucous membranes, or of the circulatory organs, exists. It has been recently combined with *cod-liver oil* (see *p.* 1092), by which a compound medicine of the most valuable kind, possessing both alterative and tonic powers, has been produced. The *dose* of the *salts of quinine,* as a *tonic,* is ½ to 1 gr., twice or thrice daily; as an *antiperiodic,* 2 to 5 gr., or even more, every second or third hour, during the intervals of the paroxysms of ague, and of other intermittent or periodic affections; also in acute rheumatism. The *disulphate* is the salt generally used; they are all most effective when taken in solution.

The *salts of quinine* may be made by simply saturating the *dilute acids* with the *base,* and gently evaporating the solutions for crystals, or to dryness. Prince Lucien Bonaparte recommends *all these salts* to be prepared by the addition of a *strong alcoholic solution of quinia* to a *cold solution of the acid.* We have tried this method with success.

It has been recently asserted by Dr. Bell, of the Royal Infirmary, Manchester, that "*carbo-azotic acid* is a valuable and efficient substitute for quinine in intermittents." *This acid* may be "easily prepared from *carbolic acid* in any quantity" (Prof. Crace Calvert), and "from the *grass-tree* or *black-bay gum* of Australia, at 1*s.* per *lb.*, by treating it with *nitric acid.* (R. Warrington.)

QUININE (Acetate of). Syn. *Quinæ Acetas,*—Lat. *Prep.* (P. Cod.) Mix *quinia,* 2 parts, with *water,* 3 parts; heat the mixture, and add of *acetic acid,* q. s. to dissolve the alkaloid, and to render the solution slightly acid; lastly, decant or filter the solution whilst boiling hot, and set it aside to crystallize. The mother-water, on evaporation, will yield a second crop of the acetate.

Prop., &c. Satiny, acicular crystals, which are rather more soluble in water than those of the disulphate. *Dose.* ½ to 5 gr.

QUININE (Arseniate). Syn. *Quinæ Arsenias,*—Lat. *Prep.* (Bourières.) *Arsenic acid,* 1½ dr.; *quinia,* 5 dr.; *distilled water,* 6 fl. oz.; boil them together in a covered glass vessel until the alkaloid is dissolved, then set the solution aside to crystallize.

Uses, &c. Recommended by Dr. Neligan, and others, as being more powerfully antiperiodic than the other preparations of quinine. *Dose.* $\frac{1}{12}$ to ¼ gr., made into pills; in agues, neuralgia, &c.; also in cancer.

QUININE (Arsenite of). Syn. *Quinæ Arsenis,*—Lat. *Prep.* By adding an *alcoholic solution of quinia* to a *concentrated solution of arsenious acid,* avoiding excess; on heating the solution the precipitate is redissolved, and again deposited in the crystalline form as the liquid cools.

Uses, &c. As the last. A *diarsenite of quinine* (*quiniæ diarsenis*) is also formed, by dissolving in a hot solution of the arsenite, as much quinine as that already in it.

QUININE (Chloride of). See *p.* 1090.

QUININE (Citrate of). Syn. *Quinæ Citras,*—Lat. *Prep.* 1. By mixing a *hot solution of sulphate of quinine* with a like *solution of citrate of soda.*

2. From *quinia* and *citric acid,* as the acetate. Needle-shaped prisms. *Dose, &c.* As the sulphate or disulphate.

QUININE (Disulphate). See *Quinine* (Sulphates).

QUININE (Ferrocitrate of). Syn. *Quinæ Ferro-citras,*—Lat. See *Quinio-citrate of Iron.*

QUININE (Ferrocyanide of). Syn. *Cyanide of Iron and Quinine; Quinæ Ferroprussias, Quinæ Ferrocyanidum, Ferri Cyanidum cum Quinâ, Hydrocyano-ferras Quinicus,*—Lat. var. *Prep.* (P. Cod.) *Disulphate of quinine,* 100 parts; *ferrocyanide of potassium,* 31 parts; *distilled water,* 2500 parts; boil for a few minutes, and when cold separate the impure salt which floats as an oily mass on the surface, wash it with a little *cold water,* and dissolve it in *boiling alcohol;* the solution will deposit crystals as it cools.

Obs. This compound is said by some parties to be the most efficacious of all the salts of quinia. M. Pelouze asserts that it is a mere combination of the common sulphate with percyanide of iron. *Dose.* 1 to 6 gr.

QUININE (Ferrosulphate of). See *Quinine and Iron* (Sulphate of).

QUININE (Hydriodate of). Syn. *Quinæ Hydriodas, Q. Iodidum,*—Lat. *Prep.* 1. By adding, drop by drop, a concentrated *solution of iodide of potassium* to a *like solution of neutral sulphate of quinine,* and drying the precipitate in the shade; or, heat the liquid nearly to the boiling point, and allow it to crystallize.

2. (*Ioduretted,*—Bouchardat.) From an *acid solution of quinia* and a *solution of iodide of iron* containing a *slight excess of iodine,* as the last.

Obs. By solution in hot alcohol both the above may be obtained in crystalline scales. They are reputed alterative, tonic, and antiperiodic. *Dose.* 1 to 4 gr.; in obstinate intermittents, and in the scrofulous affections of debilitated subjects.

QUININE (Hydrochlorate of). Syn. *Chloride of Quinia, Muriate of Quinine; Quinæ Hydrochloras, Quiniæ Murias, Q. Iodidum, Chinium Hydrochloratum,*—Lat. *Prep.* 1. By neutralizing *dilute hydrochloric acid* with the *base,* as above.

2. (Ph. Bor.) *Chloride of barium,* 5 dr.; *boiling water,* 1 ℔; dissolve, add, gradually, of *sulphate of quinine,* 2 oz.; boil gently for a few minutes, filter the solution whilst hot, and set it aside that crystals may form.

3. (*Quinæ Murias,*—Ph. D.) Dissolve *chloride of barium,* 123 gr., in *distilled water,* 2 fl. oz.; add of *sulphate* (disulphate) *of quinine,* 1 oz., dissolved in *boiling water,* 1½ pint; mix, evaporate the solution to one half, filter, and again evaporate until spiculæ begin to appear; next allow the liquid to cool, collect the crystals, and dry them on bibulous paper. The mother-liquor, by further concentration and cooling, will yield an additional product.

Obs. Hydrochlorate of quinine occurs in snow-white groups of feathery crystals, of a mother-of-pearl lustre, which are more freely soluble than those of the disulphate.

QUININE (Kinate of). Syn. *Quinæ Kinas,*—Lat. *Prep.* As the other salts of quinine; also, by double decomposition, from the *residuary kinate of lime* of the manufacturers of sulphate of quinine.

QUININE (Lactate of). Syn. *Quinæ Lactas,*—Lat. *Prep.* As the *acetate* or *citrate.* By spontaneous evaporation fine crystals may be obtained. Said to agree better with dyspeptic patients than the other salts of quinine.

QUININE (Muriate of). See *above.*

QUININE (Nitrate of). Syn. *Quinæ Nitras,*—Lat. *Prep.* As the *hydrochlorate,* substituting *dilute nitric acid,* or *nitrate of baryta* (P. Cod.), for hydrochloric acid or chloride of barium.

QUININE (Phosphate of). Syn. *Quinæ Phosphas,*—Lat. As the *acetate.* Silky, needle-shaped crystals, with a pearly lustre. It has been highly recommended in intermittents, &c., associated with rickets, and stomach affections.

QUININE (Sulphate of). Syn. *Neutral Sulphate of Quinine, Soluble do.; Quinæ Sulphas, Q. S. Neutralis, Q. S. Solubilis,*—Lat. *Prep.* From *disulphate of quinine,* 1 oz.; dissolved, by the aid of heat, in *water,* ½ pint, previously acidulated with *dilute sulphuric acid,* 5 fl. dr.; the solution affords crystals on cooling, and more on evaporation.

Obs. This salt possesses the advantage of being soluble in about 10 parts of water at 60° Fahr.; but it is seldom used. It is the *bisulphate, supersulphate,* or *acid sulphate of quina* of Soubeiran, and other Continental chemists.

QUININE (Disulphate of). Syn. *Basic Sulphate of Quinine, Subsulphate of do.; Quinæ Disulphas,*—Ph. L. *Sulphate of Quinine, Quinæ Sulphas,*—Ph. E., D., & U. S.; & P. Cod. *Quininæ Sulphas,*—Ph. D. 1826. *Sulphate de Quinine,*—Fr. *Prep.* 1. (Ph. L. 1836.) Take of *yellow cinchona bark* (cinchona cordifolia), bruised, 7 ℔; *sulphuric acid,* 4¼ oz.; (diluted with) *water,* 6 gall.; boil them for 1 hour, and strain; repeat this a second time for 1 hour, with a *like quantity* of *acid* and *water,* and again strain; next boil the *bark* for 3 hours, in *water,* 8 gall., and strain; wash the residue with fresh quantities of *boiling distilled water;* to the *mixed decoctions* and *washings,* add *moist hydrated oxide of lead* to saturation, decant the supernatant fluid, and wash the sediment with *distilled water;* boil down the liquor for 15 minutes, and strain, then *precipitate* the *quina* with *liquor of ammonia,* and wash the precipitate (with *very cold water*) until nothing alkaline is perceptible; saturate what remains with *sulphuric acid,* ½ oz., diluted with *water,* q. s., digest with *animal charcoal,* 2 oz., and strain; lastly, the charcoal being well washed, evaporate the mixed liquors that crystals may form.

2. (Ph. E.) This process varies from the last one, in the *bark* (1 ℔) being first boiled in *water* (4 pints) along with *carbonate of soda* (4 oz.); the residuum being pressed, is moistened with *water,* and again pressed, and this operation is repeated a second and a third time; the object being to remove,

as much as possible, the acids, colouring matter, gum, and extractive, before proceeding to extract the alkaloid. *Carbonate of soda* is also used as the precipitant, instead of ammonia, and the *precipitate* is formed into a *sulphate* (disulphate) by being stirred with *boiling water*, 1 pint, to which *sulphuric acid*, 1 fl. scruple, or q. s., is subsequently added. The crystals, after digestion with *prepared animal charcoal*, 2 dr., are ordered to be dried at a heat not higher than 140° Fahr.—*Obs.* This is an excellent process. *Lime* (Stolze) and *caustic potassa* (Badollier & Scharlau) have been successfully employed for the same purpose as the carbonate of soda is used for by the Edinburgh College. The *methods* recently *patented* by Mr. Edward Herring, and by Dr. W. B. Herapath, are simply modifications of the above.

3. (Ph. D.) *Yellow bark*, 1 *lb.*, is macerated for 24 hours in *water*, 2 quarts, acidulated with *oil of vitriol*, 2 fl. dr.; and then boiled for half an hour, after which the fluid is decanted; this is repeated a second and a third time with *water*, 2 quarts, and *oil of vitriol*, 1 fl. dr.; the decanted (or strained) liquors are evaporated to a quart, and filtered, and *slacked lime*, 1 *oz.*, or q. s., added to the solution until it exhibits a decidedly alkaline reaction; the *precipitate* is next collected on a calico filter, and after having been washed with *cold water*, partially dried on porous bricks, and subjected to powerful pressure enveloped in blotting paper, is boiled for 20 minutes in *rectified spirit*, 1 pint, and the liquid, after subsidence, decanted; this is repeated a *second* and a *third* time with a fresh pint of *spirit*, and the residuum being well pressed, the mixed liquors are filtered, and the spirit removed by distillation; the brown viscid residuum is dissolved in *boiling water*, 16 fl. oz., boiled, and *dilute sulphuric acid*, ½ fl. oz., or q. s., added to render the solution neutral or only slightly acid; *animal charcoal*, ½ *oz.*, is next stirred in, the mixture boiled for about 5 minutes, filtered, and set aside to crystallize; the crystals are dried on blotting paper, by mere exposure to a dry atmosphere.—*Obs.* This process is a modification of that of M. Henry. When adopted on the *large scale*, either freshly slaked lime, or milk of lime is used, the resulting precipitate, after being drained on a filter, is submitted to powerful hydraulic pressure, and the tinctures formed by exhausting the dry cake, merely reduced by distillation to a syrupy consistence. The addition of the acid is also sometimes made to the *tincture*, and, at other times, to the *hot aqueous solution*, as above. The use of spirit of wine does not increase the expense above ¾*d.* to 1*d.* per oz., which is more than counterbalanced by the saving of time and the superiority of the product.

4. (*Hospital Sulphate*,—Mr. E. Herring.) The *crushed bark* is boiled in a *solution of caustic soda* or *potassa*, to extract colouring matter and gum; it is then pressed, washed with *cold water*, a second time boiled with a *solution of caustic alkali*, and again pressed, washed, and pressed; the *decoloured* and *purified bark* is next exhausted by coction with *acidulated water*, in the usual way, and the filtered mixed decoctions are precipitated with *carbonate of soda;* the *precipitated quinia* is then dissolved in *hot dilute sulphuric acid*, to saturation, when the "*hospital sulphate*" crystallizes out, as the solution cools; this is, lastly, washed with a little *cold water*, drained, and dried. —The advantage of this process is the non-use of animal charcoal as a bleacher, and the consequent less cost of the product. In the preparation of his *white sulphate* Mr. Herring uses *benzole* as a solvent, instead of alcohol. *Patent* dated July 28th, 1853.

Prop. When pure it forms very light, delicate, flexible, white needles, which are efflorescent, inodorous, and intensely bitter; it is soluble in 740 parts of water at 60°, and in 30 parts at 212° Fahr.; it takes about 80 parts of cold rectified spirit for its solution, but is freely soluble in boiling alcohol, and in acidulated water; it melts at 240° Fahr., and is charred and destroyed at a heat below that of redness. The crystals contain 76·1% of quinia, 8·7% of sulphuric acid, and 15·2% of water; of the last, they lose about 3-4ths by exposure to dry air, and nearly the whole when kept in a state of fusion for some time.

Pur. This may be inferred from the form of its crystallization. "It is entirely soluble in water (hot), and more readily so when an acid is present. Precipitated by ammonia, the residuary liquid, after evaporation, should not taste of sugar. By a gentle heat it loses 8 or 10% of water. It is wholly consumed by heat. If chlorine be first added, and then ammonia, it becomes green." (Ph. L. 1836.) "On adding chloride of barium to 100 gr. of this salt dissolved in water mixed with hydrochloric acid, 26·6 gr. of sulphate of baryta, dried at a red heat, are prepared." (Ph. L. 1851.) "A solution of 10 gr. in 1 fl. oz. of distilled water, and 2 or 3 drops of sulphuric acid, if decomposed by a solution of ½ oz. of carbonate of soda, in two waters, and heated until the precipitate shrinks and fuses, yields on cooling a solid mass, which, when dry, weighs 7·4 gr., and when reduced to powder, dissolves entirely in a solution of oxalic acid." (Ph. E.)

Adult. Disulphate of quinine is often adulterated with *starch*, *magnesia*, *gum*, *sugar*, *cinchonine*, *quinidine*, &c. The *first three* remain undissolved when the salt is digested in spirit; the *fourth* is dissolved out by cold water; the *fifth* may be detected by its total insolubility in ether; or, by precipitating the quinine by liquor of potassa, and dissolving the precipitate in boiling alcohol; cinchona crystallizes out as the solution cools, but the quinine remains in the mother-liquor; and the *last*, by the greater solubility and sp. gr. of the salt, &c., as noticed at *page* 1089. If the sample disengages ammoniacal fumes when treated with liquor of potassa, it contains *sal ammoniac.* The *presence of most foreign organic substances* is also shown by the sample being turned brown, and being soon charred when treated with a drop of concentrated sulphuric acid. If it turn red it contains *salicine*, a substance which is now frequently used to adulterate disulphate of quinine. The pure disulphate is not discoloured by this reagent.

Uses, &c. The disulphate is more extensively employed than any of the other salts of quinine, and, indeed, to almost the exclusion of them. It is the article intended to be used whenever *sulphate of quinine*, or even *quinine*, is ordered for medicinal purposes, unless the name is qualified by some other term. It is a most valuable *stomachic*, in doses of $\frac{1}{4}$ to 1 gr.; as a *tonic*, 1 to 3 gr.; and as a *febrifuge*, 2 to 20 gr.

QUININE (Sulpho-tartrate of). Syn. *Quinæ Sulpho-tartras*,—Lat. *Prep.* From *disulphate of quinine*, 4 parts; *tartaric acid*, 5 parts; *distilled water*, 20 parts; mix, gently evaporate to dryness, and powder the residuum.

QUININE (Tannate of). Syn. *Quinæ Tannas*,—Lat. *Prep.* Dissolve *disulphate of quinine* in *slightly acidulated water*, and add a *solution of tannic acid* as long as a precipitate forms; wash this with a little *cold water*, and dry it. The Ph. Græca orders infusion of galls to be used as the precipitant. In intermittent neuralgia.

QUININE (Tartrate of). Syn. *Quinæ Tartras*,—Lat. *Prep.* (P. Cod.) From *tartaric acid* and *quinia*, as the *acetate*.

QUININE (Valerianate of). Syn. *Quinæ Valerianas*,—Ph. D. *Prep.* 1. As the *acetate* or *citrate*.

2. (Ph. D.) *Valerianate of soda*, 124 gr.; *distilled water*, 2 fl. oz.; dissolve; also dissolve *muriate of quina*, 7 *dr.*, in *distilled water*, 14 fl. oz.; next heat each solution to 120° (*not higher*), mix them, and set the vessel aside for 24 hours; lastly, press the mass of crystals thus obtained, and dry them, without the application of artificial heat.

Prop., &c. Silky needles and prisms; its solution suffers decomposition when heated much above 120° Fahr. It is powerfully antispasmodic, antiperiodic, and nervine. *Dose.* $\frac{1}{2}$ gr., every two hours, or 1 to 3 gr., twice or thrice daily; in epilepsy, hemicrania, hysteria, neuralgia, and other nervous affections.

QUININE (Amorphous). See *Quinoidine.*

QUININE AND COD-LIVER OIL. Syn. *Cod-liver Oil with Quinine*, *Quiniaretted Cod-liver Oil; Oleum Morrhuæ cum Quinâ*, *Oleum Jecoris Aselli cum Quinâ*,—Lat. This valuable medicine is a solution of pure anhydrous quinia in pure cod-liver oil.

Prep. 1. *Pure quinia* (preferably recently precipitated) is fused in a *glass* or *porcelain capsule* by this heat of an oil or sand bath, carefully applied, by which it assumes a brown colour, and the appearance of a resin; it is then allowed to cool out of contact with the air, after which it is reduced to powder in a dry mortar, and added to pure *pale Newfoundland cod-liver oil*, *gently* heated in a closed glass vessel over a water bath; the solution of the alkaloid is promoted by constant agitation, and, when complete, the vessel, still corked, is set aside in a dark situation to cool; when the *quiniaretted oil* is quite cold, it is put into bottles, in the usual manner, and preserved, as much as possible, from the light and air.

2. The *anhydrous quinia* is dissolved in a little *anhydrous ether* before adding it to the *oil*, which in this case need not be heated, as the union is effected by simple agitation; should this not take place, it may be gently warmed for a few minutes.

3. The *anhydrous quinia* is dissolved in *anhydrous alcohol*, and after being added to the *oil*, the whole is gently heated, in an open vessel, by the heat of a water bath, until the *alcohol* is expelled; agitation, &c., being had recourse to, as in No. 1.

Prop., &c. The above preparation resembles ordinary cod-liver oil, except in having a pale yellowish colour, and a slightly bitter taste, similar to that of cinchona bark. It possesses all the properties of cod-liver oil combined with those peculiar to quinine, by which the tonic, stomachic, and antiperiodic qualities of the latter are associated, in one remedy, with the genial, supporting, and alterative action of the other. It is now extensively used both in private practice and in the hospitals, with almost general success, in all those cases in which cod-liver oil is commonly administered; more especially when these are associated with extreme debility, loss of appetite, or dyspeptic affections. It is found that the stomach will bear this preparation when the simple cod-liver oil is rejected by it. It has also the advantage of being effective in smaller doses. The *common strength* of this remedy is 2 gr. of *quina* per *oz.* That prepared by Messrs. Drew & Co., the well-known wholesale druggists, of 91, Blackman Street, Borough, and which is the one now principally used in the hospitals, is much stronger than this; and we may also add, from personal inspection, that it is compounded of the choicest importations of pure Newfoundland cod-liver and pure quinine, without the addition of any foreign ingredient.

QUININE AND IRON (Citrate of). See *Quinio-citrate of Iron.*

QUININE AND IRON (Iodide of). Syn. *Quinæ et Ferri Iodidum,*—Lat. *Prep.* From *protiodide of iron,* 2 parts; *hydriodate of quinia,* 1 part; *rectified spirit,* 12 parts; heat them together, and either evaporate to dryness, or crystallize by refrigeration. A powder, or crystalline scales.

QUININE AND IRON (Sulphate of). Syn. *Ferro-sulphate of Quinine; Quinæ Ferro-sulphas, Quinæ et Ferri Sulphas,*—Lat. *Prep.* From *solutions* of the *sulphates of iron* and *quinine,* in atomic proportions, mixed whilst hot, and the crystals which form as the liquid cools, carefully dried, and preserved from the air.

QUININE AND MERCURY (Chloride of). See *page* 781.

QUINOIDINE. Syn. *Amorphous Quinine, Chinoidine; Quina Amorpha, Quina Informis, Quinoidia, Quinoidina, Quinoidinum, Chinoideum,*—Lat. This is obtained from the refuse or mother-liquors of the quinine-manufacturers, and appears to consist chiefly of quinidine associated with some cinchonine, a little crystallizable quinine, and vegetable extractive matter altered by heat.

Prep. 1. The dark-coloured *mother-liquor* remaining from the crystallization of *disulphate of quinine* is precipitated with a *carbonate of soda;* the precipitate is purified by dissolving it in *dilute sulphuric acid,* passing *sulphuretted hydrogen* through the solution, and after a short ebullition, and filtration, re-precipitating it with *carbonate of soda;* the last precipitate is then washed, dried, and reduced to powder.

2. (Liebig.) *Crude quinoidine,* precipitated from the mother-liquor by a *caustic alkali,* is exhausted with *ether,* which after defecation is distilled off, leaving the *purified quinoidine* behind. This process has been patented in England by Mr. Bullock.

Prop., &c. In its crude form quinoidine somewhat resembles aloes; in its purest state it is a yellowish-brown resin-like mass, freely soluble in alcohol and ether, but nearly insoluble in water; with the acids it forms dark-coloured, uncrystallizable salts. It is powerfully febrifuge, but less so than either quinidine or quinine, although it is identical in chemical composition with both of them. "It evidently bears to quinine the same relation that uncrystallizable syrup does to ordinary sugar, being produced from quinine by the heat employed in the preparation." The *amorphous quina* prepared by Liebig's or Bullock's process consists chiefly of *quinidine.*

QUINOLEINE. See *Chinoleine.*

QUINOMETRY. The art of estimating the quantity of quinine in cinchona bark, and in the commercial salts of this alkaloid.

Proc. 1. *For Bark.—a.* (Ph. E.) A filtered decoction of 100 gr. of *bark,* in *distilled water,* 2 fl. oz., is precipitated with 1 fl. dr., or q. s. of a *concentrated solution of carbonate of soda;* the precipitate, after being heated in the fluid so as to become a fused mass, and having again become cold, is dried, and weighed. "It should be 2 gr., or more, and entirely dissolve in a solution of oxalic acid." To render the result strictly accurate, the *product* should be exhausted with ether, and the mixed solutions evaporated.

b. (M. Rebourdain.) 100 gr. of the *bark* (coarsely powdered) are exhausted with *acidulated water,* and the *filtered solution* rendered alkaline with *liquor of potassa;* it is next shaken with about 1-3rd of its volume of *chloroform,* and then allowed to repose for a short time; the chloroform holding the alkaloid in solution sinks to the bottom of the vessel in a distinct stratum, from which the supernatant liquid is separated by decantation; the chloroformic solution, either at once, or after being washed with a *little cold water,* is allowed to evaporate; the residuum, when weighed, gives the *per centage* richness of the sample.—*Obs.* A like result may be obtained with *ether,* instead of chloroform; in which case the solution of quinine will form the *upper* stratum.

2. *For the Salts.* The above methods, as well as several others which have been devised for the purpose, may also be applied to the *salts of quinine;* but, unfortunately,

they are inapplicable when great accuracy is required, owing to the non-recognition of the presence of *quinidine*, as such, and which consequently goes to swell the apparent richness of the sample in quinine. The following ingenious method, invented by Dr. Ure, not merely enables us to detect the presence of *cinchonine* and *quinidine* in commercial samples of the *salts of quinine*, but, with some trifling modifications, it also enables us to determine the quantity of each of these alkaloids present in any sample:—"10 gr. of the *salt* to be examined" (the disulphate is here more especially referred to) "is put into a *strong test-tube*, furnished with a tight-fitting cork; to this are to be added 10 drops of *dilute sulphuric acid* (1 acid and 5 water), with 15 drops of *water*, and a gentle heat applied to accelerate solution. This having been effected, and the solution *entirely cooled*, 60 drops of *officinal sulphuric ether* with 20 drops of *spirits of ammonia* (? liquor of ammonia) must be added, and the whole well shaken while the top is closed by the thumb. The tube is then to be closely stopped, and shaken *gently* from time to time, so that the bubbles of air may readily enter the layer of ether. If the salt be *free* from CINCHONINE and QUINIDINE, or contain the *latter* in no *greater proportion* than 10%, it will be *completely dissolved;* while on the surface, where contact of the two layers of clear fluid takes place, the MECHANICAL IMPURITIES only will be separated. After some time the layer of ether becomes hard and gelatinous, and no further observation is possible."

"From the above statement respecting the solubility of quinidine in ether, it appears that the 10 gr. of the salt examined may contain 1 gr. of *quinidine*, and still a complete solution with ether and ammonia may follow; but in this case the QUINIDINE will shortly begin to crystallize in a layer of ether. The *least trace of quinidine* may be yet more definitively detected by employing, instead of the ordinary ether, some *ether previously saturated with quinidine*, by which means all of the QUINIDINE contained in the quinine examined, must remain undissolved. It is particularly requisite, in performing this last experiment, to observe, (*immediately*) after the shaking, whether *all* has dissolved; for owing to the great tendency of quinidine to crystallization, it may become again separated in a crystalline form, and be a source of error."

"If more than 1-10th of *quinidine* or (any) *cinchonine* be present, there will be found an insoluble precipitate at the limits of the two layers of fluids. If this be QUINIDINE, it will be *dissolved* on the addition of proportionately more ether, while CINCHONINE will remain unaffected."

QUINOVINE. Syn. *Cinchovine, Quinovia.* An alkaloid obtained from the *bark* of *quina ovata*, by a like process to that by which quinine is obtained from yellow bark.

QUINQUINA. See *Cinchona.*

QUINSEY. See *Throat Affections.*

QUINTESSENCE. Syn. *Quinta Essentia,*—Lat. A term invented by the alchemists to represent a concentrated alcoholic solution of the active principles of organic bodies. It is still occasionally employed in perfumery and the culinary art. See *Essences, Tinctures, &c.*

QUOTIDIAN. See *Ague.*

RABBIT. The *lepus cuniculus* (Linn.) of the Cuvian Order *rodentia.* The *domestic* rabbit, when young, is a light and wholesome article of food, approaching in delicacy to the common barn-door fowl; but has less flavour than the wild animal. The *fat* is among the "*Simples*" of the Ph. L. 1618. Its *hair* and *skin* are made into *cheap furs, gloves, hats, &c.*

RACAHOUT. Syn. *Racahout des Arabes.* This is said to be farina prepared from the acorns of *quercus ballota* or *Barbary oak*, disguised with a little flavouring. The following is recommended as an imitation:—*Roasted cacao* or *chocolate nuts*, 4 *oz.; tapioca* and *potato farina*, of each, 6 *oz.; white sugar*, slightly flavoured with vanilla, ½ *lb.* Very nutritious. *Used* as arrow-root.

RACEMIC ACID. Syn. *Paratartaric Acid, Thannic do., Uvic do., Vinic do.* This compound was discovered by Kestner, in 1820, replacing tartaric acid in the grape-juice of the Department of the Vosges. For upwards of 30 years it was regarded as a peculiar product of the grapes of that district and of the Upper Rhine; but it has since been found in the mother-liquors of the manufacturers of tartaric acid residing in other localities. The subject, at different times, has occupied the attention of the leading chemists of Europe. In 1850, the Society of Pharmacy of Paris offered a reward for its investigation; and during the year of the Great Exhibition (1851) it was brought into the market, for the first time, by Mr. Simpson, the well-known manufacturing chemist, of Kennington.

Racemic acid may be distinguished from *tartaric acid* as follows:—

TARTARIC ACID *dissolves* in less than its own weight of cold water;—a *ray* of *polarized light* in passing through its solution turns to the *right;*—its solution added to *lime water*, or to a *dilute solution of chloride of calcium*, causes *no* immediate precipitate;—it *furnishes* ample *indications of electricity* when one of its crystals, held by a pair of platinum tongs, and gently heated in the flame of a spirit lamp, is brought into contact with the plate of an electroscope.

RACEMIC ACID takes *fully* 5 parts of *cold water* for solution;—*polarized light* is *not* altered by it;—with *lime water, &c.*, it *gives* an *immediate* precipitate;—it is *not* pyro-electric.

In 1849, Pasteur discovered that racemic acid is a compound of two other acids, in equal proportions, one polarizing the rays of light to the *right*, and hence named "*dextroracemic acid;*" the other exhibiting *left-handed* polarization, and called "*levoracemic acid.*" By adding a *neutral solution of racemate of soda* to a like *solution of racemate of ammonia*, and allowing the solution to crystallize *very slowly*, two varieties of polyhedrous crystals are obtained, and may be distinguished by their form; namely, as the image and the reflection of the image, or as *right-handed* and *left-handed*, like an ordinary daguerreotype and its subject. These crystals are separated by careful inspection, and on being separately converted into *lead* or *barytic salts*, and decomposition by sulphuric acid, yield crystalline acids which are identical in every respect except their deportment with polarized light, their degree of solubility in cold water, and the peculiarity of their crystals, just referred to as occurring in their salts. The crystals of both are strongly pyro-electric.

Racemic acid and *tartaric acid*, as well as their salts (*racemates* and *tartrates*), have precisely the same chemical composition, and yield, when heated, precisely the same products; viz., *paratartralic*, *paratartrelic*, and *anhydrous racemic* or *tartaric acids*.

"It is very probable, not to say certain, that *dextroracemic acid* is nothing but *common tartaric acid.*" (Fownes.) See *Tartaric Acid.*

RACKING. See *Cider* and *Wines.*

RADICAL. The *base* or distinguishing part of a compound. It may be either *simple* or *compound.* Thus, *sulphur* and *phosphorus* (elementary substances) are the radicals of the acids which bear their names; and *acetyle* and *ethyle* (carbo-hydrogens), of the acetyl- and ethyl-compounds or series.

RADICAL VINEGAR. See *Acetic Acid.*

RADISH. The common garden radish (*raphanus*,—Lat.) is the *root* of *raphanus sativus* (Linn.), one of the *cruciferæ.* There are several varieties. They are all slightly diuretic and laxative, and possess considerable power in exciting the appetite. The *seed* is pressed for its oil. The *horse-radish* belongs to a distinct genus. (See *p.* 568).

RAIN-GUAGE. Syn. *Ombrometer, Pluviameter, Udometer.* An instrument for determining the quantity of water, which falls as rain, at any given place. A simple and convenient rain-guage for agricultural purposes, is formed of a wide-mouthed funnel, or open receiver, connected with a glass tube furnished with a stop-cock. The diameter of the tube may be exactly 1-100th that of the receiver, and if the tube be graduated into *inches* and *tenths*, the quantity of rain that falls may be easily read off to the 1-1000th of an inch. The instrument should be set in some perfectly open situation; and for agricultural purposes, with its edge as nearly level with the ground as possible. "The quantity of water should be duly measured, and registered at 9 a.m., daily." (*Instr. of the Royal Soc.*, 1840.)

RAISINS. Syn. *Dried Grapes; Uvæ Siccatæ; Uva*,—Ph. L. *Uvæ Passæ*, Ph. E. & D. "The prepared fruit of *vitis vinifera*" (Linn.),—Ph. L. The grapes are allowed to ripen and dry on the vine. After being plucked and cleaned, they are dipped, for a few seconds, into a *boiling lye of wood-ashes* and *quicklime* at 12° or 15° Baumé, to every 4 gall. of which a handful of *culinary salt* and a pint of *salad oil* has been added; they are then exposed for 12 or 14 days in the sun to dry; they are, lastly, carefully garbled, and packed for exportation. The sweet, fleshy kinds of grapes are those selected for the above treatment; and, in general, their stalks are cut about one half through, or a ring of bark is removed, to hasten their maturation.

Raisins are nutritious, cooling, antiseptic, and, in general, laxative; the latter to a greater extent than the fresh fruit. There are *many varieties* found in *commerce.* Their *uses* as a dessert and culinary fruit, and in the manufacture of wine, &c., are well known, and are referred to elsewhere. See *Grapes, Wines, &c.*

RANCIDITY. The strong, sour flavour and odour which oleaginous bodies acquire by age and exposure to the air. For its *prevention* see *Fats, Oils* (Fixed), *&c.*

RAPE. Syn. *Vinacea,*—Lat. The cake left from pressing grapes. By fermentation with *water*, and *distillation*, it yields an inferior variety of *brandy*.

RAPE OIL. See *Oils* (Fixed).

RASH. A term "properly limited to that state of inflammation of the skin in which the inflammatory action does not proceed beyond its more simple and primary signs, namely, redness, heat, swelling, and pain." (Eras. Wilson.)

The above authority notices *four* different affections, as included under this head:—

1. *St. Anthony's Fire*, or *Erysipelas*, the severest of them all, already referred to. (See *p.* 381.)

2. *Nettle-rash*, or *Urticaria*, characterised by its tingling and pricking pain, and its little white elevations on a reddish ground, like the wheals caused by the sting of a nettle. This efflorescence seldom stays many hours, and, sometimes, not even many minutes in the same place, and is multiplied or reproduced whenever any part of the skin is scratched or even touched. No part of the body is exempt from it, and when many of them occur together, and continue for an hour or two, the parts are often considerably swelled, and the features temporarily disfigured. In many cases these eruptions continue to infest the skin, sometimes in one place, and sometimes in another, for one or two hours together, two or three times a day, or, perhaps, for the greatest part of the twenty-four hours. In some constitutions this lasts only a few days; in others several months.

There are *several varieties* of *nettle-rash* or *urticaria* noticed by medical writers, among which *urticaria febrilis, persistans,* and *evanida*, are the principal.

The *common cause* of *nettle-rash* is some derangement of the digestive functions, arising either from the use of improper food, or a disordered state of the nervous or other systems of the body. Lobsters, crabs, mussels, shrimps, dried fish, pork, cucumbers, mushrooms, and adulterated beer or porter, bear the character of frequently causing this affection. In childhood, it commonly arises from teething. Occasionally, in persons of peculiar idiosyncrasy, the most simple articles of food, as almonds, nuts, and even milk, rice, and eggs, will produce this affection.

The *treatment* may consist of the administration of *gentle saline aperients*, and in severer cases, a gentle emetic, followed by the copious use of *acidulated diluent drinks*, as weak lemon-juice-and-water, effervescing potash-draughts, &c., and, when required, diaphoretics. The clothing should be light but warm, and the itching, when severe, may be allayed by the application of a *lotion* of water to which a little vinegar, or camphorated spirit has been added; the latter must, however, be employed with caution. A hot knee-bath is useful in drawing the affection from the face and upper part of the body. A "compress" wrung out of cold water until it ceases to drip, and kept in contact with the stomach by means of a dry bandage, has been recommended to relieve excessive irritation of the stomach and bowels. It has been stated, that *decoction of Virginian snake-root* is particularly useful in relieving *chronic urticaria.*

3. *Red-rash*, *Red-blotch*, or *Fiery spot*, is commonly the consequence of disordered general health, of dyspepsia, and particularly, in females, of tight lacing. Sometimes it is slight and evanescent; at others, it approaches in severity to the milder forms of erysipelas, there being much swelling and inflammation. Chaps, galls, excoriations, and chilblains, are varieties of this disease produced by cold, excessive moisture, or friction. The *treatment* is similar to that of nettle-rash.

4. *Rose-rash, False measles*, or *Roseola*, is an efflorescence, or rather a discoloration of a rose-red tint, in small irregular patches, without wheals or papulæ, which spread over the surface of the body, and are ushered in by slight febrile symptoms. There are several varieties. The *causes* are the same as those which produce the preceding affections, and the *treatment* may be similar. In all of them strict attention to the diet, and a careful avoidance of cold applications, or exposure to cold, so as to cause a retrocession, are matters of the first moment.

RASPBERRY. Syn. *Hindberry.* The *fruit* of *rubus idæus* (Linn.), a small shrub of the natural order *rosaceæ.* It is cooling, antiscorbutic, and mildly aperitive. It is frequently used to communicate a fine flavour to liqueurs, confectionery, wine, &c. See *Fruits* and *Vegetables.*

RAS-SA-MA-LA. See *Storax.*

RATAFIA. Originally, a liquor drank at the ratification of an agreement or treaty. It is now the common generic name in France of liqueurs compounded of spirit, sugar, and the odoriferous and flavouring principles of vegetables; more particularly of those containing the juices of recent fruits, or the kernels of apricots, cherries, or peaches. In its unqualified sense this name is commonly understood as referring to cherry-brandy or peach-brandy.

Ratafias are *prepared* by distillation, maceration, or extemporaneous admixture, in the manner explained under the head "*Liqueurs*."

Ratafia d'Angelique. From *angelica seeds*, 1 dr.; *angelica stalks*, 4 *oz.; blanched bitter almonds*, bruised, 1 *oz.; proof spirit* or *brandy*, 6 quarts; digest for 10 days, filter, add of *water*, 1 quart; *white sugar*, 3½ *lb.;* mix well, and in a fortnight decant the clear portion through a piece of clean flannel.

Ratafia d'Anis. See *Aniseed Cordial.*

Ratafia de Baume de Tolu. From *balsam of Tolu*, 1 *oz.; rectified spirit*, 1 quart; dissolve, add water, 3 pints; filter, and further add of *white sugar*, 1½ *lb.* Pectoral and traumatic.

Ratafia de Brou de noix. From *young walnuts* with soft shells (pricked or pierced), 60 in no.; *brandy*, 2 quarts; *mace, cinnamon*, and *cloves*, of each, 15 gr.; digest for 8 weeks; press, filter, add of *white sugar*, 1 *lb.;* and keep it for some months before decanting it for use. Stomachic.

Ratafia de Cacao, R. de Chocolat. From *Caracca cacao-nuts*, 1 *lb.; West Indian do.*, ½ *lb.;* both roasted and bruised; *proof spirit*, 1 gall.; digest for 14 days, filter, and add of *white sugar* 2½ *lb.; tincture of vanilla*, ½ dr.; (or, a *shred of vanilla* may be infused with the nuts in the spirit instead;) lastly, decant in a month, and bottle it.

Ratafia de Café. From *coffee*, ground and roasted, 1 *lb.; brandy* or *proof spirit*, 1 gall.; *sugar*, 2 *lb.;* (dissolved in) *water*, 1 quart; as last.

Ratafia de Cassis. From *black-currant juice*, 1 quart; *cinnamon*, 1 dr.; *cloves* and *peach-kernels*, of each, ½ dr.; *brandy*, 1 gall.; *while sugar*, 3 *lb.;* digest for a fortnight, and strain through flannel.

Ratafia de Cerises. From *Morello cherries*, with their kernels bruised, 8 *lb.; brandy* or *proof spirit*, 1 gall.; *white sugar*, 2 *lb.;* as last.

Ratafia de Chocolat. See above.

Ratafia de Coings. From *quince juice*, 3 quarts; *bitter almonds*, 3 *dr.; cinnamon* and *coriander seeds*, of each, 2 *dr.; mace*, ½ *dr.; cloves*, 15 gr. (all bruised); *rectified spirit* (quite flavorless), ½ gall.; digest for a week, filter, and add of *white sugar*, 3½ *lb.*

Ratafia de Crème. From *crème de noyau*, and *sherry*, of each, ¼ pint; *capillaire*, ½ pint; *fresh cream*, 1 pint; beaten together.

Ratafia de Curaçoa. See *p.* 707.

Ratafia de Framboises. See *Raspberry Cordial* (p. 709).

Ratafia de Genièvre. From *juniper berries* (each pricked with a fork), ¼ *lb.; caraway* and *coriander seed*, of each, 20 gr.; *finest malt-spirit* (22 u. p.), 1 gall.; *white sugar*, 2 *lb.;* digest a week, and strain with expression.

Ratafia de Grenoble. From the small *wild black cherry* (with the kernels bruised), 2 *lb.; proof spirit*, 1 gall.; *white sugar*, 3 *lb.; citron peel*, a few grains; as before.

Ratafia de Grenoble, de Teyssère. From *cherries* (bruised with the stones), 1 quart; *rectified spirit*, 2 quarts; mix, digest for 48 hours, then express the liquor, and heat it to boiling in a *close* vessel; when cold add of *sugar* or *capillaire*, q. s.; together with some *noyau*, to flavour, and a little *syrup of the bay laurel*, and of *galangal;* in 3 months decant, and bottle it.

Ratafia de Noyau. From *peach* or *apricot kernels* (bruised), 120 in no.; *proof spirit* or *brandy*, 2 quarts; *white sugar*, 1 *lb.;* digest for a week, press, and filter. (See *p.* 829.)

Ratafia de Œillets. From *clove-pinks* (without the white buds), 4 *lb.; cinnamon* and *cloves*, of each, 15 gr.; *proof spirit*, 1 gall.; macerate for 10 days, express the tincture, filter, and add of *white sugar*, 2½ *lb.*

Ratafia d'Ecorçes d'Oranges. See *Crème d'Orange* (p. 767).

Ratafia de Fleurs d'Oranges. From fresh *orange petals*, 2 *lb.; proof spirit*, 1 gall.; *white sugar*, 2½ *lb.;* as last. Instead of orange flowers, *neroli*, 1 dr., may be used.

Ratafia à la Provençale. From *striped pinks*, 1 *lb.; brandy* or *proof spirit*, 1 quart; *white sugar*, ¾ *lb.; juice of strawberries*, ¾ pint; *saffron*, 20 gr.; as before.

Ratafia des Quatre fruits. From *cherries*, 30 *lb.; gooseberries*, 15 *lb.; raspberries*, 8 *lb.; black currants*, 7 *lb.;* express the juice, and to each pint add of *white sugar*, 6 *oz.; cinnamon*, 6 gr.; *cloves* and *mace*, of each, 3 gr.

Ratafia Rouge. From the *juice* of *black cherries*, 3 quarts; *juices of strawberries* and *raspberries*, of each 1 quart; *cinnamon*, 1 dr.; *mace* and *cloves*, of each, 15 gr.; *proof spirit* or *brandy*, 2 gall.; *white sugar*, 7 *lb.;* macerate, &c., as before.

Ratafia Sec. Take of the *juice of gooseberries*, 5 pints; *juices of cherries, strawberries*, and *raspberries*, of each, 1 pint; *proof spirit*, 6 quarts; *sugar*, 7 *lb.;* as before.

Ratafia à la Violette. From *orris powder*, 3 *oz.; litmus*, 4 *oz.; rectified spirit*, 2 gall.; digest for 10 days, strain, and add of *white sugar*, 12 *lb.;* dissolved in *soft water*, 1 gall.

The addition of a *few drops* of *essence of ambergris*, or of a grain of *ambergris*, rubbed up with sugar and infused in the spirit, imparts a delightful flavour and bouquet, which is much admired. For *other formulæ* and *directions*, see "*Liqueurs*."

RATS. The common rat is the *mus decumanus* (Linn.), one of the most prolific, and destructive species of the *rodentia*. It was introduced to these islands from Asia; and has since spread over the whole country, and multiplied at the expense of the black rat (*mus rattus*,—Linn.), which is the old British species of this animal, until its inroads on our granaries, our stores, and dwelling-houses, have increased to such an extent, that its extirpation has become a matter of serious, if not of national importance.

For the *destruction* of these noxious animals two methods are adopted—

1. *Trapping.* To render the *bait* more attractive, it is commonly sprinkled with a little of one of the *rat-scents* noticed below. The trap is also occasionally so treated.

2. *Poisoning.* The following are reputed the most effective mixtures for this purpose:—

Arsenical Paste. From *oatmeal* or *wheaten flour*, 3 *lb.; powdered indigo*, ½ *oz.; finely powdered white arsenic*, ¼ *lb.; oil of aniseed*, ½ dr.; mix, add of *melted suet*, 2½ *lb.;* and beat the whole into a paste. A similar compound has the sanction of the French government.

Arsenical Powder. From *oatmeal*, 1 *lb.; moist sugar*, ¼ *lb.; white arsenic* and *rotten cheese*, of each, 1 *oz.; rat-scent*, a few drops.

Millers' Rat Powder. From *fresh oatmeal*, 1 *lb.; nux vomica* (in very fine powder), 1 *oz.; rat-scent*, 5 or 6 drops. This is highly spoken of by those who have used it.

Mineral Rat-poison. From *carbonate of baryta*, ¼ *lb.; sugar* and *oatmeal*, of each, 6 *oz.; oils* of *aniseed* and *caraway*, of each, a few drops.

Philantrope Muophobon. A French preparation which, according to Mr. Beasley, consists of *tartar emetic*, 1 part; with *farinaceous matter*, 4 parts; and some other (unimportant) ingredients.

Phosphor Paste. See *page* 971.

Among "*Rat-scents*" the following are said to be the most attractive:—

a. Powdered *cantharides* steeped in *French brandy*. For traps. It is said that rats are so fond of this, that if a little be rubbed about the hands they may be handled with impunity.

b. From *powdered assafœtida*, 8 gr.; *oil of rhodium*, 2 dr.; *oil of aniseed*, 1 dr.; *oil of lavender*, ½ dr.; mix by agitation.

c. From *oil of aniseed*, ½ *oz.; tincture of assafœtida*, ¼ *oz.*

d. From *oil of aniseed*, ¼ *oz.; nitrous acid*, 2 to 3 drops; *musk* (triturated with a little powdered sugar), 1 gr.

RAZORS. See *Papers, Pastes*, and *Shaving.*

REAGENTS. See *Tests.*

REALGAR. See *Bisulphuret of Arsenic* and *Red Pigments.*

RECTIFICATION. A second distillation of a fluid, for the purpose of rendering it purer.

RED BOTTLE. Syn. *Taylor's Red Bottle, Whitworth Doctor's do.* From *British brandy*, 1 quart; *cochineal* (bruised), ¼ *oz.; oil of origanum*, 10 or 12 drops; digested together for 24 hours, and then filtered.

REDDLE. See *Red Pigments.*

RED DYES. The substances principally employed for this purpose are *cochineal, lac-dye*, and *madder*, which, under proper treatment, yield permanent colours of considerable brilliancy, the first and third, more particularly so. Extremely beautiful, but fugitive colours, are also obtained from *Brazil wood, safflower, archil*, and some other substances. SILK is usually dyed of a permanent red or scarlet with cochineal, safflower, or lac-dye; WOOL, with cochineal and, still more frequently, with madder; and COTTON, with madder (chiefly), Brazil wood, &c. The leading properties of these substances are given under their respective names, and the methods of employing them are generally referred to in the articles "*Dyeing*," "*Mordants*," *&c.*, and, therefore, need not be repeated here. The following may, however, be useful to the reader:—

1. First give the "*goods*" a *mordant* of *alum*, or of *alum-and-tartar*, rinse, dry, and boil them in a bath of madder. If *acetate of iron* be used instead of alum, the colour will be PURPLE, and by combining the two, as mordants, any intermediate shade may be produced.

2. The *yarn* or *cloth* is put into a *very weak alkaline bath* at the boiling temperature, then washed, dried, and "*galled*;" (or, when the calico is to be printed, for this bath may be substituted one of cow-dung, subsequent exposure to the air for a day or two, and immersion in very dilute sulphuric acid. In this way the stuff gets opened, and takes and retains the colour better). After

the "galling," the *goods* are dried, and *alumed* twice; then dried, rinsed, and passed through a *madder bath*, composed of $\frac{3}{4}$ *lb.* of good madder for every *lb.* weight of the goods; this bath is slowly raised to the boiling point in the course of 50 or 60 minutes, more or less, according to the shade of colour required; after a few minutes, the stuff is taken out, and slightly washed; the operation is then repeated, in the same manner, with fresh madder; it is, lastly, washed and dried, or passed through a *hot soap bath*, which carries off the fawn-coloured particles.

3. *Adrianople red, Turkey do.* This commences with cleansing or scouring the goods by *alkaline baths*, after which they are steeped in *oily liquors* brought to a creamy state by a little *carbonate of soda;* a bath of *sheep's dung* is next often used as an intermediate or secondary steep; the oleaginous bath, and the operation of removing the superfluous or loosely adhering oil with an *alkaline bath*, is repeated two or three times, due care being taken to dry the goods thoroughly after each distinct process; then follow the distinct operations of *galling*, *aluming*, *maddering*, and *brightening*, the last for removing the dun-coloured principle, by boiling at an elevated temperature with *alkaline liquids* and *soap;* the whole is generally concluded with a "*rosing*" by *spirit of tin.* In this way are given the most brilliant reds on cotton.

Obs. Wool takes from half its weight of madder to an equal weight to dye it red; cotton and linen take rather less. On account of the comparative insolubility of the colouring matter of madder, this dye-stuff must be boiled along with the goods to be dyed, and not removed from the decoction, as is the practice in using many other articles. Other dyes-stuffs are frequently added to the *madder bath*, to vary the shades of colour. *Decoction of fustic, weld, logwood, quercitron, knoppern, &c.*, are often thus employed, the mordants being modified accordingly. By adding *bran* to the *madder bath*, the colour is said to be rendered much lighter, and of a more agreeable tint.

RED GUM. A slight eruptive disease of infancy, occasioned by teething, and, less frequently, by irritation from rough flannel worn next the skin. See *Strophulus.*

RED LAVENDER. See *Compound Tincture of Lavender.*

RED LIQUOR. The crude solution of acetate or sulpho-acetate of alumina employed in calico-printing. It is generally *prepared* by mixing *crude sulphate of alumina* with about an equal weight of *crude pyrolignite of lime*, both being in the state of solution.

RED PIGMENTS. Of these the following are the principal:—

Armenian Bole; Bolus Armeniæ. Formerly imported from Armenia, Portugal, Tuscany, &c.; now generally made by grinding together a mixture of *whiting*, *red oxide of iron*, and *red ochre*, in nearly equal proportions.

Brown Red. A factitious mixture of *red oxide of iron* and *red ochre*, in variable proportions.

Carmine. See *page* 205.

Carminated Lake. See *page* 671.

Chrome Red. Syn. *Dichromate of Lead, Subchromate of do., Red Chromate of do.; Plumbi Dichromas, P. Chromas Rubrum,*—Lat. *Prep.* 1. Boil pure *carbonate of lead* with *chromate of potash*, in excess, until it assumes a proper colour; then wash it well with *pure water*, and dry it in the shade.

2. Boil *neutral chromate of lead* with a little *water of ammonia* or *lime water.*

3. (Liebig & Wöhler.) Fuse *saltpetre* at a low red heat in a *Hessian crucible*, and throw in *chromate of lead* (pure chrome yellow), by small portions at a time, as long as a strong ebullition follows upon each addition of the pigment, observing to stir the mixture frequently with a glass rod; after repose for a minute or two, pour off the fluid part, and, as soon as the solid residuum is cold, wash it with *water*, and dry it by a gentle heat.

Obs. Great care must be taken in conducting the last process, not to employ too much heat, nor to allow the saline matter to stand long over the newly formed chrome-red, as the colour is thus apt to change to a brown or orange. When well managed, the product has a crystalline texture, and so beautiful a red colour, that it vies with native cinnabar. The liquid poured from the crucible is reserved for manufacturing chrome yellow.

Indian Red, Purple Ochre; Ochra Purpurea Persica, Terra Persica. This is a native production, brought from Ormus. A *factitious article* is prepared by calcining a *mixture* of *colcothar* and *red ochre.*

Lakes (Various). See *p.* 671-2.

Light Red. From *yellow ochre*, by careful calcination. It works well with both oil and water, and produces an admirable flesh-colour by admixture with pure white. All the ochres, both red and yellow, are darkened by heat.

Orange Red, Sandix. Obtained from *white lead*, by calcination. Very bright.

Realgar. See *p.* 86.

Red Bole. See *Armenian* and *Venetian Bole.*

Red Chalk. A clay iron-ore, much used for pencils and crayons, and, when ground, also for paints.

Red Lead, Minium. The finest *red lead* is *prepared* by exposing *ground* and *elutriated massacot*, or *dross of lead*, in shallow iron trays, (about 12 inches square, and about 4 or 5 inches deep,) piled up on the hearth of a reverberatory furnace, to a heat of about 600 to 650° Fahr., with occasional stirring until it acquires the proper colour. The furnace employed for the preparation of massicot during the day, usually possesses sufficient residuary heat during the night for this process, by which fuel is saved. Lead for the above purpose should be quite free from copper and iron.

Red Ochre. A natural production abounding on the Mendip hills.

Red Orpiment, Red Arsenic. See *page* 86.

Rose Pink. This is *whiting* coloured with a *decoction of Brazil wood* to which a little *pearlash* has been added. A very pretty colour, but it does not stand. It is always kept in a damp state. The *colour* may be *varied* by substituting *alum* for pearlash, or by the addition of a little *spirits of tin.*

Venetian Red ; Bolus Veneta. A species of *ochre*, brought from Italy.

Vermilion. (See that word.)

REDUCTION. Syn. *Revivification.* A term, in its fullest sense, applied to any operation by which a substance is restored to its natural state; but, now generally restricted, in chemistry, to the abstraction of oxygen, and hence, frequently termed *deoxydation* or *deoxydizement.* This change is operated by either heating the substance in contact with carbon or hydrogen, or in exposing it to the action of some other body having a powerful affinity for oxygen. See *Potassium, &c.*

REECE'S MIXTURE. *Prep.* From *infusion of chirayta*, 8 fl. oz.; *carbonate of soda*, 1 dr.; mix. *Dose.* 1 or 2 dessert-spoonfuls, twice daily. See *Pills, &c.*

REFINING. A term employed in commercial chemistry and metallurgy synonymously with purification. The separation of the precious metals from those of less value, as in the operation of parting, constitutes the business of the "*refiner.*" See *Gold, Silver, &c.*

REFRACTION (of Light). The deviation of a ray of light from its original path on entering a medium of a different density or power. For the practical application of this property see *Gem* and *Goniometry.*

REFRIGERANTS. Medicines or agents which tend to lessen the animal temperature without causing any marked diminution of sensibility or nervous energy. Among *internal* refrigerants *cold water*, *weak acidulous drinks*, and *saline aperients*, are those which are, probably, the best known, and the most useful. Among *external* refrigerants are *cold, cold water*, *evaporating lotions*, *weak solutions of diacetate of lead, &c.*

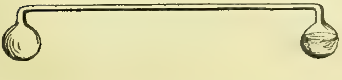
REFRIGERATION. The abatement of heat; the act or operation of cooling.

Among the purposes to which *refrigeratory processes* are applied in the *arts*, the principal are—the *condensation of vapours*, —the *cooling of liquids*,—the *congelation of water*, and—the *production* of *extreme degrees of cold* in chemical operations. The *first* of these is referred to under the heads *Distillation, Steam, Still, &c.*; and the *second*, under *Worts.* It is, therefore, only necessary to notice here the *third* and *fourth* applications of cold, artificially produced, above referred to.

The *refrigeratory processes* at present employed depend upon the *greater capacity for heat* which the *same body possesses* as its *density lessens*, or its *attenuation increases;* as exhibited in the *sudden liquefaction of solids*, the *rapid evaporation of liquids*, and the almost *instantaneous return of atmospheric air*, or other *gaseous body*, from a *highly condensed state* to its *normal condition.* The loss of sensible heat in the *first* example, is the basis of the various processes of producing cold by what are commonly called "*freezing*" or "*frigorific mixtures*," all of which act upon the principle of liquefying solid substances without supplying heat. The caloric of liquidity being in these cases derived from that previously existing in the solid itself in a sensible state, the temperature must necessarily fall. The *degree of cold* produced, depends upon the quantity of heat which is thus diffused through a larger mass, or which, as it were, disappears; and this is dependent on the quantity of solid matter liquefied, and the rapidity of the liquefaction. *Saline compounds* are the substances most frequently employed for this purpose, and those which have the greatest affinity for water, and thus liquefy the most rapidly, produce the greatest degree of cold. Similar changes occur during the *evaporation* of *liquids.* When heat passes from the sensible to the insensible state, as in the formation of vapour, cold is generated. This may be shown by pouring a few drops of ether or rectified spirit on the palm of the hand, when a strong sensation of cold is experienced. A still more familiar illustration of this fact is exhibited in the rapidity with which the animal body loses heat when enveloped in damp or wet clothing. The *evaporation of water*, produces a degree of cold, which is greater than that of other liquids, in exact proportion as the *insensible* or *latent heat* of its *vapour* exceeds theirs. In the *attenuation* or *rarefaction of gases* similar phenomena occur.

It has been found that evaporation proceeds much more rapidly from the surface of fluids in a vacuum than in the atmosphere. Water may be easily frozen by introducing a surface of *sulphuric acid* under the receiver of an air-pump, over which is placed a *capsule* filled with *water*, so that the vapour arising from the latter may be immediately absorbed by the former. After a few strokes of the piston the water is converted into a solid cake of ice. The acid operates by absorbing the aqueous vapours as soon as generated, and thus maintaining the integrity of the vacuum. Professor Leslie found that when air is thus rarified 250 times, the surface of evaporation was cooled down 120° in winter; and when only 50 times, a depression of 80° or even 100° took place. "Sulphuric acid is capable of congealing more than 20 times its weight of water before it has imbibed nearly its own bulk of that liquid, or has lost about $\frac{1}{8}$th of its refrigerating power." (Ure.) Sulphuric acid, which has become diluted in this way, may be reconcentrated by heat.

A pleasing philosophical toy, illustrative of the evaporative power of a vacuum, is the *Cryophorus*, or *frost-bearer*, of Dr. Wollaston. This instrument consists of two small glass globes united by a tube, one of which is partly filled with water. The whole apparatus is perfectly free from air, and is, consequently, filled with attenuated aqueous vapours. No sooner is the pressure removed, as by plunging the empty ball into a freezing mixture (which condenses the vapour), than rapid evaporation commences, and the water in the other ball is frozen in two or three minutes.



It has been discovered that *oatmeal*, dried nearly to brownness before a common fire, and cooled in close vessels, may be substituted for sulphuric acid. With a quantity of this substance, one foot in diameter, and 1 inch deep, Professor Leslie froze 1 imperial pint of water, contained in a hemispherical porous cup. Ignited chloride of calcium, in porous pieces, has also been successfully used for the same purpose. Dr. Ure has found that a requisite vacuum for this purpose may be produced by the agency of steam, afterwards condensed by the affusion of cold water.

Even in hot climates ice may be produced under favorable circumstances by evaporation. On the open plains, near Calcutta, this is effected by exposing a thin stratum of water to the atmosphere, during the fine clear nights of December, January, and February. The pans are made of porous earthenware, and water is poured in to the depth of about $1\frac{1}{2}$ inch. A large number of these vessels are arranged in an excavation in the ground, 30 or 40 feet square and 2 feet deep, the bottom of which is covered, to the depth of 10 or 12 inches, with sugar canes or the stalks of Indian corn. At sunrise the pans are visited, the ice separated from the water, and packed as tight as possible in a deep cavity or pit, well screened from the heat.

Dr. Gorrie, a physician of New Orleans, has recently invented a machine, by which water is frozen in large quantities, by exposure to condensed air in the act of its subsequent expansion. It is worked by either hand or steam power. (*Mech. Mag.*, 1851.)

In the production of ice, or an extreme degree of cold, by saline mixtures, the salts should be in the crystallized state, and as rich as possible in water, but without being in the least damp. They should also be coarsely pulverized at the time of using them, and should not be mixed until immediately before throwing them into the liquid ingredients. The mixture should be made in a thick vessel, well clothed, to prevent the accession of external heat; and the substance to be acted on should be contained in a very thin vessel, so as to expose it more fully to the action of the mixture. On the *large scale*, a vessel called a "*freezing pot*" or "*sabotière*" is commonly employed. See *Ices* (and the *following Table*).

TABLE *exhibiting a few of the most useful* FRIGORIFIC MIXTURES *contained in* MR. WALKER'S *Publication, of* 1808, *drawn up from actual experiments.*

Ingredients.		Thermometer sinks.	Deg. of cold produced.
Snow *or* pounded ice Chloride of sodium	2 parts 1 „	From any temperature. to — 5°	—
Snow *or* pounded ice Chloride of sodium Sal ammoniac	5 „ 2 „ 1 „	to — 12°	—
Snow *or* pounded ice Chloride of sodium Nitrate of ammonia	12 „ 5 „ 5 „	to — 25°	—
Snow Hydrochloric acid (*concentrated*)	8 „ 5 „	From + 32° to — 27°	59°
Snow Crystallized chloride of calcium	2 „ 3 „	From + 32° to — 50°	82°
Sal ammoniac Nitrate of potassa Water	5 „ 5 „ 16 „	From + 50° to + 10°	40°
Nitrate of ammonia Water	1 „ 1 „	From + 50° to + 4°	46°
Nitrate of ammonia Carbonate of soda Water	1 „ 1 „ 1 „	From + 50° to — 7°	57°
Phosphate of soda Nitrate of ammonia Diluted nitrous acid*	9 „ 6 „ 4 „	From + 50° to — 21°	71°
Sulphate of soda Hydrochloric acid	8 „ 5 „	From + 50° to 0°	50°
Snow Diluted nitrous acid*	3 „ 2 „	From 0° to — 46°	46°
Snow Sulphuric acid Water	2 „ 1 „ 1 „	From — 20° to — 60°	40°
Snow Crystallized chloride of calcium	1 „ 2 „	From 0° to — 66°	66°
Snow Crystallized chloride of calcium	1 „ 3 „	From — 40° to — 73°	33°
Snow Sulphuric acid Water	8 „ 5 „ 5 „	From — 68° to — 91°	23°

* *Fuming nitrous acid,* 2 part; *water,* 1 part; by weight.

Obs. The materials in the first column are to be cooled, previously to mixing, to the temperature required in the second, by the use of other mixtures.

REGULUS. A term applied by the alchemists to various metallic matters obtained by fusion; as *Regulus of antimony*, *arsenic*, &c. It is now obsolete.

RELISH (Kitchener's). See *Sauces.*

REMITTENT. A term applied to fevers, and other diseases, which exhibit a decided remission in violence during the twenty-four hours, but without entirely leaving the patient, in which they differ from intermittents or agues.

REMITTENT FEVER. Syn. *Febris Remittens,*—Lat. The diseases which come under this name vary in degree from extreme mildness to alarming violence, and are regarded as both inflammatory and malignant. The *milder form* of *remittent fever* commences with drowsiness, languor, chilliness, and other febrile symptoms; the skin is hot and dry, the thirst considerable, and there is, generally, nausea, and total loss of appetite. In the course of the day, usually towards evening, the pulse quickens, the heat and constitutional disturbance increase, and, at length, terminate in a sweat, which after a time goes off, leaving the skin hot and dry, and the pulse still quicker than before. These symptoms, if not arrested, are repeated with increased severity daily, until "the head, but more frequently the liver, or some other abdominal viscus, gives proof of being loaded and oppressed, and the restlessness becomes intolerable; or, a sudden bilious purging or vomiting supervenes, and carries off the complaint by a salutary crisis." In the *severer forms* of *remittent fever* the febrile symptoms are much exaggerated, there is a putrid tendency in the fluids, the sweat becomes fœtid, the breath offensive, the tongue fœtid, livid, or greenish-black, and the dejections blackish, highly offensive, and parted with insensibly; the mind also wanders, and there are spasmodic twitchings and petechial spots.

The remittent fever of infancy (*infantile fever*), perhaps, the mildest form of this disease, is *occasioned* by worms or a disordered state of the bowels; but remittent fevers in general are referred to the action of marsh miasmata, and unwholesome air. The r*emittents of autumn*, in this country, often assume a character of extreme severity. The malignant fevers of hot climates, of this kind, are commonly known as *bilious remittent fever*, from the great disorder of the hepatic system. Among these, the *African*, *West Indian*, and *yellow fever*, are the most fatal.

The *treatment* of the *milder forms* of *remittent fever* consists in the administration of *mercurial* and *saline purgatives*, assisted by saline diaphoretics, and a spoon-farinaceous diet. As the pulse becomes less frequent, and diaphoresis is established, *mild tonics*, such as bark and the vegetable bitters, in combination with the dilute mineral acids, should be had recourse to. This treatment, with good air, and careful ventilation, generally effects a cure in 10 days or a fortnight. In the *bilious remittents*, last above alluded to, "particular symptoms frequently present themselves which require particular modes of treatment; and this must also be modified according to the inflammatory, malignant, nervous, or intermittent form which they may assume or pass into." In these cases skilful medical assistance in the early stages is absolutely necessary for the safety of the patient. See *Fever*, *&c.*

RENNET. Syn. *Runnet*, *Prepared Calf's Maw*, *Coaguline*. The *stomach of the calf*, freed from the outer skin, fat, and useless membrane, washed, treated with either *brine* or *dry salt* for a few hours, and then hung up to dry. When well prepared the dried "*vells*" somewhat resemble parchment in appearance.

Uses, *&c.* Rennet is employed to curdle milk. A piece of the requisite size is cut off, and soaked for some hours in *whey* or *water*, after which the whole is added to the *milk* for curdling, slightly warmed, and the mixture is slowly heated, if necessary, to about 122° Fahr. In a short time after this temperature has been attained, the milk separates into a solid, white coagulum (*curd*), and into a yellowish, translucent liquid (*whey*). Two square inches from the bottom of a good "vell" are sufficient for a cheese of 60 *lb.* It is the gastric juice of the stomach that operates these changes. The stomachs of all sucking quadrupeds possess the same properties. See *Cheese.*

RENNET (Liquid). Syn. *Essence of Rennet*, *Liquid Coaguline*, *&c.* *Prep.* From *fresh rennet* (cut small), 12 *oz.*; *common salt*, 3 *oz.*; knead them together, and leave the mixture at rest, in a cool place, for 5 or 6 weeks, then add of *water*, 18 *oz.*; *good rum* or *proof spirit*, 2 *oz.*; lastly, digest for 24 hours, filter, and colour the liquid with a little *burnt sugar*.

Obs. 2 or 3 teaspoonfuls will curdle a quart of milk. Some persons use white wine instead of water, with simple digestion for a day or two.

RENOVATION (of Clothing). See *Scouring*.

RESINEONE. An oily liquid obtained, along with "*resinone*," when *resin* and *lime* are distilled together. (Fremy.)

RESINS. Syn. *Resinæ*,—Lat. Proximate vegetable principles, the ultimate composition of which is carbon, hydrogen, and oxygen. They are distinguished by their solubility in alcohol, insolubility in water, inflammability, fusing by a moderate heat, and not being volatilized at a higher temperature without decomposition. Their sp. gr. varies from 0·9 to 1·2. According to Liebig, they are oxidized essential oils. *Common rosin* or *colophony*, and the *shell lac* of which sealing-wax is made, are familiar examples of these substances. Gutta-percha and caoutchouc may also be regarded as belonging to this class of bodies, although distinguished by their total insolubility in alcohol.

Some valuable contributions have recently been made to the chemistry of the resins and allied substances. The *hancornia speciosa*, one of the *sapotaceæ*, which grows on the high plateaux of Brazil, bears a fruit (*mangrava*), in shape resembling a bergamot pear, the milky juice of which is liquid Indian-rubber. After this fruit has been gathered and kept about three weeks, the Indian-rubber disappears, or is converted into sugar, and it is then found to be superior to all the other fruits of the country. Profiting from this wonderful fact, Chevalier de Claussen was led to suppose that both *caoutchouc* and *gutta-percha* contained starch, and was hence induced to endeavour to form these substances from mixtures of *starch* or *flour* with *resinous* or *oily substances* in combination with *tannin.* In this he was so successful, that he produced new compounds which will mix with Indian-rubber and gutta-percha in all proportions without altering their properties; and some of these combinations are as hard as horn. (*Trans. Brit. Ass.*, 1855.)

RESIN (Black). Syn. *Rosin, Black do.; Colophony; Resina Nigra, Colophonia,*—Lat. What remains of *turpentine* after the oil has been distilled. When this substance, whilst still fluid, is agitated with about 1-8th part of *water*, it forms the *yellow resin* of pharmacy. *Used* for violin bows, dark-coloured ointments, varnishes, &c.

RESIN (Yellow). Syn. *Yellow Rosin, White do.; Resina Flava; Resina,*—Ph. L. Detergent. *Used* in ointments, plasters, &c. (See *above.*)

RESOLVENTS. Syn. *Discutients; Resolventia.* Substances or agents which discuss or resolve inflammatory and other tumours. See *Digestives.*

RESPIRATION. The peculiar function by which the nutrient circulating fluid of organized beings is submitted to the action of the air, for the purpose of removing carbonic acid, and restoring its vitality by the absorption of atmospheric oxygen.

The *primary object* of the *respiratory process* is the production of animal heat. The air expired from the lungs is found to have undergone a most remarkable change. It is now loaded with aqueous vapour, whilst a considerable portion of its oxygen has disappeared, and its place is supplied by about a like volume of carbonic acid. It is no longer capable of supporting animal life, and even a lighted taper plunged into it is immediately extinguished. In the meantime, the *venous blood* which entered the lungs from the right chambers of the heart has lost its dingy hue, and has acquired the rich florid colour which is characteristic of *arterial blood.* In this state it is returned to the left chambers of the heart, and is propelled by that organ to every part of the body, from which it passes by the capillaries to the veins, and by these again to the heart and lungs, to undergo the same changes and circulation as before. The *carbon* and *hydrogen* of the blood, ultimately derived from the food, are, in this course, gradually converted into carbonic acid and water, by a species of *slow combustion;* but how these changes are effected is not definitely ascertained, although it appears pretty certain that they occur in the capillaries of the whole body, and not in the lungs, the temperature of which does not exceed that of the other parts. Much of the oxygen is, no doubt, simply dissolved in the *serum* of the blood. According to Prof. Liebig, the *corpuscles* act as carriers of another portion, in virtue of the iron which they contain, that metal being alternately in the state of sesquioxide and of carbonate of the protoxide,—of sesquioxide in the arteries, and of carbonate of protoxide in the veins, by loss of oxygen, and acquisition of carbonic acid. M. Mulder considers the *fibrine* of the blood to act in the same manner; being *true fibrine* in the veins, and, in part at least, an *oxide of proteine* in the arteries.

The lungs, as is well known, receive the atmospheric air through the *trachea* or *windpipe.* At the root of the neck this divides into two branches called bronchi, and each bronchus upon entering its respective lung divides into an infinity of small tubes. The latter terminate in small pouches, called the *air-cells,* and a number of these little air-cells communicate together at the extremity of each small tube. The number of air-cells in the two lungs has been estimated at 1,744,000,000, and the extent of the skin which lines the cells and tubes together at 1500 square feet. (Dr. Addison.) Under ordinary circumstances, about 15 cubic inches only of air are thrown out at each expiration; but, by a forced effort, as much as 50 or even 60 inches may be expelled. The number of respirations per minute, in health, when the individual is tranquil and undisturbed, is about 18. Exercise increases this number. See *Food, Nutrition, &c.*

RESPIRATION (Artificial). Various means have been adopted for this purpose, among which blowing air into the lungs is, perhaps, that generally adopted. A better, and, in general, a much more efficient method, is as follows:—Powerful but not violent *pressure* is made upon the *sides of the chest* and upon the *abdomen* at the *same time,* by which the cavity of the thorax is diminished, and the air contained in the lungs is expelled; the compression is then suddenly withdrawn, when the elasticity of the ribs causes them to resume their old expanded positions; the chest is again enlarged, a partial vacuum is formed, and air rushes into the lungs, to be again expelled by pressure upon the ribs and abdomen as before. By this means artificial respiration may be kept up for a great length of time, without the use of bellows, or any other apparatus. See *Animation* (Suspended).

RESUSCITATION. See *Animation* (Suspended).

RETINIC ACID. The name given by Prof. Johnston to that part of *retinite* or *retinasphalt* which is soluble in alcohol.

REVALENTA ARABICA. A mixture of the *red Arabian* or *Egyptian lentil* with *barley flour*, and a little *sugar* or *salt.* ('Lancet.') See *Lentils* and *Ervalenta.*

REVERBERATORY FURNACE. A furnace so formed, with a roof or dome, that the flame and hot air from the fuel is thrown down upon a "hearth," or space beyond it. For an example, see *Carbonate of Soda.*

REVIVER (Black). Syn. *Paris's Anticardium.* *Prep.* 1. *Blue galls* (bruised), 4 *oz.*; *logwood* and *sumach*, of each, 1 *oz.*; *vinegar*, 1 quart; macerate in a closed vessel, at a gentle heat, for 24 hours, then strain off the clear, add *iron filings* and *green copperas*, of each, 1 *oz.*, shake it occasionally for a week, and preserve it in a corked bottle.

2. *Galls*, 1 *lb.*; *logwood*, 2 *lb.*; boil for 2 hours in *water*, 5 quarts, until reduced to a gallon, then strain, and add of *green copperas*, ½ *lb.* *Used* to restore the colour of faded black cloth.

REVIVER (Blue). *Prep.* From *soluble Prussian blue*, 1 *oz.*; dissolved in *distilled water*, 1 quart. *Used* for either black or blue cloth.

REVIVER (French-polish). See *p.* 1023.

RHABARBERIC ACID. See *Rheumic Acid.*

RHABARBERINE. Syn. *Rheine, Rheumine.* The yellow colouring principle of rhubarb. It is obtained by digesting *powdered rhubarb* in *ether*, distilling off greater part of the ether, and submitting the remainder to spontaneous evaporation. The crystals thus obtained are purified by repeated solutions and crystallizations in alcohol. Orange yellow. Gripes, but does not purge. (Brandes.) See *Rheine.*

RHAMNINE. Syn. *Rhamnina* (?). *Prep.* Express the juice from *buckthorn berries* scarcely ripe, which is to be rejected; boil the *cake* or *residue* with *water*, strain with pressure, and filter the liquid whilst hot; *crude rhamnine* will be deposited as the liquid cools, which, by solution in *boiling alcohol*, and *filtration*, may be procured in crystals.

Obs. Buckthorn juice (*succus rhamni*), "the juice of the fruit of *rhamnus catharticus* (Linn.)," is officinal in the Ph. L.

RHAPONTICINE. A peculiar, yellow, odourless, tasteless, and crystallizable substance, obtained from the root of *English rhubarb.* It is extracted by boiling *absolute alcohol.*

RHATANY. Syn. *Rhatany Root; Krameria*,—Ph. L. E. & D. *Rhataniæ Radix*,—Ph. D. 1826. "The *root* of *krameria triandria.*" (Ph. L.) It is stomachic, and powerfully astringent and styptic. *Dose.* 10 gr. to ½ dr., either in substance or made into a decoction or infusion. It is much employed in tooth-powders, to fix the teeth when they become loosened by the recession of the gums, and also for improving the natural red colour of the lips and gums. A *saturated tincture* or *fluid extract*, made with brandy, forms the "*wine-colouring*" used by the Portuguese to give roughness, colour, and tone to their Port wine. *Hard extract of rhatany* is also much employed for the same purpose.

RHEINE (?). An inodorous, bitterish substance, of a yellow colour, obtained by gently heating *powdered rhubarb* with 8 parts of *nitric acid* of the sp. gr. 1·37, evaporating to the consistence of syrup, and diluting with *water.* (Brande.) See *Rhabarberine.*

RHEUMATISM. Syn. *Rheumatismus*,—Lat. An affection of the joints, and of the external muscular, tendinous, and fibrous textures of the body, attended with swelling, stiffness, and great pain. *Acute rheumatism*, or *rheumatic fever*,—*arthritis*, inflammation of the synovial membrane, or *rheumatic gout*,—*sciatica*, or rheumatism of the cellular envelope of the great sciatic nerve, affecting the hip,—and *lumbago*, or rheumatism of the loins, are varieties of this disease.

The *treatment* of *rheumatism* consists in the administration of *purgatives* and *diaphoretics* or *sudorifics*, accompanied by *tonics*, as bark, quinine, &c. *Calomel* with *opium*, and *iodide of potassium*, have also been frequently and successfully employed in this complaint. Of late years the administration of the *bicarbonate*, *citrate*, or *nitrate of potassa* in rather large doses has been strongly recommended, and in numerous cases adopted with success. *Lemon juice*, liberally taken, has also proved useful in suddenly cutting short severe attacks of certain forms of rheumatism. When the inflammatory symptoms are severe, occasional *venesection* may be had recourse to. The *compound powder of ipecacuanha*, taken at night, will generally promote the ease and sleep of the patient, and, by its sudorific action, tend considerably to hasten a cure. Where possible, a dry atmosphere and a regular temperature should be sought, since a damp atmosphere, and, indeed, exposure to damp under any form, are the *principal causes of rheumatism.* *Stimulating embrocations*, *blisters*, *frictions*, and above all, the *hot* or *vapour bath*, are also frequently serviceable in rheumatism, especially in *lumbago*, and casual attacks arising from cold. The *daily use of oranges*, or of *lemon juice* diluted with water, has been found, in the majority of cases, to lessen the susceptibility of those who employ them to attacks of rheumatism and rheumatic gout, arising from a damp situation, or exposure to the weather. See *Lemon Juice.*

RHEUMIC ACID. Syn. *Rhabarberic Acid.* A name erroneously given by Mr. Henderson to the oxalic acid found in *rhubarb.*

RHODANIC ACID. Sulphocyanic Acid.

RHODIUM. A whitish metal discovered by Wollaston, in 1803, associated with palladium in the ore of platinum.

Prep. The *solution of platinum ore in aqua regia,* after being saturated with *soda,* is precipitated with *bicyanide of mercury,* to throw down the "*palladium,*" and after filtration, is mixed with *hydrochloric acid,* and the whole evaporated to dryness; the residuum is next powdered and digested in *alcohol* of the sp. gr. 0·837; the undissolved portion (*double chloride of rhodium and sodium*) is then washed with *alcohol,* and either exposed to a *very strong heat,* or *gently heated* in a *stream of hydrogen gas;* it is, lastly, boiled in *water,* and dried. The *product* is a white, coherent, spongy mass.

Another method is to dissolve in *water* the *portion left after the action of the alcohol,* and to precipitate it by a *plate of zinc.* In either case, the solution from which the platinum and palladium have been separated in the ordinary method of preparing those metals, may be employed, by which the process will be shortened. In this state it is a black powder.

Prop., &c. Pure rhodium is brittle, and resembles platinum in appearance; it is the hardest, most difficultly fusible, and least soluble of all the metals; it is insoluble in acids, even when heated, but dissolves in aqua regia when it is alloyed with other metals. Obtained as above it is only blackened by heat; but with borax it acquires a white metallic lustre, though it remains infusible. Sulphur or arsenic, however, renders it fusible, and may afterwards be expelled by continuing the heat; but the button thus obtained is not malleable. It unites with oxygen and chlorine, and forms alloys with nearly all the metals. The solutions of its salts are characterised by their rosy colour. Sp. gr., about 11.

Uses, &c. It is chiefly employed for the points of "*rhodium*" or "*everlasting pens.*" A very small quantity added to steel is said to improve its closeness, hardness, and toughness, and to render it less easily corrodible by damp.

RHODIUM (Chloride of). Syn. *Sesquichloride of Rhodium, Perchloride of do.* Obtained by adding to a *solution of the double chloride of rhodium and potassium, silico-hydrofluoric acid,* as long as the *double fluoride of potassium and silicium* is generated, then filtering, evaporating to dryness, and redissolving the residuum in water. (Berzelius.)

Prop., &c. A brownish red, deliquescent mass, forming a rich red solution. Several double chlorides may be formed. *Chloride of rhodium and potassium* is prepared by heating in a stream of chlorine a mixture of equal parts of finely powdered rhodium and chloride of potassium. This salt has a fine red colour, is soluble in water, and crystallizes in 4-sided prisms. *Chloride of rhodium and sodium* is also a very beautiful red salt, obtained by a similar process.

RHODIUM (Oxide of). Syn. *Sesquioxide of Rhodium, Peroxide of do.* Obtained by heating *pulverulent rhodium,* mixed with *hydrate of potassa* and *a little nitre,* in a silver crucible, and well washing the resulting powder, first with *water,* then with *hydrochloric acid,* and again with *water.* A greenish gray powder. In this state it is insoluble in acids. An *impure soluble oxide* is precipitated when carbonate of potash or soda is added in excess to the double chloride of rhodium and potassium. A *protoxide* may be also formed, but is little known.

RHODIZONIC ACID. *Prep.* When *dry carbonic oxide* is passed over *fused potassium,* a black porous mass is obtained, and this substance, exposed to moist air, deliquesces into a solution of *rhodizonate of potassa* of a scarlet colour, from which the excess of alkali may be taken by alcohol; by treatment with a *mixture* of *sulphuric acid* and *alcohol,* the *rhodizonic acid* may be obtained in a separate form.

Prop. This acid is yellow, soluble in both water and alcohol, and easily crystallizable. When its solution is heated, it is converted into "*croconic acid.*" This last acid is obtained by adding *fluosilicic acid* to a *solution of croconate of potassa,* evaporating to dryness, and dissolving out the *croconic acid* with *water.* Croconic acid, as well as its salts, are yellow; hence its name.

RHUBARB. Syn. *Rheum,*—Ph. E. & D. *Rheum* (Sinense),—Ph. L. *Rhabarbarum, Rhœum,*—Obs. "The *root* of uncertain species of rheum." (Ph. L.) According to Dr. F. Farre, the term *sinense* (Chinese), employed by the London College, "was placed after rheum, to *include* the so-called Russian and East Indian rhubarbs, which are considered to be the produce of China and Chinese Tartary, and to *exclude* European, Himalayan, &c." The Dutch trimmed or Batavian rhubarb is regarded in the light of East Indian by the College.

Three *principal varieties* of *rhubarb* are known in this country:—

Russian or *Turkey rhubarb* is the produce of six-years old plants of the mountain declivities of Chinese Tartary; and its principal excellence depends on its more careful preparation, and subsequent garbling, both before its selection for the Russian market, and after its arrival at Kiachta, and again at St. Petersburgh. At Kiachta all pieces of a porous, gray, or pale colour, are rejected, the whole being pared and perforated, the better to determine the quality of the interior portion. At St. Petersburgh the pieces are again carefully examined and garbled, and are, finally, packed in close cases or chests, which are rendered air-tight by the application of pitch on the outside.

East Indian or *Chinese rhubarb* is the produce of the locality just referred to, as well as of other parts of China. It is obtained from younger plants, and its preparation and subsequent selection or garbling is conducted with less care.

English rhubarb is principally produced at Banbury, Oxfordshire, from the rheum palmatum and rhaponticum. It is cut and dressed up after the manner of Turkey rhubarb, for which it is sold by itinerant vendors, habited as Turks.

Qual. Russian or *Turkey rhubarb* occurs in irregular plano-convex or roundish lumps, perforated with a circular hole; it possesses a yellow colour outside; when recently broken the inside presents a rich mottled appearance, and evolves a peculiar, and somewhat aromatic odour. It is firm, compact, heavy, perfectly free from moisture, and easily grated. Its taste is bitter, slightly astringent, and sub-acid; and when chewed it feels gritty, and tinges the saliva of a beautiful yellow colour. It breaks with a rough, hackly fracture, is easily pulverized, and its powder is of a bright, buff-yellow colour.

East Indian, Canton, or *Chinese rhubarb* is in flat pieces, seldom perforated, and its taste and odour are stronger than the other. It is also heavier, tinges the saliva of an orange-red hue, and when pulverized the powder is redder than that of Russian rhubarb.

English rhubarb possesses all the preceding qualities in a greatly less degree. It is light and spongy, does not feel gritty between the teeth, its taste is mucilaginous, and its powder has a peculiar pinkish hue not present in either of the other varieties of rhubarb. As a medicine it possesses little value, and is chiefly employed to adulterate East Indian and Turkey rhubarb.

Prop., &c. Rhubarb is an astringent, stomachic, and purgative. In small doses its operation is principally or wholly confined to the digestive organs; in larger ones, it first acts as a mild aperient, and, afterwards, as an astringent; hence its value in diarrhœa. It has also been used externally, to promote the healing of indolent sores. *Dose.* As a stomachic, 5 to 8 gr.; as a purgative, 15 to 30 gr. It is most effective when chewed, or in the form of powder produced by *grating* it.

RHUBARB (Roasted). Syn. *Burnt Rhubarb; Rheum Ustum,*—Lat. *Prep.* 1. *Rhubarb,* in coarse powder, is carefully and regularly heated in a smooth shallow iron-dish, with constant stirring, until its colour has changed to a *moderately dark brown,* when it is allowed to cool out of contact with the air; when cold it is reduced to powder, and at once put into a well-closed bottle.

2. (Mr. Hoblyn.) Roast *powdered rhubarb* in an *iron vessel,* constantly stirring, until it becomes almost black, then smother it in a covered jar. *Dose.* 5 to 10 gr.; as an astringent in diarrhœa, and a tonic in dyspepsia, &c. Mr. W. Procter, the well-known American pharmaceutist, recommends the rhubarb to be only roasted to a "*light brown.*"

RICE. Syn. *Oryza,*—Lat. The *seed* of *oryza sativa,* a plant of the natural order *gramineæ.* Several varieties are known in commerce, distinguished by the name of the country or district which produces them. The finest is that imported from Carolina.

As an *article* of *diet* rice is highly nutritious and wholesome when combined with fresh animal or other nitrogenized food; but, owing to the very small quantity of 'flesh-formers' which it contains, and its comparative destitution in saline matter, it is totally unfit to form the principal portion of the diet of the working classes, or the poorly fed, at least in this climate. "It does not appear so well calculated for European constitutions as the potato; for we find the poor constantly reject it, when potatoes can be had." This preference evidently depends on something more than mere whim or taste; for a few years since, when rice was substituted for potatoes in some of our Union Workhouses, the most serious consequences followed. In one of these, nine or ten deaths from scurvy and allied diseases occurred in a single fortnight.

RICINOLEIC ACID. Syn. *Elaiodic Acid, Oleoricinic Acid.* A variety of oleic acid discovered by MM. Bussy & Lecanu in *saponified castor oil.*

RICINOSTEARIC ACID. A solid fatty acid resulting from the *saponification* of *castor oil.* Neither this nor the preceding compound possesses any practical interest.

RICKETS. Syn. *Rachitis,*—Lat. A disease, generally confined to childhood, *characterised* by a large head, prominent forehead, protruded breast bone, flattened ribs, tumid belly, emaciated limbs, and great general debility. The bones, more particularly those of the spine and legs, become distorted, and exhibit a deficiency of earthy matter; the stools are frequent and loose, a slow fever succeeds, with cough, painful and difficult respiration, and unless the child rallies, atrophy is confirmed, and death ensues. When recovery takes place there is always more or less deformity left. Children of a scrofulous diathesis are the most liable to this affection.

The *common causes* of *rickets* are bad nursing, exposure to damp and cold, and insufficient nutrition arising from the use of white bread containing alum, or any of the pernicious compounds vended under the names of "*Farinaceous food,*" "*Infants' do.,*" "*Patent do.,*" *&c.* Rickets, like caries of the bones, is a disease which is scarcely known amongst infants whose pap is made of coarse meal bread, and whose mothers or nurses consume the same themselves.

The *treatment* of *rickets* depends more on proper domestic management, than on direct medication. Careful nursing, warm dry clothing, thorough ventilation, moderate exercise, and, above all, a light nutritious mixed diet abounding in nitrogenous matter and the phosphates, will do much to effect a cure. To these may be added, the administration of the milder chalybeate tonics, bark, or quinine, with occasional doses of some mild aperient, as phosphate of soda, or, when there is diarrhœa, of rhubarb or some other tonic purge. The administration of *small* doses of phosphate of lime or of dilute phosphoric acid, frequently repeated, or, still better, the daily use of jelly made of pure ivory or bone shavings, will often effect wonders in those cases in which the bones are implicated from an apparent deficiency of earthy matter. See *Bread, Farinaceous Food, Nursing, &c.*

RINGWORM. Syn. *Scald-head; Porrigo,*—Lat. The common ringworm, the *porrigo scutulata* of medical writers, is a disease that appears in circular patches of little pustules which afterwards form scabs, leaving a red pimply surface, and destroying the bulbs of the hair in its progress. It spreads rapidly, and is *very infectious,* often running through a whole school. It chiefly affects the neck, forehead, and scalp of weakly children, and frequently arises without any apparent cause, but, in general, may be traced to uncleanliness, or contact with parties suffering from the disease.

The *treatment* of *ringworm* consists in shaving the part, and keeping it clean with soap and water, at the same time that an occasional mild saline aperient is administered, and a light, nutritious diet, of which the *red meat* and *ripe fruits* should form a portion, be rigorously adhered to. When the *scabbing* commences, dressings of *tar ointment,* or of the *ointment of nitrate* or *nitric-oxide of mercury* of the London Ph., or a *mixture* of equal parts of the *first,* and either the *second* or *third,* should be applied, in each case diluting the mixture with sufficient *lard* to adapt it to the state of irritability of the part. During this treatment the head should be covered with an ordinary nightcap, or some simple bandage, and not enveloped in a bladder or oil-skin case, as is commonly the practice; since the complete exclusion of atmospheric air tends to aggravate the disease.

Obs. There are *several varieties* of *ringworm* or *porrigo* besides that noticed above, but being of less frequent occurrence, they are, consequently, less important. Of these are the *porrigo larvalis, crusta lactea,* or *milky crust* of infancy; the *porrigo furfurans,* or *scaly* or *branny scald-head,* occasionally occurring in adults, and more particularly in females;—the *porrigo favosa,* or *honey-comb ringworm,* of childhood, consisting of an eruption of large, soft, straw-coloured pustules, the appearance of which have given this name to the disease; and the *porrigo decalvans,* characterised by simple bald circular patches, without any other affection of the scalp. The last, although not a severe, is often a very obstinate disease, and can only be cured by the long-continued application to the part of some stimulant pommade, liniment, or wash, with the frequent use of the razor and warm soap-and-water.

RIPENING. See *Wines, Brewing,* and *Malt-liquors.*

ROACH. The *cyprinus rutilis* (Linn.), a fish of the carp family of soft-finned abdominal fishes (*malacopterigii abdominales*). It is found in most of the rivers and streams of England, and its flesh is regarded as "particularly light, sound, and wholesome."

ROASTING. Alexis Soyer recommends

"as an invariable rule," that "all *dark meats*, such as *beef* and *mutton*, should be put down to a *sharp fire*, for at least fifteen minutes, until the outside has acquired a coating of *osmazome* or *condensed gravy*, and then removed back, and allowed to cook *gently*. *Lamb*, *veal*, and *pork*, if young and tender, should be done at a moderate fire. *Veal* should even be covered with paper."

"Very *rich meat*, if covered with paper, does not require basting. *Fowls*, *&c.*, should be placed close to the fire, to set the skin, and in about ten minutes rubbed over with a small piece of *butter*, pressed in a spoon. *Meats* whilst *roasting* should be dredged with *flour*, just at the time when the gravy begins to appear; the flour absorbs it, and forms a coating which prevents any more coming out. *Hares* and *small game* should be treated in the same manner."

Under ordinary circumstances as to the fire, and the distance between it and the joint, *beef*, *mutton*, and *veal*, take about ¼ *hour* per *lb.* in roasting. *Lamb*, *poultry*, and *small game*, require only 12 to 14 minutes per *lb.*; whilst *veal* takes fully 15 minutes, and *pork* takes from ¼ hour to 20 minutes, as they must always be well done. The *flesh* of *old animals* requires more cooking than the flesh of *young ones*; and *inferior*, *tough*, and *bony parts*, than the prime joints and pieces.

Roasting is not an *economical method* of cooking pieces of meat abounding in bone or tendinous matter; since the nutritious portion of these is either destroyed, or rendered insoluble by the heat employed. Thus, the *raw bones* from a joint are capable of affording a rich and excellent basin of soup, highly nutritious; whilst the bones from a corresponding joint which has been roasted are nearly worthless when so treated. The same applies with even greater force to the gristly and tendinous portions. A dry heat either destroys them or converts them into a horny substance unfit for food; whilst by boiling they are transformed into a highly succulent, and nutritious article of food, besides affording excellent soup or jelly. Hence the policy of "*boning*" meat before roasting or baking it; or, at all events, of removing the bony portion which would be most exposed to the action of the fire. See *Bones* and *Jellies.*

ROB. Syn. *Roob.* A term, derived from the Arabic, formerly applied to the *inspissated juices of ripe fruit*, mixed with *honey* or *sugar* to the consistence of a conserve or thin extract. Rob of elder-berries (*elder rob; roob sambuci*), juniper berries (*juniper rob; roob juniperi*), mulberries (*mulberry rob; roob diamorum*), and walnuts (*walnut rob; roob dyacaryon*), with a few others, are still found in some of the foreign pharmacopœias.

ROCCELLIC ACID. Syn. *Roccelline.* A fatty crystallizable substance obtained from *roccella tinctoria* or *herb-archil.*

ROCCELLININE. A substance obtained, along with *orsellinic acid*, when *betaorsellic acid* is boiled with *water.* It forms hair-like crystals of a silvery lustre.

ROCK. The popular name of a sweetmeat formed of *sugar boiled to a candy*, and then poured upon an *oiled slab*, and allowed to cool in the lump. It is variously flavoured.

ROCK CRYSTAL. Native crystallized silica. See *Quartz.*

ROCK LEATHER, *Rock Wood.* See *Asbestos.*

ROCK OIL. See *Petroleum.*

ROCK SOAP. A native subsilicate of alumina; *used* for crayons, and for washing cloth.

ROCKETS (In Pyrotechny). *Prep.* 1. The Cases. These are made of *stout cartridge paper*, rolled on a mould and pasted, and then throttled a little below the mouth, like the neck of a phial. The *diameter* should be exactly equal to that of a leaden ball of the same weight, and the length should be equal to 3½ times the internal diameter. They are filled with the following mixtures, tightly driven in; and when intended for flight (*sky rockets*), they are "*garnished*," and affixed to willow rods to direct their course.

2. The Composition—*a.* (Marsh.)—*aa.* For 2-*oz. rockets.* From *nitre*, 54½ parts; *sulphur*, 18 do.; *charcoal*, 27¼ do.; all in fine powder, and passed through lawn.

ab. For 4-*oz. do.* From *nitre*, 64 parts; *sulphur*, 16 do.; *charcoal*, 20 do.; as the last.

ac. For ½-*lb.* to 1-*lb. do.* From *nitre*, 62¾ parts; *sulphur*, 15¾ do.; *charcoal*, 21½ do.

b. (Ruggieri.) — *ba.* For *rockets* of ¾-*inch diameter.* From *nitre*, 16 parts; *charcoal*, 7 do.; *sulphur*, 4 do.

bb. For ¾ to 1½-*inch rockets*, use 1 part more of *nitre.*

bc. For 1¾-*inch rockets*, use 2 parts more of *nitre.*

bd. By using 1 *part less* of *charcoal* and *adding* respectively 3, 4, and 5 parts of *fine steel filings*, the above are converted into "*Brilliant fires.*"

be. By the substitution of *coarse cast-*

iron borings for filings, and a *further omission* of 2 *parts* of *charcoal* from each, the latter are converted into "*Chinese fire.*"

Hand rockets and *ground rockets* are usually loaded with nothing but very fine *meal gunpowder* and *iron* or *zinc filings* or *borings.*

After *sky-rockets* and *water-rockets* are charged a *piece of clay* is driven in, through which a hole is pierced, and the "*head*" or "*garniture*" filled with *stars*, and a little cornpowder is then applied. See *Coloured Fires* and *Stars.*

ROLLS. A variety of fancy bread, generally in the form of small semi-cylindrical cakes, prepared by the bakers, and intended to be eaten hot for breakfast. They differ from *ordinary fine*, or *French bread*, as it is called, chiefly in containing more water. Some are wetted up with *milk-and-water*, and are hence called "*milk rolls.*"

ROLL (Wine). *Prep.* Soak a *French roll* or *sponge-biscuit* in *raisin*, *marsala*, or *sherry wine*, surround it by a *custard* or *cream thickened with eggs*, and add some *spice* and *ornaments.*

ROOT. Syn. *Radix*,—Lat. That part of a plant which imbibes its nourishment (from the soil or medium in which it grows), producing the herbaceous portion and the fructification, and which consists of the *caudex* or body, and *radicles*. (Linnæus.) In popular language, *bulbs*, *corms*, *tubers*, *&c.*, are included under this term.

Although the *roots* of *plants* are hidden by the soil from the gaze of man, and, when gathered, prove less showy and odorous than the members of the floral world, they are infinitely more useful and important than they are. With the single exception of the seeds or fruits, among which is bread corn, the roots of vegetables furnish a more ample and varied supply of matter fit for food, than any other part of their structure. Nor are their good offices confined to supplying man with food, for they also furnish him with many of his most valuable medicines, as well as numerous products of the utmost value in the arts, manufactures, and domestic economy. See *Vegetable Substances.*

ROOTS (Aperient). See *Species.*

ROPINESS. See *Malt Liquors* and *Wines.*

ROPOPHAGON. *Prep.* From *yellow soap*, sliced, 1 *oz.; soft soap* (finest), 3 *oz.;* melt them by the heat of *hot water*, then allow them to cool a little, and stir in of *oil of cloves*, ½ dr.; *essence of ambergris*, 10 drops. It is kept a month before sale. *Used* for shaving.

ROSACIC ACID. The name given by M. Proust to the rose-coloured sedimentary matter found in the urine of persons laboring under gout and inflammatory fevers. It is obtained by acting on the sediment with alcohol.

ROSE (Dog). See *Hips.*

ROSE (Damask). Syn. *Cabbage Rose, Hundred-leaved do.; Rosa Centifolia*,—Linn., Ph. L. & E. *Rosa Damascena, Flores Rosæ Albæ, Rosæ Centifoliæ Petala*,—Lat. var. "The *fresh petals*," (Ph. L.) Odorous, and slightly astringent and laxative. See *Distilled Waters* and *Syrups.*

ROSE (French). Syn. *Provins Rose, Red do.; Rosa Gallica*,—Linn., Ph. L. E. & D.; *Flores Rosæ Rubræ, F. Rosarum Rubrarum, Rosæ Gallicæ Petala*,—Lat. var. "The *fresh* and *dried unexpanded petals*," (Ph. L.) The white claws or peels of the petals are removed before drying them.

Uses, &c. The red rose is an elegant astringent and tonic, and as such is used as the basis of several pharmaceutical preparations. See *Confections, Honeys, Infusions*, and *Syrups.*

ROSEMARY. Syn. *Rosmarinus*,—Ph. L. E. & D. The *flowering tops* of *rosmarinus officinalis* (Linn.), or the common rosemary of our gardens, are officinal in the Ph. E. & D.; as is also the oil (*oleum rosmarini*) in the Ph. L. The odour of both is refreshing, and they are reputed carminative, emmenagogue and neurotic. The *dried leaves* are occasionally used by the hysterical and hypochondriacal as a substitute for China tea. The *oil* is an ingredient in Hungary water, and is much used in various cosmetic compounds under the presumption of its encouraging the growth of hair and improving its quality.

ROSEOLA. See *Rashes.*

ROSE PINK. See *Red Pigments.*

ROSIN. See *Resins.*

ROSY-DROP. See *Acne.*

ROT. Syn. *Great Rot, Hydrophic do., Sheep do., Wet do.* A disease peculiar to sheep, produced by a humid atmosphere, wet pasturage, and exposure to the weather. The *leading symptoms* are loss of flesh and vivacity; the lips and tongue look livid, and the eyes sad and glassy; the pelt comes off on the slightest pull; the breath is fœtid, and the urine high-coloured and scanty; and there is either black purging or obstinate costiveness. The *treatment* consists in a change to a dry warm situation, and a dry diet, consisting of oats, barley meal, tail-wheat, &c., to which some turnips, carrots, or mangel wurzel may be added, with a liberal supply of common salt, and a few grains of sulphur, daily. These last two substances form the active ingredients in Flesh's "*Patent restorative.*"

ROT (In Timber). See *Dry Rot.*

ROTATION (of Crops). The *rotation* or *succession of crops* is absolutely necessary for the successful and economical cultivation of the soil. *Crops* have been divided by agriculturists into *exhausting crops*, *restoring crops*, and *cleaning crops.* The most EXHAUSTING CROPS are usually considered to be those of corn, but all those that are allowed to ripen their seed, and which are carried off the ground, are also exhausting, but in different degrees. Even *clover*, *tares*, and *grass* cut green, are considered as exhausting, but in a less degree than those that are allowed to ripen. RESTORING CROPS are such as are allowed to decay upon the ground, or are consumed upon it by domestic animals. CLEANING CROPS are such as are grown in drills, and undergo the usual operations of *weeding*, *hoeing*, &c.; the majority of these may also be regarded as exhausting crops. An *exhausting* crop should always be followed by a *restoring* or *a cleaning* crop; or where possible by *both combined.* Crops should also succeed each other in such a way that the soil may not be exhausted of any one particular kind of nutriment. This is best effected by so rotating the crops that plants which are nearly allied should not succeed each other on the same soil, or at all events not more than once. See *Agriculture*, *Soils*, *&c.*

ROTTEN STONE. See *Tripoli.*

ROUGE. Syn. *Toilet Rouge; Rouge Végétal, Rouge d'Espagne*, — Fr. *Prep.* Wash *safflower* (any quantity) until the water comes off colourless; dry and pulverize it, and digest the powder in a *weak solution* of *crystallized carbonate of soda;* then place some *fine cotton-wool* at the bottom of a porcelain or glass vessel, pour the filtered *tinctorial solution* on this, and throw down the colouring matter, by gradually adding *lemon juice* or *white-wine vinegar*, until it ceases to produce a precipitate; next wash the *prepared cotton* in *pure cold water*, and dissolve out the colour with a fresh *solution of soda;* to the *new solution* add a quantity of *finely-powdered talc* or *French chalk*, proportionate to the intended quality of the rouge; mix well, and precipitate with *lemon juice*, as before; lastly, collect the powder, dry it with great care, with as little heat as possible, and triturate it with a *very small quantity* of *oil of olives*, to render it smooth and adhesive.

Obs. According to the best authorities, this is the only article which will brighten a lady's complexion, without injuring the skin. The relative fineness and proportion of talc employed determines the quality of the rouge. It is applied by means of a camel's hair pencil, a small "powder puff," or a hare's foot. It is also employed under the form of *pommade* and *crepons.* The last of these consist of pieces of white *woollen-crape*, upon which the colouring matter of the carthamus has been precipitated, instead of upon the talc, noticed above.

The following articles also pass under the name of *rouge*, and are used for the purposes named after each:—

Brown-red Rouge. Jeweller's rouge.

Chinese Card Rouge. This is a *carthamate of soda*, colourless when applied, but being decomposed by the acid secretions of the skin, acquires a most beautiful rose-like tint. (O'Shaughnessy.)

Jeweller's Rouge. See *page* 644. *Used* to polish gold, &c.

Liquid Rouge. The *red liquid* left from the preparation of carmine; or, a *solution of carmine* in *weak carbonate of potash water;* or of *pure rouge* in *alcohol acidulated with acetic acid.*

Rouge Indienne. The *terra persica*, or *Indian red*, imported from Ormuz.

Rouge de Prusse. Light red, or burnt *yellow ochre.* See *Red Pigments.*

Spanish Lady's Rouge. This is *cotton wool* which has been repeatedly wetted with an *ammoniacal solution of carmine*, and dried. It is applied like *rouge crepons.*

Vert Rouge d'Athènes, or "*pure rouge.*" See *Carthamine.*

ROUGHENING. See *Wines.*

RUBEFACIENTS. Substances or agents which when applied for a certain time to the skin occasion a redness and increase of heat, without blistering. They act as counter-irritants. *Mustard, powdered ginger* (both made into a paste with water), *hartshorn* and *oil*, and *ether* and *spirit of wine* (when their evaporation is prevented), are familiar examples of this class of remedies.

RUBEOLA. See *Measles.*

RUBIACINE. An orange-coloured substance, obtained from *madder.* By the action of oxidizing agents it is converted into *rubiacic acid*, *rubian* (a bitter principle), and some other substances.

RUBIC ACID. Syn. *Rubinic Acid.* See *Japonic Acid.*

RUBY. See *Gems* and *Pastes.*

RUDDLE. See *Red Pigments.*

RUE. Syn. *Rutæ Folia; Ruta*, — Ph. L. & E. "The *leaf* of *ruta graveolens*"

(Linn.) Ph. L. A powerful antispasmodic, diuretic, and stimulant. It is also reputed nervine and emmenagogue. The *fresh leaves* are powerfully acrid, and even vesicant; but they become milder in drying. *Dose.* Of the powder, 15 to 30 gr., twice or thrice daily; in hysteria, flatulent colic, &c. See *Infusions* and *Oils* (Volatile).

RUFINE. A red substance, possessing little practical interest, formed by the action of *sulphuric acid* on *salicine.*

RUM. Syn. *Spiritus Jamaicensis, Spiritus Sacchari,*—Lat. An ardent spirit obtained by distillation from the fermented skimmings of the sugar-boilers (*syrup scum*), the drainings of the sugar-pots and hogsheads (*molasses*), the washings of the boilers and other vessels, together with sufficient *recent cane juice* or *wort* prepared by mashing the *crushed cane,* to impart the necessary flavour. The *sweet liquor*, before fermentation, commonly contains from 12 to 16% of saccharine.

Obs. Rum is imported from the West Indies. The best comes from Jamaica, and is hence distinguished by that name. *Leeward Island Rum* is less esteemed. The *duty* on *West India rum* is 9*s.* per proof gallon; that on *East India rum,* 15*s.*; the latter, hence, amounts to a prohibition. The consumption of rum has long been declining in England; its place being supplied by *gin* or *British brandy.* Rum owes its flavour to a volatile oil and butyric acid; a fact which the wary chemist has availed himself of in the manufacture of a butyric compound (*essence of rum*) for the especial purpose of enabling the spirit-dealer to manufacture a *factitious rum* from malt or molasses spirit. In Jamaica it is usual to put *sliced pine apples* into the puncheons containing the finer qualities of rum, which is then termed *pine-apple rum.* See *Alcohol, Spirit,* &c.

RUPERT'S DROPS. These are made by letting *drops of melted glass* fall into *cold water.* By this means they assume an oval form, with a tail or neck resembling a retort. They possess this singular property, that if a small portion of the tail is broken off, the whole bursts into powder with an explosion, and a considerable shock is communicated to the hand.

RUPIA. A skin disease, which commences with an eruption of flattish vesicles, which are slightly inflamed at their base. These are slowly succeeded by an ill-conditioned discharge, which concretes into thin scabs, which are easily rubbed off, and are rapidly regenerated, a circumstance which more particularly distinguishes this affection from ecthyma. In *rupia simplex* the crust or scab "is comparable in appearance, and apparent construction, and sometimes, also, in size, to an oyster-shell." In another variety, *rupia prominens,* the crust is "conical in shape, and resembles a limpet-shell." In *rupia escharotica,* which is confined to infants and young children, there are ill-looking sores which, from their peculiar corroded appearance, and the absence, or the thin and imperfectly formed condition of the crusts, have been termed "burnt holes."

Rupia is a *common consequence* of dirt and semi-starvation; and, from thus occurring in highly debilitated constitutions, and cachectic habits, is very difficult to cure, and frequently fatal. The *treatment* consists in the judicious use of a light restorative diet, with tonics and alteratives, assisted by warm bathing, and free exercise in the open air.

RUPTURE. See *Surgery* (Popular).

RUSKS. *Prep.* From 4 *eggs; new milk* and *warm water,* of each, ½ pint; *melted butter* and *sugar,* of each, ¼ *lb.; yeast,* 3 table-spoonfuls; beat well together with as much *flour,* added gradually, as will make a very light paste; let it rise before the fire for half an hour, then add a *little more flour,* form it into small loaves or cakes 5 or 6 inches wide, and flatten them; bake these moderately, and when cold, cut them into slices the size of rusks, and put them into the oven to brown a little. A nice *tea-cake* when hot, or with caraways to eat cold. *Plain rusks* are made by simply cutting loaves of bread into slices, and baking them in a slow oven to the proper colour.

RUSMA. An *arsenical iron pyrites,* found in Galatia, which when reduced to powder, and mixed with half its weight of *quick-lime,* is used by the Turkish ladies to make their "*psilothrons,*" or compounds to remove superfluous hair. See *Depilatories.*

RUST. Syn. *Rubigo,*—Lat. The coating or film of oxide or carbonate which forms on the surface of several of the metals when exposed to a moist atmosphere; more particularly, that which forms on iron or steel (*hydrated sesquioxide of iron; Ferrugo, Ferri rubigo*).

To *prevent iron* or *steel goods rusting,* it is merely necessary to preserve them from damp or moisture. In the shops, *small articles* in *steel* are, commonly, either *varnished* or enclosed in *quicklime* finely pulverized; *large articles* are generally protected with a *coating* of *plumbago,* or of *boiled oil,* or some cheap *varnish,* applied to them previously gently heated. *Surgical* *instruments* are frequently slightly smeared with a little *strong mercurial ointment,* with the same intention.

Spots of *rust* may be removed from the surface of *polished iron* or *steel* by rubbing them with a little *tripoli* or *very fine emery* made into a paste with *sweet oil;* or, chemically, by a mixture of *polisher's putty-powder* with a little *oxalic acid,* applied with *water.* When the *last* is employed, the articles should be afterwards well *rinsed* in *pure water,* then wiped dry, and finished off with a warm and dry rubber, in order to remove every trace of acid.

RUST'S ASTRINGENT. *Prep.* From *Armenian bole, carbonate of magnesia,* and *white sugar,* of each, 2 dr.; *rhubarb,* 1 dr.; (all in powder;) *oil of mace,* 2 or 3 drops; mix, and triturate well. *Dose.* 1 teaspoonful, thrice daily; in chronic gonorrhœa, gleet, excessive menstruation, &c.

RUTHENIUM. A new metal, discovered by M. Claus, associated with iridium, in the *residue* from *crude platinum* which is insoluble in aqua regia. It forms small angular masses, with a metallic lustre; is very brittle and infusible; resists the action of acids, but readily oxidizes when heated in the air. Sp. gr. 8·6.

Chloride or *sesquichloride of ruthenium* is orange-yellow, astringent, and soluble. Its solution, when heated, turns first green and then blue, with decomposition, and the formation of the *protochloride.* It forms *double salts* with the chlorides of ammonium and potassium.

Protoxide of ruthenium is a greyish-black, bronze-like powder, obtained by heating bichloride of ruthenium with carbonate of soda in excess, in a stream of carbonic acid gas, and then washing away the soluble saline matter. Thus prepared, it is insoluble or only feebly soluble in acids.

Sesquioxide of ruthenium, in the anhydrous state, is a bluish-black powder, formed by heating the metal in the air. It is also precipitated by alkalies from the sesquichloride as a blackish-brown hydrate, soluble in acids forming orange-yellow salts.

Binoxide of ruthenium is a deep-blue powder, procured by roasting the bisulphuret.

Other compounds of ruthenium, besides those named above, have been formed, but possess no practical importance, including an acid (*ruthenic acid*). A paper on the subject will be found in the *Annalen der Chemie und Pharm.,* lix, 234.

RUTILINE. A name given by Braconnot to the product of the decomposition of *salicine* by *sulphuric acid.* A brownish-red solid, coloured blood-red by acids, and violet by alkalies.

RUTINIC ACID. An acid compound said to exist in the *leaves* of *ruta graveolens* or *garden rue.*

RYE. Syn. *Secale,*—Lat. The *seed* of *secale cereale* (Linn.), a gramineous plant, the native country of which is undetermined. It is a more certain crop, and requires less culture and manure than wheat, and is, hence, largely cultivated in Germany, Russia, and the northern parts of Europe.

It has been stated that *rye* comes nearer to wheat than any other grain; but this is evidently an error, since it is less nourishing than wheat, and is more strongly disposed to acescency than any other grain. In those unaccustomed to its use, it generally, at first, occasions acidity, heartburn, and diarrhœa. It, however, furnishes an excellent *malt* for the distillation of spirit.

According to Einhof, *rye* consists of—*husk,* 24·2%; *flour,* 65·6%; *water,* 10·2%. The FLOUR gave of—*gluten,* 9·5%; *vegetable albumen,* 3·2%; *starch,* 61·1%; *uncrystallizable sugar,* 3·3%; *gum,* 11·0%; *vegetable fibre,* 6·3%; *loss,* including a *vegetable acid,* 5·6%. The ASH contained the *phosphates of lime* and *magnesia.*

RYE (Spurred). See *Ergot.*

SABADILLA. *Cebadilla, Cevadilla; Sabadilla,*—Ph. E. The *fruit* or *seeds* of *asagræa officinalis* (Lindley), *helonias officinalis* (Don.), *veratrum sabadilla* (Retz.), and, probably, of other species of *melanthaceæ* (*colchicaceæ,*—Lindl.) A drastic and dangerous cathartic, formerly used in tape-worm; and, *externally,* to destroy pediculi, but, even, for this purpose, when the scalp has been denuded or ulcerated, it has sometimes caused death. It is now used chiefly as a source of *veratria.*

SABADILLIC ACID. Syn. *Cevadic Acid.* A crystallizable, fusible, volatile, fatty acid, obtained from the oil extracted by ether from the *seeds* of *veratrum sabadilla.* The *sabadillate of baryta* is prepared in the same way as the butyrate of baryta is from butter. When this salt is heated with concentrated phosphoric acid, the sabadillic acid sublimes in white needles. It has an odour resembling butyric acid.

SABADILLINE. Syn. *Sabadillina.* An alkaloid obtained by Couerbe from *cebadilla seeds.* According to Simon, it is merely a compound of the resinates of soda and veratria. It is very poisonous.

SABLE. The *mustella zibellina* (Linn,) a small quadruped of the martin-cat family, found in Northern Asia. Its *fur* is remarkable for its fine quality and rich colour, and for the hairs turning with equal ease in every direction. A single skin of the darker colour, taken from the animal between November and February, though only 4 inches square, fetches about £15. The skins of the rabbit, cat, &c., dressed, painted, and lustred, are sold under the name of *common* or *mock sable.*

SABOTIERE. An apparatus of peculiar construction, employed by the French confectioners for making *ices.* It consists of a *pail* to contain a freezing mixture, and an *inner vessel* for the creams to be iced. It may be used with a mixture of *pounded ice* and *salt* (see *p.* 591), but is intended for one of *powdered sulphate of soda* and *hydrochloric acid.* The pail and cream vessel being loaded, and closely covered, an alternate rotatory motion is given to the apparatus by means of the handle, for 10 or 15 minutes, care being taken to occasionally scrape down the frozen portion of the cream from the sides, by means of a wooden spoon. See *Refrigeration.*

SACCHARIC ACID. Syn. *Oxalhydric Acid.* A compound, formerly supposed to be identical with malic acid, resulting from the action of dilute nitric acid on sugar. It is frequently found in the mother-liquor of oxalic acid.

Prep. Take of *sugar* or *gum*, 1 part; *nitric acid*, 2 parts; (diluted with) *water*, 10 parts; dissolve by the aid of heat, and continue the heat as long as reaction takes place; then neutralize the liquid with *carbonate of lime*, precipitate by *acetate of lead*, and decompose the precipitate, suspended in water, by *sulphuretted hydrogen;* neutralize the *filtered liquid* with *potash*, concentrate and crystallize; redissolve the resulting *saccharate of potassa*, decolour it with a little *animal charcoal*, reprecipitate by *acetate of lead*, and decompose the precipated *saccharate of lead* by *sulphuretted hydrogen*, as before.

Prop., &c. Long colourless needles; mixed with nitrate of silver, ammonia being subsequently added, a white precipitate falls, which is reduced, on gently warming the whole, to *pure metallic silver*, the vessel being coated with a smooth and brilliant layer of that metal. It forms salts with the bases called *Saccharates;* of which those of the alkalies, lime, and baryta, are soluble. Nitric acid converts it into oxalic acid.

SACCHARINE. The technical name of the uncrystallizable sugar found in malt-wort.

SACCHARINE FERMENTATION. This occurs during the germination and kiln drying of grain in the operations of malting, and in the mashing of malt in brewing. The sweetening of bread during its exposure to heat in the oven, is also included under this head by many writers.

The *substance* which most *powerfully excites* the *sugar fermentation* was first shown by Payen and Persoz to be a peculiar principle to which they have given the name of "*diastase.*" This is always present in good malt, and possesses the singular property of converting *starch* successively into *gum* (dextrine) and *sugar*, at a temperature ranging between 149° and 168° Fahr. During the action of this substance on starch, it is itself decomposed, and when the sugar fermentation ceases, it is found to have entirely disappeared. It is the presence of diastase in malt, which *alone* converts the starch of the grain into sugar during the operation of *mashing* with hot water; and hence the absolute necessity of employing water at the proper temperature, as on this depends the *strength* and *sweetness* of the wort, and consequently its fitness for undergoing the vinous fermentation, and for making beer. *Vegetable albumen* and *gluten* also possess the property of exciting the saccharine fermentation, but in a considerably inferior degree to diastase.

The sugar formed during the germination of seeds containing starch results from the action of diastase, and disappears as soon as the woody fibre (*lignine*), which has a similar constitution, is developed, forming the skeleton of the young plant. (Liebig.) See *Brewing, Diastase, Dextrine, &c.*

SACCHAROMETER. An instrument, similar in principle to the common spirit hydrometer, but so weighted and graduated, as to adapt it for the indication of the richness of malt-worts in sugar, or saccharine, expressed in *pounds* per *barrel,* or the *excess of gravity*, over that of *water*, the last being taken at 1000. See *Brewing, Syrups, Worts, &c.*

SACCHOLACTIC ACID. Syn. *Saclactic Acid.* See *Mucic Acid.*

SACCHULMIC ACID. A light brown powder, obtained by Boullay and Malaguti, by boiling *sugar* along with *dilute sulphuric acid.* It is soluble in ammonia and the fixed alkalies, forming salts (*sacchulmates*). It is the *ulmic acid* of Boullay & Malaguti.

SACCHULMINE. An insoluble substance, obtained, like the last, by boiling 10 parts of *sugar*, 30 of *water*, and 1 of *sulphuric acid*, for a very long time. It is deposited in brilliant, brown scales, along with some *sacchulmic acid*. The latter is removed by the action of ammonia water.

Prop., *&c.* Sacchulmine is insoluble in ammonia and the alkalies. It is the *ulmin* of Boullay & Malaguti.

SACHET. Syn. *Sacculus*,—Lat. Sachets (*sacculi*) are little bags, containing dry substances, used for the external medication of parts, or for communicating agreeable perfumes to wearing apparel, drawers, furniture, &c. Those belonging to *perfumery* are commonly filled with mixtures of *fragrant vegetable substances* reduced to coarse powder, and differ from those employed for *pot pourri* chiefly in being used in the dry state. Sacculi are now seldom employed in this country in legitimate medicine. See *Powders* (Scented), *&c.*

SACHET (Anti-phthisic). Syn. *Sacculus Anti-phthisicus*,—Lat. *Prep.* Dissolve of *aloes*, 1 *oz.*, in *strong decoction of fresh rue*, ½ pint; next fold a piece of *soft muslin* in 8 folds, large enough to cover the chest and part of the stomach; steep this in the decoction and dry it in the shade; lastly, place in a small bag, one side of which is formed of scarlet silk or wool, and the other, intended to be worn next the skin, of the finest net or gauze. A celebrated domestic remedy for consumption and asthma. It is intended to be constantly worn on the chest.

SACHET (Resolvent). Syn. *Melting Bag; Sacculus Resolvens*,—Lat. *Prep.* 1. (Dr. Breslau.) *Iodide of Potassium*, 1 part; *sal ammoniac*, 8 parts; dry and reduce each separately to fine powder; mix them, and enclose ½ *oz.* to 1 *oz.* of the mixed powder in a *small bag* of linen or silk. *Used* as a resolvent to indolent tumours, especially goitures and scrofulous indurations. It should be worn on the part night and day for some time. The part next the skin should be well-pricked with a needle, and the powder shaken up and readjusted every 2 or 3 days; and it should be renewed about once a fortnight.

2. (Trousseau & Reveil.) *Iodide of potassium*, 1 part; *burnt sponge*, 4 parts; *fine saw-dust*, 5 parts; as before.

SACK. (From *sec*, Fr., *dry*.) A wine used by our ancestors, supposed by some to have been Rhenish or Canary; but, with more probability, by others, to have been *dry mountain* or "*vin d'Espagne; vin sec;*" (Howell, Fr. and Eng. Dict., 1650.) Falstaff calls it "*sherris sack*," (sherry sack,) from *Xeres*, a sea town of Corduba, where that kind of sack (wine), is made. (Blount.) At a later period, the term came to be used as a general name for all sweet wines.

SAFFLOWER. Syn. *Bastard Saffron, Dyer's do.; Carthamus.* The *flowers* of *carthamus tinctorius* (Linn.), a plant cultivated in Spain, Egypt, and the Levant. It contains two colouring principles; the one *yellow*, and the other *red.* The first is removed by water, and is rejected. The *second* is easily dissolved out by *weak solutions* of the *carbonated alkalies*, and is again precipitated on the addition of an acid. This property is taken advantage of in the manufacture of *rouge*, and in *dyeing silk* and *cotton.*

The most lively tints of *cherry*, *flame*, *flesh*, *orange red*, *poppy*, and *rose colour* are imparted to silk by the following process, modified to suit the particular shade required:—The *safflower* (previously deprived of its yellow colouring matter by water) is exhausted with *water* containing either *carbonate of soda* or of *potassa*, in the proportion of about 5% of the weight of the prepared dye-stuff acted on; the resulting liquid is next treated with *pure lemon-juice* until it acquires a distinct and rich red-colour; the silk is then introduced and turned about as long as it is perceived to take up colour, a little *more lemon-juice* being added as may appear necessary; for deep shades this is repeated with one or more *fresh baths*, the silk being dried and rinsed between each immersion; it is, lastly, brightened by turning it for a few minutes through a bath of *warm water* to which a little *lemon juice* has been previously added. For *flame colour*, the silk should receive a slight shade with annatto *before* putting it into the safflower-bath. For the *deeper shades*, when expense is an object, a little *archil* is commonly added to the first and second bath.

SAFFRON. The prepared *stigmata* or stigmas of *croci sativus* or *saffron crocus.* There are two principal varieties known in commerce:—

1. *Saffron, Hay do.; Crocus in Fœno. C. Hispaniolus, Croci Stigmata; Crocus*,—Ph. L. E. & D. This consists of the stigmas, with part of the styles, carefully picked from the other parts of the flowers, and then dried on paper, by a very gentle heat, generally, in a portable oven constructed for the purpose.

2. *Cake saffron; Crocus in Placentâ.* This, professedly, merely varies from the last, in being compressed into a cake, after it has become softened by the fire, and being then

dried in that condition. The *cake saffron* of *commerce* is now, however, mostly, if not entirely, composed of *safflower* made into a paste with some *sugar* and *gum-water*, rolled out on paper into oval cakes 10 to 12 inches long, 9 or 10 broad, and about $\frac{1}{8}$th of an inch thick, and then dried. "I can detect neither saffron nor marigold in them." (Dr. Pereira.)

Pur. Saffron, of all the articles of commerce, except French brandy, is, perhaps, the one most largely and constantly adulterated. Abroad it is frequently mixed with safflower, and in England with "*prepared marigolds*," or *French* (mock) *saffron*. These frauds may be detected by the inferiority of the colour, and by soaking the leaves in water, when the stigmas of the *crocus sativus* may be readily distinguished from the *florets* of *safflower* and the *petals* of *marigolds*. Winckler and Grüner propose to detect these substances by means of a solution of *nitrate of silver* or of *sesquichloride of iron*. The infusion of *true saffron* is not altered by these reagents, but that of either of the above-mentioned adulterants is rendered opaque, and is at length precipitated. "It consists of tripartite filaments of an orange-red colour, with the small filaments towards the apex dilated." (Ph. L.) In the *wholesale drug-trade*, *prepared marigolds* are not only employed to mix with genuine saffron, but are extensively sold to the country dealers for that purpose. *Old* and *dry saffron* is "*freshened up*" by rubbing it between the hand, slightly oiled, and then re-picking it.

Prop., &c. Saffron is anodyne, cordial, emmenagogue, and exhilarant; but is now seldom employed, except as an adjuvant, in medicine. Amongst cooks, confectioners, and liquoristes, it is largely used on account of its fine colour. Its colouring principle is named *polychroite*.

SAFFRON (Meadow). See *Colchicum.*

SAGAPENUM. This substance is described in the London Pharmacopœia as a gum resin, the production of an uncertain species of ferula. The mass of the sagapenum sold to the retail trader is, however, a factitious article, formed by softening a mixture of *assafœtida*, 3 parts, and *galbanum*, 15 parts; over a water or steam bath, and then stirring in about $\frac{1}{17}$th of their weight of *oil of turpentine*, with a little *oil of juniper*. This mixture is labelled "*Gum. Sagapeni Opt*," an inferior sort being made by adding sundry portions of *yellow resin* and *paste of gum tragacanth* to the above. (Cooley, *Chem.* v, 369.)

Prepared Sagapenum (*Sagapenum præparatum*,—Ph. L.) is ordered to be prepared in the same manner as "prepared ammoniacum."

Obs. Sagapenum is the feeblest of all the fœtid gum-resins. *Dose.* 5 to 15 gr., made into pills; as an antispasmodic and emmenagogue.

SAGO. Syn. *Sago*,—Ph. L. E. & D. "The *fæcula* (starch) from the stem of *sagus lævis*, *s. Rumphii*, and, perhaps, of other species of palms." (Ph. L.) It forms the principle portion of the pith of the sago palm, and other allied trees. Its *properties* and *uses*, for the most part, resemble those of arrowroot. It is *used* for making puddings, jellies, &c. (See *p.* 656.)

SAL ABSINTHII. Carbonate of Potash.

SAL ACETOSELLÆ. See *page* 1041.

SAL ALEMBROTH. See *pages* 570 and 781.

SAL AMMONIAC. See *page* 59.

SAL DE DUOBUS. Sulphate of potash.

SAL DIURETICUS. Acetate of potash.

SAL ENIXUM. Crude bisulphate of potash.

SAL GEMMÆ. Rock or fossil salt.

SAL MARTIS. Sulphate of Iron.

SAL MIRABILE. Sulphate of Soda.

SAL PERLATUM. Phosphate of soda.

SAL POLYCRESTUS. See *page* 1042.

SAL PRUNELLA. Syn. *Sore-throat Salt, Crystal Mineral; Potassæ Nitras Fusa, P. N. Fusum, Nitrum Tabulatum, Sal Prunellæ, Lapis, do.*,—Lat. From *nitre*, fused in a Hessian crucible, and poured out on a smooth surface, or into moulds, to cool. Its usual form and size is that of an ordinary musket bullet, with the tail, in which state it is known in the drug trade as "*sal prunellæ globosum*." When in cakes it is often called "*sal p. in placentis*," or "*s. p. tabulatum*." A small portion allowed to dissolve slowly in the mouth, the saliva being slowly swallowed, often removes incipient inflammatory sore throat. *Product* 50%.

SAL SATURNI. Sugar of lead.

SAL SEIGNETTE. Rochelle salt.

SAL VOLATILE. Sesquicarbonate of ammonia.

SALADS are generally made of *esculent vegetables*, either singly or mixed, chosen according to taste or time of year, and seasoned with *oil*, *mustard*, and other *condiments*. Sliced *boiled egg* is a common addition. *Cold meat*, *poultry*, and *game*, sliced small, with some *cucumber*, or *celery*, and a little *onion* or *chopped parsley*, or instead of them, some *pickles*, make a very relishing salad. *Fish* are also employed in the same manner.

Lettuce Salad. Take two *large lettuces*, remove the faded leaves and the coarser green ones; next cut the green tops off, pull each leaf off separately, rinse it in *cold water*, cut it *lengthways*, and then into *four* or *six pieces:* put these into a bowl, and sprinkle over them, with your fingers, 1 small tea-spoonful of *salt*, ½ do. of *pepper*, 3 do. of *salad oil*, and 2 do. of *English* or 1 of *French vinegar;* then with the spoon and fork turn the salad *lightly* in the bowl until thoroughly mixed; the less it is handled the better. A tea-spoonful each of *chopped chervil* and *tarragon* is an immense improvement.

Obs. The above seasoning is said to be enough for ¼ *lb.* of lettuce. According to the celebrated M. Soyer, it is "such as the Italian Count used to make some years since, by which he made a fortune in dressing salads for the tables of the aristocracy." The above may be varied by the addition of 2 *eggs*, boiled hard, and sliced, a little *eschalot*, or a few *chives* or young *onions.* Several other salad herbs, especially *endive, water cresses*, and *mustard-and-cress*, may be "dressed" in the same manner; always remembering that the excellence of a salad depends chiefly on the vegetables which compose them being *recently gathered*, and *carefully cleansed.*

To improve the appearance of the above, and other salads, when on the table or sideboard, before being used, the gay flower of the nasturtium or marygold, with a little sliced *beet-root* or *radish*, and *sliced cucumber*, may be tastefully intermixed with them; by which they are rendered not only more refreshing to the sight, but also, through the mind, more grateful to the palate.

Lobster Salad. (Soyer.) "Have the bowl half filled with any kind of *salad herb* you like, as *endive, lettuce, &c.;* then break a *lobster* in two, open the tail, extract the *meat* in *one piece*, break the *claws*, cut the meat of both in small slices, about a quarter of an inch thick, and arrange these tastefully on the salad; next take out all the *soft part* from the belly, mix it in a basin with 1 tea-spoonful of *salt*, ½ do. of *pepper*, 4 do. of *vinegar*, and 4 do. of *oil;* stir these well together, and pour the mixture on the *salad;* lastly, cover it with 2 *hard eggs*, cut into slices, and a few slices of *cucumber*." "To vary this, a few *capers* and some *fillets* of *anchovy* may be added, stirred lightly, and then served, either with, or without some *salad sauce.* If for a dinner, *ornament* it with some *flowers* of the *nasturtium* and *marigold.*"

Concluding Remarks. Salads being eaten raw, are mostly of difficult digestion, especially those of the more cooling kind, containing cucumbers, hard egg, &c. They are, however, *highly antiseptic*, and tend to correct "the grossness" of animal food, and the bad effects of a salt-meat diet. They are very useful in scurvy, and excellent to excite the appetite when languid or temporarily lost. "What is more refreshing than salads when your appetite seems to have deserted you, or even after a capacious dinner—the nice, fresh, green, and crisp salad, full of life and health, which seems to invigorate the palate and dispose the masticating powers to a much longer duration." (Soyer.) See *Sauces*, and the respective *salad vegetables.*

SALEP. Syn. *Salop, Saloup?* The tuberous roots of *orchis mascula*, and other allied species, washed, dried, and afterwards reduced to coarse powder. That imported from Persia and Asia Minor, occurs in small oval grains, of a whitish-yellow colour, often semi-translucent, with a faint, peculiar smell, and a taste somewhat resembling gum tragacanth. It consists, chiefly, of *bassorine* and *starch*, is very nutritious, and is reputed aphrodisiac. It is employed in the same way as sago. A decoction of about 1 *oz.* of this substance in a pint of *water*, is sold at street-stalls, in various parts of this country, under the name of "*saloup.*" A tea made of *sassafras chips*, flavoured with *milk* and *coarse brown sugar* or *treacle*, is also sold in the same way, and under the same name.

French salep is prepared from the *potato.* Dr. Ure says that the *orchis mascula* of our own country, properly treated, would afford an article of salep, equal to the Turkey, and at a vastly lower price.

SALICINE. Syn. *Salicina?* A white, crystalline substance, discovered by Le Roux and Buchner, in the *bark* and *leaves* of several species of *salix* and *populus.* It occurs most abundantly in the white willow (*salix alba*), and the aspen (*salix helix*), but is also found in all the bitter poplars and willows. From willow bark which is fresh, and rich in salicine, it may be obtained by the cautious evaporation of the cold aqueous infusion.

Prep. 1. (Merck.) Exhaust *willow bark* by repeated coction with *water*, concentrate the *mixed liquors*, and while boiling, add *litharge* until the liquid is nearly decoloured; filter, remove the dissolved oxide of lead, first by *sulphuric acid*, and afterwards by *sulphuret of barium;* filter, and evaporate, that crystals may form; the crystals must be purified by re-solution and re-crystallization.

2. (P. Cod.) To a *strong filtered decoction* of *willow bark* add *milk of lime* to throw down the colour; filter, evaporate the liquor to a syrupy consistence, add *alcohol* (sp. gr. 0·847), to separate the gummy matter, filter, distil off the spirit, evaporate the residuum, and set it aside in a cool place to crystallize; the crystals are purified by solution in *boiling water*, agitation with a little *animal charcoal*, and re-crystallization.

Prop., &c. Salicine forms white, silky needles and plates; it is intensely bitter; inodorous; neutral; non-basic; fuses at 230° Fahr. with decomposition; is soluble in 5½ parts of water at 60°, and in much less at 212°; dissolves readily in alcohol; but is insoluble in ether. Hydrochloric acid, and dilute sulphuric acid convert it into a tasteless powder called *Saliretine*, which is insoluble in water, but dissolves in alkalies and alcohol. With chlorine it forms *Chlorosalicine.* It is tonic and febrifuge, and has been given in dyspepsia, intermittents, and other diseases in which quinine is commonly administered; but it has not fulfilled the early expectations respecting it. *Dose.* 3 to 30 gr.

Pur., & Tests.—1. It is entirely soluble in water and rectified spirit.—2. When strongly heated it is *wholly* dissipated, and if kindled, burns with a bright flame, leaving a bulky charcoal.—3. Its solution is absolutely neutral to test paper.—4. Concentrated sulphuric acid causes it to agglutinate into resin-like lumps, with the accession of an intense blood-red colour.—5. When its aqueous solution is mixed with some hydrochloric acid, or dilute sulphuric acid, and the mixture is boiled for a short time, the liquid suddenly becomes turbid, and deposits *saliretine*, under the form of a granular crystalline precipitate. This is characteristic.—6. No reagent precipitates salicine without decomposition. See *Salicylic* and *Salicylous Acid.*

SALICYDES. Syn. *Hydrosalicylates, Salicylites?* Compounds of salicyle with the metals, &c. See *Salicylous Acid.*

SALICYLE. Syn. *Salicule.* A compound salt-radical, forming the basis of the so-called *salicyl-compounds*, or *salicyl-series.* It is known only in combination. The volatile oil of meadow-sweet is a natural *hydride* or *hydruret of salicyle*, a substance which, when artificially prepared, is better known under the name of *hydrosalicylic* or *salicylous acid.* (See *p.* 875, 1027, and *below.*)

SALICYLIC ACID. Syn. *Saliculic Acid.* A peculiar volatile, crystallizable acid, discovered by Piria. It is *obtained* by fusing *salicylous acid* with *solid hydrate of potassa* in slight excess, until the mixture turns white and gas is disengaged, and treating a solution of the residuum with *hydrochloric acid*, in slight excess, to separate the potash; the *salicylic acid* separates in crystals, which are purified by solution in hot water. It may *also* be *obtained* from the *oil of partridge-berry* (gaultheria procumbens), by acting on it with a *strong* and *hot solution of potassa*, and afterwards separating the acid as before. This oil is true *salicylic ether* or *salicylate of oxide of ethyle.* (See *p.* 876.) In its general properties *salicylic acid* closely resembles benzoic acid.

SALICYLOUS ACID. Syn. *Hydrosalicylic Acid, Hydride of Salicyle, Hydruret of do., Saliculous Acid, Hydruret of Spiroyle.* A nearly colourless, oily, inflammable liquid, discovered by Pagenstecher in the volatile oil of spiræa ulmaria (*meadow-sweet*), which, when pure, entirely consists of it; and by Piria, as a product of the decomposition of salicine.

Prep. 1. The *oil of meadow-sweet* is mixed with *a strong solution of caustic potassa*, and the yellow crystalline mass which separates on agitation is purified by pressure between folds of *bibulous paper*, and re-crystallization from alcohol; the resulting crystals (*salicylide of potassium*) are then decomposed by the addition of *dilute sulphuric acid*, the *floating oil* separated from the water, and freed from moisture by careful distillation from *chloride of calcium.*

2. (From *Salicine*,) See *p.* 875. The *product* is 25%. (Ettling.)

Prop., &c. Salicylous acid, or, more correctly, *hydrosalicylic acid*, is soluble in ether and alcohol, and slightly so in water, to which it imparts its peculiar fragrance, and the characteristic property of striking a deep violet colour with the sesquisalts of iron. It is distinguished from salicylic acid, which also exhibits this reaction, by its liquid form, and odour.

Hydrosalicylic acid combines with the bases to form *hydrosalicylates*, which are true *salicylides* (salicylites,) of which the following are the principal:—*Salicylide of ammonium;* unstable yellow needles:—*Salicylide of barium;* yellow acicular crystals slightly soluble in cold water:—*Salicylide of copper;* a green insoluble powder, yielding some curious products by destructive distillation:—*Salicylide of potassium;* large, square, golden-yellow tables, permanent in the air when dry, and soluble in both water and alcohol with an alkaline reaction. It also forms several highly interesting compounds with *iodine, bromine, chlorine, &c.* (See *above.*)

SALIFIABLE BASES. Substances which by combination with the acids, &c., form salts.

SALIGENINE. A substance formed, along with grape sugar, by the action of the *emulsion* or *synaptase of sweet almonds,* or of *dilute acids,* on *salicine.* It forms colourless, pearly scales, which are freely soluble in water, alcohol, and ether; it melts at 180° Fahr., and is decomposed at a higher temperature. When boiled in dilute acids it is converted into a resinous looking substance, called *saliretine.* Its aqueous solution strikes a deep blue with the sesquisalts of iron. *Chlorosaligenine, bichlorosaligenine,* and other interesting compounds have been formed.

SALIRETINE. See *Salicine* (and *above.*)

SALIVA. See *Mastication.*

SALMON. Syn. *Salmo,*—Lat. The *salmo salar* (Linn.), a well-known, soft-finned abdominal fish. Its normal locality is at the mouth or estuary of the larger rivers of the northern seas, which, during the breeding season, it ascends, sooner or later, in the summer months, against all obstacles, for the purpose of depositing its spawn.

The *salmon* is an excellent and highly esteemed fish; but it is rich, oily, and difficult of digestion, and, therefore, ill adapted to the delicate or dyspeptic. When *pickled, salted,* or *smoked,* it is only fitted for persons of very strong stomachs, although in this state it is regarded as a great delicacy by epicures.

Salmon is preferably *cooked* by boiling. One weighing 10 *lb.* will require to be *gently simmered* for about an hour, reckoning from the time the water commences boiling. For fish of other weights from 6 to 7 minutes per *lb.* may be allowed. See *Fish, &c.*

SALOOP. *Sassafras* (chips) *tea,* flavoured with *milk* and *sugar.* A wholesome and useful drink in cutaneous and rheumatic affections. See *Salep.*

SALT. Syn. *Sal,*—Lat. *Sel,*—Fr. A compound of an acid with an alkali or a salifiable base, or of bromine, chlorine, fluorine, or iodine, with a metal. The names of the salts are derived from the acids which they contain, followed by that of the base; as *sulphate of soda,* a compound of sulphuric acid and soda; *sulphite of lime,* a compound of sulphurous acid and lime. *Neutral salts* are such as contain 1 eq. each of acid and base; *basic,* or *subsalts,* such as contain 2 or more atoms of base to one of acid; *acid,* or *supersalts,* such as contain more than 1 eq. of acid.

Double salts are combinations of two salts of the same acid, but of different bases, which crystallize together. *Hydrous* or *hydrated salts,* are such as contain water of crystallization, or combined water; *anhydrous salts,* those that are destitute of water. *Deliquescent salts* are those that attract moisture from the atmosphere; *efflorescent salts,* such as part with their combined water, and become opaque and pulverulent, under like circumstances. The salts formed by the direct union of the *archæal elements,* bromine, chlorine, iodine, &c., of which culinary salt and iodide of potassium are well-known examples, are termed *haloid salts.* The *salts* of the *hydracids* belong to this class. *Oxy-salts,* are those, which like nitrate of potassa (nitre) and sulphate of magnesia (Epsom salt), are supposed to be simple combinations of an acid with an oxide or base. *Sulphur-salts* are such as contain sulphur in the place of oxygen; and which are usually formed by the union of a protosulphuret of an alkaline metal (*sulphur base*) with a higher sulphuret of a non-metallic substance or of a metal whose protoxide is a feeble base (*sulphur-acid*). The name *ternary salt* has been applied to those which consist of two single members of one class, and one member of another; such as the boro-fluorides, hydrargyro-chlorides, sodio-chloride of gold, &c.

The *salts* are a most important class of bodies, and their applications and uses in the arts of life and civilization are almost infinite. See *Nomenclature, Pulverization, &c.*

SALT (Bitter Purging). See *page* 738.

SALT (Cathartic). Of *Glauber,* sulphate of soda; *English* or *bitter do.,* sulphate of magnesia.

SALT (Common), *Culinary do.* Chloride of sodium.

SALT (Diuretic). Acetate of potash.

SALT (Epsom). See *page* 738.

SALT (Febrifuge). Chloride of potassium.

SALT (Fusible). Phosphate of ammonia.

SALT (Glauber's). Sulphate of soda.

SALT (Macqueer's). See *page* 1033.

SALT (Microcosmic). See *page* 786.

SALT (RED). *Common salt* wetted with an *infusion of beet-root* or *cochineal,* or *tincture of red sanders wood,* then dried, and rubbed through a sieve. *Used* to impart a colour to gravies, &c. *Infusion of saffron* also gives a beautiful colour for this purpose. It has been proposed to colour

Epsom salt in this way to distinguish it from oxalic acid.

SALT (Rochelle). Potassio-tartrate of soda.

SALT (Sea). Chloride of sodium.

SALT (Sedative). See *page* 150.

SALT (Sore-throat.) See *page* 1116.

SALT (Tasteless). Phosphate of soda.

SALT (Vegetable). Tartrate of potash.

SALT (Volatile). See *page* 58.

SALT OF AMBER. Succinic acid.

SALT OF BENZOIN. Benzoic acid.

SALT OF HARTSHORN. Carbonate of ammonia.

SALT OF LEMONS. Syn. *Sal Limonum*,—Lat. Citric acid. That sold in the shops for the *removal* of *ink-spots from linen*, is *binoxalate of potash*, either alone, or mixed with one half of its weight of *cream of tartar.* (See *p.* 1042.)

SALT OF SORREL. See *pages* 1041-2.

SALT OF STEEL. Sulphate of iron.

SALT OF TARTAR. See *page* 1033.

SALT OF VITRIOL. Sulphate of zinc.

SALT OF WORMWOOD. See *page* 1033.

SALTPETRE. Nitrate of potassa.

SALTS (Cheltenham). See *Mineral Waters.*

SALTS (Harrowgate). See *Mineral Waters.*

SALTS (Smelling). Syn. *Sal Volatilis Oleosus*,—Lat. Sesquicarbonate of ammonia commonly passes under the name of *smelling salts*, and, with the addition of a few drops of essential oil, is frequently employed to fill "*smelling bottles;*" but when a strong and durable pungency is desired, the *carbonate* should alone be used, as in one or other of the following formulæ:—

1. *Carbonate* (not sesquicarbonate) *of ammonia*, 1 *lb.; oil of lavender* (Mitcham), 2 *oz.; essence of bergamot*, 1 *oz.; oil of cloves*, ¼ *oz.;* rub them together, and sublime; keep the product in well-stopped bottles.

2. *Carbonate of ammonia*, 1 *lb.; oil of lavender*, 2 *oz.; oils of bergamot* and *lemon*, of each, 1 *oz.;* as the last.

3. *Carbonate of ammonia*, ½ *lb.; essence of bergamot*, 1 *oz.; oil of verbena*, ¼ *oz.; otto of roses*, 1 dr.; as before.

4. *Carbonate of ammonia*, ¾ *lb.; essences of bergamot* and *lemon*, of each, ½ *oz.; essence de petit grain*, ¼ *oz.: oil of cloves*, 1 dr.; as before.

5. *Carbonate of potash* and *sal ammoniac*, of each, 8 *oz.;* powder, add of *leaves of Syrian herb mastich* (*marum Syriacum*), ½ *oz.; rectified spirit*, ½ pint; (holding in solution) *oil of cinnamon*, 20 gr.; *oils of cloves* and *nutmeg*, of each, ½ dr.; *oils of sweet marjoram, lemon*, and *orange*, of each, 1 dr.; triturate together, then distil by a very gentle heat, and stop the process as soon as the liquid that rises begins to dissolve the salt.

6. (*Extemporaneous.*)—*a.* From *sal ammoniac*, 1 dr.; *pure potassa*, 3 dr.; grind them together, and add of *essence of lemons*, 15 drops; *oil of cloves*, 3 or 4 drops.—*b.* From *carbonate* or *sesquicarbonate of ammonia* (bruised), q. s.; *volatile ammoniacal essence*, a few drops. (See *p.* 395.)

According to Dr. Paris, *Godfrey's Smelling Salts* are made by re-subliming *volatile salt* with *subcarbonate of potash*, and a little *spirits of wine* (and *essential oil*).

SALTING, or *pickling*, is an easy method of *preserving butcher's meat*, *fish*, and, indeed, *most animal substances.* It is performed in two ways:—

1. *Dry salting.* This, as practised in Hampshire, Yorkshire, and in various *large establishments* elsewhere, consists in merely well rubbing ordinary *culinary salt*, mixed with a little *saltpetre*, into the meat, until every crevice is thoroughly penetrated, and, afterwards, sprinkling some over it, and placing it on a board or in a trough, in such a manner that the brine may drain off. On the *small scale*, in private families, a mixture of *salt*, 2 *lb.*, with *saltpetre*, 1½ or 2 *oz.;* either with or without about an *oz.* of *good moist sugar*, is commonly used for the purpose, and imparts a fine flavour to the meat. In both cases the pieces are turned every day, or every other day, until sufficiently cured, a little *fresh salt* being added as required. *Sometimes* the *fresh meat* is packed *at once* in casks, with the best *coarse-grained* or *bay-salt.* This method is that commonly adopted for sea stores.

2. *Wet salting* or *pickling in brine.* When the meat is allowed to lie in the liquor that runs from it (see *above*), or is at once plunged into strong *brine*, it is said to be *pickled* or *wet salted.* On the *small scale*, this is most conveniently performed by rubbing the *fresh meat* with *salt, &c.*, as above, and after it has lain a few hours, putting it into a pickle formed by dissolving about 4 *lb.* of *good salt* and 2 *oz.* of *saltpetre* in 1 gall. of *water*, either with or without the addition of ½ to 1 *lb.* of *moist sugar.* This pickling liquor gets weaker by use, and should, therefore, be occasionally boiled down a little, and skimmed, at the same time adding some more of the dry ingredients. Three to ten days, depending on the size, is sufficiently long to keep the meat in the brine. When it is taken out it

should be hung up to dry, after which it may be packed in barrels with *coarse-grained salt*, or *smoked*, whichever may be desired. Saltpetre added to brine gives the meat a red colour, and brown sugar improves the flavour.

The sooner animal substances, more especially flesh, are salted after being killed, the better, as they then possess considerable absorbent power, which they gradually lose by age. See *Putrefaction, Scurvy, Smoking, &c.*

SALVE. A name indiscriminately applied by the vulgar to any consistent, greasy preparation used in medicine.

SALVE (Lip). Syn. *Ceratum Labiale*,—Lat. *Prep.* 1. (*Red* or *Peruvian.*) From *spermaceti ointment*, $\frac{1}{2}$ *lb.;* *alkanet root*, $\frac{1}{2}$ *oz.;* melt them together until sufficiently coloured, strain, and when the strained fat has cooled a little, add of *balsam of Peru*, 3 *dr.;* stir well, and in a few minutes pour off the clear portion from the dregs; lastly, stir in of *oil of cloves*, 20 or 30 drops. This never gets rancid.

2. (*Rose.*) See *Cerates.*

3. (*White.*) From the finest *spermaceti ointment* or *cerate*, 3 *oz.; finely powdered white sugar*, 1 *oz.; neroli* or *essence de petit grain*, 10 or 12 drops, or q. s.

Obs. Numerous formulæ are extant for lip-salves, as for other like articles, but the preceding are those generally employed in trade. The perfumes may be varied at will, and the salve named after them. A very small quantity of *finely powdered borax* is occasionally added. *French lip-salve* is said to contain alum, in fine powder; and *German lip-salve* is said to be made of cocoa-nut butter, scented with essence of Portugal. See *Cerates, Pommades*, and *Ointments.*

SAND. Syn. *Arena*,—Lat. River and sea sand consist chiefly of finely divided siliceous matter, mixed, occasionally, with carbonate of lime. That of Lynn and Alum Bay is nearly pure silex, and is, therefore, selected for the manufacture of glass. Sand is used by *moulders* in metal, and as *manure* for heavy land. It is a large and necessary portion of every fertile soil.

SANDAL WOOD. Syn. *Red Sanders Wood, Red Saunders do.; Lignum Santali Rubri; Lignum Santalinum Rubrum; Pterocarpus*,—Ph. L. & E. The *wood* of *pterocarpus santalinus.* It is used in medicine as a colouring matter. It is also employed in *dyeing*, and to stain *varnishes.* Wool may be dyed a *carmine red* by dipping it alternately into an *infusion of this wood*, and an *acidulous bath.* (Trommsdorff.) Prepared with a *mordant of alum and tartar*, and then dyed in a *bath of sandal wood and sumach*, it takes a *reddish yellow.* (Bancroft.)

Obs. The colouring principle of red sanders wood is called "*santaline*," and may be obtained as a reddish resinous mass by evaporating its alcoholic infusion, or by digesting the rasped wood in ammonia water, and then precipitating it with an acid. Its spirituous solution gives a rich purple precipitate with *protochloride of tin*, and a violet one with *acetate of lead.*

White sandal wood (white sanders; santalum album) is the young timber, or according to others, the outside wood of *santalum album* (Linn.) *Yellow sandal wood* (santalum citrinum, s. flavum) is the old timber, or, according to others, the heart of the same tree. Both are much esteemed on account of their fragrance, and yield a valuable essential oil.

SANDARACH. Syn. *Sandrac, Gum do.* Obtained from the *thuja articulata*, a coniferous tree growing in Africa. It is slightly fragrant, is freely soluble in rectified spirit, and has a sp. gr. of 1·05 to 1·09. It is used as incense, pounce, in varnishes, &c.

SANDERS WOOD. See *Sandal Wood.*

SANDIVER. Syn. *Glass Gall; Fel Vitri, Sal Vitri*,—Lat. The saline scum that swims on glass when first made. It is occasionally used in tooth-powders.

SANDYX. See *Red Pigments.*

SANGUINARINE. Obtained from the *root* of *sanguinaria Canadensis* (Linn.) or *blood-root*, by digesting it in *anhydrous alcohol*, precipitating by *liquor of ammonia*, washing the red precipitate in *water*, boiling it with *water* and *animal charcoal*, filtering, and digesting the *solid portion* in *alcohol;* the resulting tincture, by distillation, yields a pearl-gray or yellowish substance which is *sanguinarine.* It excites sneezing, and is turned red by acids.

SANTALINE. See *Sandal Wood.*

SANTONINE. Syn. *Santonic Acid; Santoninum*,—Lat. The crystalline and characteristic principle of the seed of several varieties of artemisia.

Prep. 1. (M. Galloud.) Boil *worm-seed* (semen cynæ, semen contra) in *water* with *milk of lime;* strain, press, boil the *marc* with more *water*, and again press; mix the decoctions, and when clear, concentrate the liquor by evaporation; strain, further evaporate, pour it into an earthen vessel, and add *hydrochloric acid*, in slight excess; after 24 hours, collect the precipitate, wash it with a little very weak *spirit*, press, and dry it.

2. (Ph. Baden. 1841.) Take of *wormseed*, 4 parts; *hydrate of lime*, 1½ part; mix, and exhaust them with *alcohol* of 90%; distil off 3-4ths of the spirit, and evaporate the remainder to one half, which at the boiling temperature is to be mixed with *acetic acid* in excess, and *afterwards* with *water;* on repose *impure santonine* subsides; wash this with a little *weak spirit*, then dissolve it in *rectified spirit*, 10 parts, decolour by ebullition for a few minutes with *animal charcoal*, and filter; the *filtrate* deposits colourless crystals of *santonine* as it cools; these are to be dried, and kept in opaque bottles.

Prop., &c. Prismatic or tabular crystals; inodorous; tasteless, or only slightly bitter; fusible; volatilizable; soluble in 4500 parts of cold, and about 200 parts of boiling water; soluble in cold alcohol and ether; freely soluble in hot alcohol. It is much esteemed as "*a tasteless worm medicine*," and is especially adapted to remove *lumbricales* (large round worms). *Dose.* 6 to 18 or 20 gr., repeated night and morning, followed by a brisk purge.

SAPAN WOOD. See *page* 159.

SAP GREEN. See *Green Pigments.*

SAPONIFICATION. See *Soap.*

SAPONINE. Syn. *Saponinum*,—Lat. A white, non-crystallizable substance, obtained by the action of *hot alcohol* on the *root* of *saponaria officinalis* (Linn.) or *soap wort.* It separates as the solution cools, and may be purified, by re-solution, and digestion with a little *animal charcoal.*

Prop., &c. Saponine is soluble in water, and the solution froths strongly on agitation. The smallest quantity of the powder causes violent sneezing. By the action of acids and alkalies it is converted into a white powder termed "*saponic acid*," which is soluble in alcohol. Another substance absurdly called saponine is noticed at *page* 505.

SAPPHIRE. See *Gems* and *Pastes.*

SARCOCOLLA. The *inspissated juice* of *penœa mucronata* or *p. sarcocolla*, a tree growing in Arabia and Persia. It somewhat resembles gum arabic, except in being soluble in both water and alcohol; and in having a bitter-sweet taste. It was formerly used in surgery.

SARCOCOLLINE. The peculiar principle of sarcocolla, obtained by evaporating either its clear *aqueous* or *alcoholic solution.*

SARCOSINE. Syn. *Sarcomide.* A basic substance, obtained by boiling *kreatine* for some time with a *solution of pure baryta.* It forms colourless, transparent plates, freely soluble in water, sparingly so in alcohol, and insoluble in ether; it may be fused, and volatilized. With sulphuric acid it unites to form a crystallizable salt (*sulphate of sarcosine*).

SARDONYX. See *Gems.*

SARSAPARILLA. Syn. *Radix Sarzæ, Radix Sarsaparillæ; Sarza*,—Ph. L. & E. *Sarsaparilla*,—Ph. D. & U. S., & Ph. E. 1817. "Jamaica sarza. The *root* of *smilax officinalis*, Kunth" (Ph. L.); "and probably of other species." (Ph. E.)

The *sarsaparillas* of *commerce* are divided by Dr. Pereira into two classes:—"*Mealy sarsaparillas*" and "*Non-mealy sarsaparillas.*" In the *first* are placed *Brazilian* or *Lisbon, Caraccas* or *gouty Vera Cruz*, and *Honduras;* the *second* includes *Jamaica, Lima*, and *true Vera Cruz.*

The *mealy sarsaparillas* are distinguished by "the mealy character of the inner cortical layers, which are white or pale-coloured. The meal or starch is sometimes so abundant, that a shower of it, in the form of white dust, falls when we fracture the roots." The medulla or pith is also frequently very amylaceous.

The *non-mealy sarsaparillas* "are characterised by a deeply coloured (red *or* brown), usually non-mealy cortex. The cortex is red, and much thinner than in the mealy sorts." "If a drop of *oil of vitriol* be applied to a transverse section of the root of the non-mealy sarsaparillas, *both cortex* and *wood* acquire a *dark-red* or *purplish tint;*" whilst in the *preceding varieties*, the mealy coat, and, sometimes, the pith, is but little altered in colour. "The *decoction* of *non-mealy* sarsaparilla, when cold, is somewhat darkened, but does *not yield* a *blue* colour when a solution of iodine is added to it." The *aqueous extract*, when rubbed down with a little cold distilled water in a mortar, *does not* yield a *turbid* liquid, *nor* become *blue* on the addition of iodine. The *reverse* is the case with the decoction and extract of the mealy varieties.

The *Jamaica, red Jamaica*, or *red-bearded sarsaparilla* (Sarza Jamaicensis,—Ph. L.) is the variety which should *alone* be used in medicine. This kind yields from 33 to 40% of its weight of extract, (Battley, Hennell, Pope), and contains less starchy matter than the other varieties. It is distinguished, by exhibiting the above peculiarities in a marked degree, by the dirty reddish colour of its bark, which "is not mealy," and by being "beset very plentifully with rootlets" (fibres),—Ph. L. Its powder has also a pale reddish brown colour. The other varieties of sarsaparilla, viz.—the *Lisbon, Lima, Vera Cruz*, and *Honduras*, are frequently substituted for the *Jamaica* by the druggists in the preparation of the decoctions and extracts of this drug; but the products are vastly inferior in *quantity*, *colour*, *taste*, and *medicinal virtue*, to those prepared from the officinal sarsaparilla. Decoction of sarsaparilla when made with the Honduras root, is very liable to ferment, even by a few hours' exposure, in hot weather. We have seen hogsheads of the strong decoction, after exposure for a single night, in as active a state of fermentation as a *gyle of beer*, with a *frothy head*, and evolving a most disagreeable odour, that was not wholly removed by several hours' boiling. When this occurs the decoction suffers in density, and the *product* in *extract* is, consequently, *considerably lessened*. Yet this is frequently allowed to occur in the wholesale laboratory, where the *rule* should be—*always begin a "batch of sarza"* (as it is called,) and, indeed, of other perishable articles, *early in the morning, and finish it,* COMPLETELY *and* ENTIRELY, *the* SAME DAY.

Sarsaparilla has been recommended as a mild but efficacious alterative diaphoretic, and tonic. It has long been a popular remedy in chronic rheumatism, rheumatic and gouty pains, scurvy, scrofula, syphilis, secondary syphilis, lepra, psoriasis, and several other skin diseases ; and, especially, in cachexia, or a general bad-habit of body, and to remove the symptoms arising from the injudicious use of mercurials, often falsely called "secondary syphilis." During its *use* the skin should be kept warm, and *diluents* should be freely taken. Its efficacy has been greatly exaggerated. It is, however, much more effective in warm, than in Northern climates. *Dose.* In substance, ½ to 1 dr., three or four times daily; but, preferably, made into a decoction or infusion.

The articles recently so much puffed under the names of *American* or *United States sarsaparilla* and *extract of sarsaparilla* are "nothing more than the decoction of a common herb, a sort of 'aralia,' inhabiting the swamps and marshes of the United States. When cut up it has the appearance of *chaff*, but not the slightest resemblance in character, colour, or taste, to even the most inferior species of smilax (or sarza). The decoction, or I may say, cabbage water, according to the taste of it in the first stage, is sweetened with a little sugar, flavoured with benzoin (and sassafras), and finally, preserved from decomposition, by means of the bichloride of mercury." "I have heard of several cases of deadly sickness, and other dangerous symptoms following its use." "We do not believe that a particle of real sarsaparilla ever entered into the composition of either of the articles referred to." (Med. Circ., ii, 227.) See *Decoctions* and *Extracts*.

SARSAPARILLINE. Syn. *Parigline; Parilline*, — Pallotta. *Parillinic Acid*, — Bakta. *Salseparine; Smilacine*, — Folchi. A white, crystallizable, odourless, and nearly tasteless substance, discovered by Pallotta and Folchi, in *sarsaparilla*.

Prep. The *bark* of *Jamaica sarsaparilla* is treated with *hot rectified spirit*, and the resulting tincture reduced to about one third by distilling off the spirit; the residual liquid is then filtered, whilst boiling, slightly concentrated by evaporation, and set aside to crystallize; the crystalline deposit is redissolved in either *hot rectified spirit* or *boiling water*, and decoloured by agitation with a little *animal charcoal;* the *filtrate* deposits crystals of nearly pure *smilacine* as it cools. It may also be extracted by boiling water.

Prop., &c. By some, this substance has been regarded as a weak acid; by others, as an alkaloid or base, which its general characters would indicate to be correct. Water holding a very small quantity of it in solution, froths considerably on agitation. This is especially the case with infusion of Jamaica sarsaparilla, and this property has consequently been proposed as a test of the quality of sarsaparilla root. Its medicinal properties are similar to those of sarsaparilla. According to Pallotta, it is a powerful sedative, and diminishes the vital energies in proportion to the quantity taken. *Dose.* 2 to 10 gr.; in the usual cases in which the root is given.

SASSAFRAS. Syn. *Sassafras Radix; Sassafras*,—Ph. L. E. & D. "The *root* of *sassafras officinale*, Nees. (*Laurus sassafras*, Linn.)"—Ph. L. It has a fragrant odour, and a sweetish aromatic taste. It has long been reputed a stimulating alterative, diaphoretic, diuretic, and tonic; and an *infusion* of the chips (*sassafras chips*), under the name of *sassafras tea*, has been a popular "diet drink" in various cutaneous affections, gout, chronic rheumatism, &c.

SASSOLINE. Native boracic acid.

SATIN. See *Silk*.

SATURATION. The state in which a body has taken its full dose, or chemical proportion, of any other substance with which it can combine, or which it can dissolve; as *water* with sugar or a salt, or an *alkali* with an acid, when the properties of both are neutralized.

SAUCERS (Blue). *Prep.* From *blue carmine*, made into a paste with *gum water*, which is then spread over the inside of the saucers, and dried.

SAUCERS (Pink). *Prep.* 1. From *pure rouge* mixed with a little *carbonate of soda*, then made into a paste with *thin gum water*, and applied as the last.

2. *Well-washed safflower*, 8 *oz.; carbonate of soda*, 2 *oz.; water*, 2 gallons; infuse, strain, add of *French chalk* (scraped fine with Dutch rushes), 2 *lb.;* mix well, and precipitate the colour by adding a *solution of tartaric acid;* collect the red powder, drain it, add a very small quantity of *gum*, and apply the paste to the saucers. Inferior. Both the above are used to tinge silk stockings, gloves, &c.

SAUCES. Liquid or semi-liquid condiments or seasoning for food. The following may be useful to the reader:—

Anchovy Sauce.—1. (Extemporaneous.) From 3 or 4 *anchovies*, chopped small; *butter*, 3 *oz.; water*, a wine-glassful; *vinegar*, 2 table-spoonfuls; *flour*, 1 do.; stir them over the fire till it thickens, then rub it through a coarse hair-sieve.

2. (Wholesale.) As *essence of anchovies* (p. 385). Other *fish sauces* may be made in the same manner.

Apple Sauce. From *sharp apples*, cored, sliced, stewed with a spoonful or two of *water*, and then beaten to a perfectly smooth pulp with a little good *moist sugar*. Tomato, and many other like sauces, may be made in the same manner.

Sauce Aristocratique. From *green-walnut juice* and *anchovies*, equal parts; *cloves*, *mace*, and *pimento*, of each, bruised, 1 dr. to every *lb.* of juice; boil and strain, then add to *every pint*, 1 pint of *vinegar;* ½ pint of *port wine;* ¼ pint of *soy;* and a few *shallots;* let the whole stand for a few days, and decant the clear liquor.

Bechamel. A species of fine *white broth* or *consommée*, thickened with *cream*, and used as "white sauce."

Caper Sauce. Put twelve table-spoonfuls of *melted butter* into a stewpan, place it on the fire, and when on the point of boiling, add one *oz.* of *fresh butter* and one table-spoonful of *capers;* shake the stewpan round over the fire until the butter is melted, add a little *pepper* and *salt*, and serve where directed. Also as *Mint Sauce.*

Chetney Sauce, Quihi do. From *sour apples* (pared and cored), *tomatoes*, *brown sugar*, and *sultana raisins*, of each, 8 *oz.; common salt*, 4 *oz.; red chillies* and *powdered ginger*, of each, 2 *oz.; garlic* and *shallots*, of each, 1 *oz.;* pound the whole well, add of *strong vinegar*, 3 quarts; *lemon juice*, 1 do.; and digest, with frequent agitation, for a month; then pour off nearly all the liquor, and bottle it. *Used* for fish or meat, either hot or cold, or to flavour stews, &c. The residue is the "*Chetney*" or "*Chitni*," which must be ground to a smooth paste with a stone and muller, and then put into pots or jars. It is used like mustard.

Bengal Chitni. As the last, but using *tamarinds* instead of apples, and only sufficient *vinegar* and *lemon juice* to form a paste.

Coratch. From good *mushroom ketchup*, ½ gall.; *walnut ketchup*, ¾ pint; *India soy* and *chillie vinegar*, of each, ½ pint; *essence of anchovies*, 5 or 6 *oz.;* macerate for a fortnight.

Sauce Epicurienne. To the last add of *walnut ketchup* and *port wine*, of each, 1 quart; *garlic* and *white pepper*, of each (bruised), 4 *oz.; chillies* (bruised), 1 *oz.; mace* and *cloves*, of each, ½ *oz.*

Fish Sauce. From *port wine*, 1 gall.; *mountain do.*, 1 quart; *walnut ketchup*, 2 quarts; *anchovies* (with the liquor), 2 *lb.;* 8 *lemons;* 48 *shallots; scraped horseradish*, 1½ *lb.; flour of mustard*, 8 *oz.; mace*, 1 oz.; *cayenne*, q. s.; boil the whole up gently, strain, and bottle.

Ketchup. See *page* 661-2.

Kitchener's Sauce, Kitchener's Relish. From *salt*, 3 *oz.; black pepper*, 2 *oz.; allspice*, *horseradish*, and *shallots*, of each, 1 *oz.; burnt-sugar colouring*, a wine-glassful; *mushroom ketchup*, 1 quart; (all bruised or scraped;) macerate for 3 weeks, strain, and bottle.

Lemon Pickle. From *lemon juice* and *vinegar*, of each, 3 gall.; *bruised ginger*, 1 *lb.; allspice*, *pepper*, and *grated lemon peel*, of each, 8 *oz.; salt*, 3½ *lb.; cayenne*, 2 *oz.; mace* and *nutmegs*, of each, 1 oz.; digest for 14 days.

Lobster Sauce. From *lobsters*, as anchovy sauce.

Mint Sauce. From *garden mint*, chopped small, and then beaten up with *vinegar*, some *moist sugar*, and a little *salt* and *pepper.*

Onion Sauce. From *onions* boiled to a pulp, and then beaten up with *melted butter*, and a little *warm milk.*

Oyster Sauce. From about 12 *oysters*, and 6 or 7 *oz.* of *melted butter*, with a little *cayenne pepper*, and 2 or 3 spoonfuls of *cream*, stirred together over a slow fire, then brought to a boil, and served.

Sauce Piquante. From *soy* and *cayenne pepper*, of each, 4 *oz.; port wine*, ½ pint; *brown pickling vinegar*, 1½ pint; mix, and let them stand for 7 or 8 days before bottling.

Quin's Sauce. From *walnut pickle,* and *port wine,* of each, 1 pint; *mushroom ketchup,* 1 quart; *anchovies* and *shallots* (chopped fine), of each, 2 dozen; *soy,* ½ pint; *cayenne,* ¼ *oz.;* simmer gently for 10 minutes, and in a fortnight, strain, and bottle.

Sauce au Roi. From *brown vinegar* (good), 3 quarts; *soy* and *walnut ketchup,* of each, ½ pint; *cloves* and *shallots,* of each, 1 doz.; *cayenne pepper,* 1½ *oz.;* mix, and digest for 14 days.

Shrimp Sauce. From *shrimps* or *prawns,* as anchovy sauce.

Soy. See that article.

Sauce Superlative. From *port wine* and *mushroom ketchup,* of each, 1 quart; *walnut pickle,* 1 pint; *soy,* ½ pint; *pounded anchovies,* ½ *lb.; fresh lemon peel, minced shallots,* and *scraped horseradish,* of each, 2 *oz.; allspice* and *black pepper* (bruised), of each, 1 *oz.; cayenne pepper* and *bruised celery seed,* of each, ¼ *oz.;* (or *currie powder,* ¾ *oz.*)*;* digest for 14 days, strain, and bottle. Very relishing.

Tomato Sauce. From *bruised tomatoes,* 1 gall.; *good salt,* ½ *lb.;* mix, in 3 days press out the juice, to each quart of which add of *shallots,* 2 *oz.; black pepper,* 1 dr.; simmer very gently for 20 to 30 minutes, strain, and add to the *strained liquor, mace, allspice, ginger, nutmegs,* and *cochineal,* of each, ¼ *oz.; coriander seed,* 1 dr.; simmer gently for 10 minutes, strain, cool, and in a week put it into bottles.

Waterloo Sauce. From *strong vinegar* (nearly boiling), 1 quart; *port wine,* ¾ pint; *mushroom ketchup,* ½ pint; *walnut do.,* ¼ pint; *essence of anchovies,* 4 *oz.;* 8 *cloves of garlic; cochineal* (powdered), ½ *oz.,* (or *red beet,* sliced, 3 *oz.*); let them stand together a fortnight or longer, occasionally shaking the bottle.

White Sauce, Butter do., Melted Butter. From *good butter,* 4 *oz.; cream,* 2½ *oz.; salt* (in very fine powder), ½ tea-spoonful; put them into a pot or basin, set this in *hot water,* and beat the whole with a bone, wooden, or silver spoon, until it forms a perfectly smooth cream-like mixture, avoiding too much heat, which would make it run "oily." A table-spoonful of *sherry, marsala, lemon-juice,* or *vinegar,* is sometimes added; but the selection must depend on the dishes the sauce is intended for. *Used* either by itself, or as a basis for other sauces. Beaten up with any of the "bottled sauces," an excellent compound sauce of the added ingredient is immediately obtained.

Obs. The cautions given under pickles (*p.* 974) also apply here. A variety of other sauces may be made by the judicious use of the ingredients employed in those noticed above, and by the addition of any other flavouring substances, according to the palate of the manufacturer. The *peculiar flavour* of some of the most popular sauces of the shops is imparted to them by means of scorched saw-dust; and an *empyreumatic* or *smoky flavour* to others, by the addition of a little crude pyroligneous acid, or a drop or two of creasote, or by allowing a little of the vinegar to stand over some Barbadoes tar for a day or two. The reader will distinguish between those sauces which are merely intended for present use, and those which are intended for bottling. The more noted *advertised sauces* present a great sameness of flavour, and would be generally considered very inferior if the bottles containing them were divested of their showy labels.

SAUR KRAUT. *Prep.* Clean *white cabbages,* cut them into small pieces, and stratify them in a cask along with *culinary salt,* and a few *juniper berries* and *caraway seeds,* observing to pack them down as hard as possible, without crushing them, and to cover them with a lid pressed down with a heavy weight. The cask should be placed in a cold situation as soon as a sour smell is perceived. Used by the Germans and other northern nations of Europe, like our "*pickled cabbage,*" but more extensively.

SAUSAGES. From the *fat* and *lean of pork* (pork sausages), or of *beef* (beef sausages), chopped small, flavoured with *spice,* and pnt into *gut skins,* or pressed into *pots* or *balls* (sausage meat). *Crumb of bread* is also frequently added. Their quality is proportionate to that of the ingredients, and to the care and cleanliness employed in preparing them.

SAVELOYS. *Prep.* (Mrs. Rundell.) "Take of *young pork,* free from bone and skin, 3 *lb.; salt* it with 1 *oz.* of *saltpetre,* and ½ *lb.* of *common salt* for 2 days; then chop it fine, add 3 tea-spoonfuls of *pepper;* 1 doz. *sage leaves,* chopped fine; and 1 *lb.* of *grated bread;* mix well, fill the *skins,* and steam them or bake them half an hour in a slack oven. They are said to be good either hot or cold.

SAVINE. Syn. *Folia Sabinæ; Sabina,* —Ph. L. E. & D. "The *recent* and *dried tops* of *juniperus sabina,* Linn.," or common savine. (Ph. L.) It is a powerful stimulant, diaphoretic, emmenagogue, and anthelmintic; and, externally, rubefacient, escharotic, and vesicant. In large doses it is apt to occasion abortion and acts as a poison. *Savine powder* mixed with verdigris is often applied to corns and warts. It is now chiefly used in the form of ointment. *Dose.* 5 to 15 gr., twice or thrice daily, (with care,) in amenorrhœa and worms. (See *p.* 224.)

SAVONETTES. Syn. *Wash Balls.* These are made of any of the mild, toilet soaps, scented at will, generally with the addition of some powdered starch or farina, and sometimes sand. The spherical or spheroidal form is given to them by pressure in moulds, or by first roughly forming them with the hands, and when quite hard, turning them in a lathe. According to Mr. Beasley, "they are formed into spherical balls by taking a mass of the prepared soap in the left hand, and a conical drinking glass with rather thin edges in the right. By turning the glass and ball of soap in every direction the rounded form is soon given; when dry the surface is scraped to render it more smooth and even."

Prep. 1. Take of *curd soap*, 3 *lb.; finest yellow soap*, 2 *lb.;* (both in shavings;) *soft water*, ¾ pint; melt by a gentle heat, stir in of *powdered starch* (farina), 1½ *lb.;* when the mass has considerably cooled, further add of *essence of lemon* or *bergamot*, 1 *oz.;* and make it into balls.

2. (*Camphor.*) Melt *spermaceti*, 2 *oz.;* add *camphor* (cut small), 1 *oz.;* dissolve, and add the liquid mass to *white curd-soap*, 1½ *lb.*, previously melted by the aid of a *little water* and a gentle heat, and allowed to cool considerably, as above. These should be covered with *tin-foil.*

3. (*Communes.*) From *soap* (in shavings), 5 *lb.; starch*, 2 *lb.; essence of orange* or of *citron*, 1 *oz.; eau pour la barbe*, ½ gall.; beaten together in the cold.

4. (*Honey.*) From the *finest bright-coloured yellow soap*, 7 *lb.; palm oil*, ¼ *lb.;* melt, and add of *oil of verbena, rose-geranium*, or *ginger-grass*, 1 *oz.;* as No. 1, Sometimes ½ *oz.* of *oil of rosemary* is also added.

5. (*Mottled.*)—*a.* Red, Cut *white curd* or *Windsor soap* (not too dry), into small square pieces, and roll these in a mixture of *powdered bole* or *rouge*, either with or without the addition of some *starch;* then squeeze them strongly into balls, observing to mix the colour as little as possible.—*b.* Blue. Roll the pieces in *powder-blue*, and proceed as before.—*c.* Green. Roll the pieces in a mixture of *powder blue* and *bright yellow ochre.* By varying the colour of the powder, *mottled savonettes* of any colour may be produced.

6. (*Sand.*) From *soap* (at will), 2 *lb.; fine siliceous sand*, 1 *lb.; scent*, q. s.; as No. 1. For the finer qualities finely powdered *pumice stone* is substituted for sand.

7. (*Violet.*) From *palm-oil soap*, 4 *lb.; farina*, 2 *lb.; finely powdered orris root*, 1 *lb.* Sometimes a little *smalts*, or *indigo*, is added.

SCABIES. See *Itch.*

SCAGLIOLA. A species of plaster or stucco, made of *pure gypsum*, with variegated colours, in imitation of marble. In general, the liquid employed is a weak *solution of Flanders glue;* and the *colours*, any which are not decomposed or destroyed by admixture with sulphate of lime, and exposure to the light. The *composition* or *compositions* is often applied upon hollow columns formed of wood, or even of laths nailed together, and the surface, when hard, is turned smooth in a lathe, and polished.

SCALD-HEAD. See *Ringworm.*

SCALDS. See *Burns and Scalds.*

SCALL or *Scald.* The popular name of several skin diseases distinguished by scabs or scurfiness, whether dry or humid. See *Eruptions, Ringworm, &c.*

SCAMMONY. Syn. *Scammonium*,—Ph. L. E. & D. The "gum resin emitted from the *cut root*" of "*convolvulus scammonia*," Linn. (Ph. L.) or *Aleppo scammony-plant.*

There are three *principal varieties* or *qualities* of *scammony* known in the market; viz.,—*virgin* (sp. gr. 1·21), *seconds*, (sp. gr. 1·460 to 1·463), and *thirds* (sp. gr. 1·465 to 1·500). The best, and that only intended to be used in medicine, is imported from Aleppo.

Pur. Scammony is not only largely adulterated in the country of its production, but again after its arrival in England. *Smyrna scammony*, a very inferior variety, is also commonly dressed up, and sold as Aleppo scammony. In many cases, substances are sold at the "public sales" in London, and elsewhere, as scammony, which contain only a mere trace of that article. This is all ground up to form the *scammony-powder* of the shops. (Vide *Evid., Com. Ho. Com.*, 1855.) *Pure scammony* has a peculiar cheesy smell, and a greenish gray colour. It is "porous and brittle, and the freshly broken surface shines; hydrochloric acid being dropped on it, it emits no bubbles; nor does the powder digested in water, at a heat of 170° Fahr., become blue by the simultaneous addition of iodide of potassium and dilute nitric acid. Out of 100 gr., 78 (80,—Ph. E.) should be soluble in ether." (Ph. L.) The tincture of pure scammony is not turned *green* by nitric acid. If the powder effervesce with dilute acids it contains chalk.

Uses, &c. Pure scammony is a powerful drastic purgative and anthelmintic, inadmissible in inflammatory conditions of the alimentary canal, but well adapted for torpid and inactive conditions of the abdominal organs. Associated with calomel, rhubarb, or sulphate of potassa, it is useful in all cases in which an active cathartic or vermifuge may be required, especially for children. *Dose.* (For an adult) 5 to 15 gr., in powder, or made into a bolus, or emulsion.

SCARLATINA. See *Scarlet Fever.*

SCARLET DYE. *Proc.* (Poërner,)—*a.* The *Bouillon.* Take of *cream of tartar,* 1¾ *oz.; water,* q. s.; boil in a block-tin vessel, and when dissolved, add of *solution of tin* (made by dissolving 2 *oz.* of grain tin in a mixture of 1 *lb.* each of nitric acid and water, and 1½ *oz.* of sal ammoniac), 1¾ *oz.;* boil for 3 minutes, then introduce the cloth, boil it for 2 hours, drain it, and let it cool.—*b.* The *Rougie.* Next, take of *cream of tartar,* ¼ *oz.; water,* q. s.; boil, and add *powdered cochineal,* 1 *oz.;* again boil for 5 minutes, then gradually add of *solution of tin,* 1 *oz.*, stirring well all the time; lastly, put in the goods and dye as quickly as possible. The quantities given are those for 1 to 1¼ *lb.* of woollen cloth. The result is a *full scarlet.* To make the colour turn on the *ponceau* or *poppy,* a little turmeric is added to the bath.

SCARLET FEVER. Syn. *Scarlatina,*—*Febris Scarlatina,*—Lat. A highly contagious disease, so named after the peculiar eruption or efflorescence of the skin which accompanies it. The *milder form* of this disease (*scarlatina simplex* or *mitis*) comes on with languor, chilliness alternated by fits of heat, nausea, vomiting (frequently), and other common symptoms of fever; followed, on the third or fourth day, by a scarlet efflorescence upon the skin, which after three or four days ends in the cuticle or scarf-skin peeling off in branny scales. Dropsical swelling of the whole body sometimes follows the disappearance of the eruption; but this, with the febrile symptoms, and the soreness of the throat (if any), then give way, and the patient gradually regains his former health and strength. In the *malignant form* of scarlet fever (*scarlatina cynanchica, anginosa,* or *maligna*) the febrile symptoms, from the first, are more alarming; there is bilious vomiting, great soreness and ulceration of the throat, the pulse is small and quick, and the breathing laborious. These symptoms rapidly increase on the appearance of the eruption; the body then becomes swollen, the nose and eyes inflamed, the breath fœtid, the throat suppurates, putrid symptoms ensue, and the patient is either suddenly cut off, or recovers very slowly.

The *early symptoms* of *scarlet fever* are *distinguished* from those of the *measles* and *small-pox* by the greater extent and want of elevation of the eruption, and by its not congregating into patches. Nor is there the cough and running from the eyes and nose, which ushers in the measles.

The *treatment* of the *milder form* of *scarlet fever,* especially that of childhood, may consist of the administration of an *emetic,* followed by a *saline aperient,* to clear the bowels; the latter being repeated as occasion may require. The patient should be kept in a cool and well-ventilated room, the diet should be light and farinaceous, and the use of diluent drinks copiously indulged in. If the febrile symptoms are severe, or the throat much affected, small doses of some *mild mercurial,* as calomel, mercurial pill, or quicksilver with chalk, may be administered, either separately or combined with *antimonial diaphoretics,* or Dover's powder. In *malignant scarlet fever* a smart emetic should be given early, and mercurials and diaphoretics at once freely exhibited. *Acidulated gargles* may be used for the throat, and when the heat of the body is much above the natural standard, sponging the whole body with cold water, or with vinegar-and-water, may be had recourse to. If the malignant symptoms run high, and assume a typhoid or putrid character, the system must be supported with *stimulant tonics,* as, wine, bark, capsicum, &c.

According to Hahnemann and Prof. Koreff, belladonna is a *prophylactic* against *scarlet fever;* a statement confirmed by Dr. Randhahn, by experiment on 160 children, fully exposed to the disease. The homœopathists also hold it to be almost a specific in scarlatina.

Scarlet fever is common to all ages of life, but children and young persons are the most subject to it. Unlike the *small-pox,* it occasionally attacks the same person more than once. It is most common in dirty, close, damp situations.

SCENE PAINTING. A variety of *distemper painting* employed in theatres, &c., governed by perspective, and having for its object the production of striking effects when viewed at a distance. *Water, size,* and the *ordinary pigments,* are the only materials used for the purpose.

SCENT BAGS. See *Sachets.*

SCENT BALLS. Syn. *Pastilles de Toilette Odorantes.* These are prepared from any of the materials noticed under *pot pourri, scented powders,* and *sachets,* made into a paste with *mucilage of gum tragacanth,* and moulded into any desired form, as that of *balls, beads, medallions, &c.* The larger ones are frequently polished.

SCENTED CASSOLETTES. See *Pot Pourri* (and *above*).

SCENTS (Pommade). *Prep.* 1. (*Cowslip.*) From *essence of bergamot,* 8 *oz.; essence of lemon,* 4 *oz.; oil of cloves,* 2 *oz.; essence de petit grain,* 1 *oz.*

2. (*Jonquille.*) From *essences of bergamot* and *lemon,* of each, 8 *oz.; oils of orange-peel* and *cloves,* of each, 2 *oz.; oil of sassafras,* 1 *oz.: liquid storax,* ½ *oz.;* digest, with warmth and agitation, for a few hours, and decant the clear portion in a week.

3. (*Millefleur.*) From *essence of ambergris* (finest), 4 *oz.; essence of lemon,* 3 *oz; oil of cloves* and *English oil of lavender,* of each, 2 *oz.; essence de petit grain, essence of bergamot, and balsam of Peru* (genuine), of each, 1 *oz.;* as the last.

Obs. The above are employed to scent pomatums, hair oils, &c. 1 *oz.* of any one of them, dissolved in 1 pint of the *strongest rectified spirit,* produces a *delicious perfume* for the *handkerchief.* (See *p.* 875.)

SCENTS (Snuff). *Prep.* 1. *Essence of bergamot,* 2 *oz.; otto of roses* and *neroli,* of each, 1 dr.

2. *Oil of lavender,* 1 *oz.; essence of lemon,* 2 *oz.; essence of bergamot,* 4 *oz.*

3. To the last, add of *oil of cloves,* 2 *oz.*

4. *Essences of musk* and *ambergris,* of each, 1 *oz.; liquor of ammonia,* ½ dr. See *Snuffs, &c.*

SCHEELE'S GREEN. See *Green Pigments.*

SCHEELIUM. See *Tungsten.*

SCHLEROGEN. The ligneous matter deposited in the cells of plants. (Brande.)

SCHLIPPE'S SALT. See *page* 78.

SCHWART'S DROPS. See *Worm Drops.*

SCIATICA. See *Rheumatism.*

SCILLITINE. Syn. *Scillitina, Scillitite.* A whitish, resinous, translucent, bitter, deliquescent substance, obtained by Vögel from squills. It is soluble in water, alcohol, and acetic acid, and is purgative, acrid, and poisonous.

SCORBUTUS. See *Scurvy.*

SCORIA. Dross the refuse or useless part of any substance, more especially that left from bodies which have been subjected to the action of fire. It is frequently used in the plural (*scoriæ*).

SCOTT'S DROPS. See *Patent Medicines.*

SCOURING. The common method of cleaning cloth is by beating and brushing it, unless it be very dirty, when it undergoes the operation of *scouring.* This is best done on the *small scale,* as with *articles of wearing apparel,* as follows:—A little *curd soap* is dissolved in *water,* and, after mixing it with a little *clarified ox-gall,* is applied to all the *spots of grease, dirt, &c.,* and well rubbed into them with a *stiff brush* until they appear to be removed; after which the article is well cleaned all over with a brush or sponge dipped into some *warm water,* to which the previous mixture and a little more *ox-gall* has been added. The cloth is next thoroughly rinsed in *clean water,* and hung up to dry. For dark-coloured cloths, some *fuller's earth* is often added to the mixture of soap and gall. When the article is *nearly* dry, the nap is laid smooth, and it is carefully pressed (if with a hot iron, on the wrong side), after which a *soft brush, moistened with a drop or two of olive oil,* is frequently passed over it, to give it a finish and gloss.

Cloth is also cleaned in the *dry way;*—The spots being removed, as above, and the wetted parts having become dry, *clean damp sand* is strewed over it, and beaten into it with a brush, after which the article is well gone over with a *hard brush,* when the sand comes out, and brings the dirt with it.

Buff and *drab cloth* is generally cleaned by covering it with a paste made with *pipe-clay* and *water,* either with or without a little *umber* to temper the colour, which, when dry is rubbed and brushed off.

When the article requires *renovation* as well as scouring, it is placed, whilst *still damp,* on a board, and the threadbare parts are rubbed with a *half-worn hatter's card filled with flocks,* or with a *teasel,* or a *prickly thistle,* until a nap is raised; it is next hung up to dry, after which it is "finished off" as before. When the cloth is much faded, it is usual to give it a "dip," as it is called, or to pass it through a dye-bath to freshen up the colour. *Black* and *dark blue cloth,* if rusty or faded, is commonly treated to a coat of "*reviver,*" instead of being "re-dipped," and is then hung up until the next day, before being pressed and finished off. See *Spots and Stains.*

SCOURING DROPS. See *page* 343.

SCROFULA. A non-contageous disease, consisting in "hard indolent tumours of the conglobate glands in various parts of the body, but particularly in the neck, behind the ears, and under the chin, which after a time suppurate, and degenerate into ulcers, from which, instead of pus, a white curdled matter, somewhat resembling the coagulum of milk, is discharged." In *mild cases,* the glands, after suppuration, slowly heal; in *others,* the eyes become inflamed, and the joints affected; whilst in *severe cases,* the disease gradually extends to the ligaments and bones, producing a debilitated and hectic condition, under which the patient sinks; or, it induces phthisis, and the patient dies of that disease.

The *first appearance* of *scrofula* is usually between the *third* and *seventh* year; but it not unfrequently occurs between this age and that of puberty; after which it seldom makes a *first* attack. Delicate children with fair complexions, and those disposed to rickets, are the most liable to scrofula. In its milder forms, when not affecting any deep-seated or important parts, it is not, in itself, a dangerous disease; although by rendering the patient more liable to certain other diseases, and by aggravating their severity, it indirectly becomes so, and thus often tends greatly to shorten life.

The *exciting causes* of *scrofula,* when it is not hereditary, are a moist atmosphere, a low damp situation, and insufficient or improper diet, as well as everything that tends to debilitate the system. It is rare in either hot or very cold climates, where the air is generally dry.

The *treatment of scrofula* at different periods, and by different parties, has included at least a tithe of the materia medica; but the articles that appear to be most beneficial, are comparatively few. *Iodine,* or better, *iodide of potassium, cod-liver oil, lemon-juice,* and the *bicarbonate of potassa,* are among this number. *Mild chalybeate tonics* are also useful. The *diet* of the patient should be nourishing and liberal, and contain a moderate share of the red meats and cruciferous vegetables. The *clothing* should be warm, and amply sufficient; and, when convenient, an *elevated* or *dry situation* should be chosen for a residence. *Sea air* and *sea-bathing* often prove most beneficial when all other remedies have failed.

SCUDAMORE'S LOTION. See *page* 720.

SCURF. Syn. *Furfura.* Scurf "is a natural and healthy formation, and though it may be kept from accumulating, it cannot be prevented. It is produced on every part of the body where hair is found, although, from the more active growth of hair on the scalp, the facilities for collecting, and the contrast of colour, it strikes the eye most disagreeably in that situation. This will show how futile any attempt must be, which shall have for its object to prevent the formation of the scurf. It *may be removed,* and *should be removed,* every day, with the hair-brush; but prevention is impossible, inasmuch as it is opposed to a law of nature. *Occasionally,* as a *morbid action,* an *unusual quantity of scurf is produced,* in which case medical means may be adopted to bring the scalp into a more healthful state." (Eras. Wilson.) In such cases the daily use of some mild stimulating or detergent wash, with due attention to the stomach and bowels, will generally abate this annoyance.

SCURVY. Syn. *Scorbutus.*—Lat. This disease commences with indolence, sallow looks, debility, and loss of spirits; the gums become sore and spongy, the teeth loose, and the breath fœtid; the legs swell, eruptions appear on different parts of the body, and, at length, the patient sinks under general emaciation, diarrhœa, and hæmorrhages.

The *treatment* of *ordinary cases* of this disease mainly consists in employing a *diet* of *fresh animal* and *green vegetable food,* with *mild ale, beer,* or *lemonade,* as beverages; scrupulously avoiding salted and dried meat. The *fresh-squeezed juice of lemons,* is, perhaps, of all other substances, the most powerful remedy in this disease in its early stages, and is useful in all of them. *Effervescing draughts* formed with the *bicarbonate of potassa* (not soda) are also excellent. See *Potassa* (*p.* 1032).

SEALING WAX. See *Wax.*

SEA SICKNESS. The most *effectual preventive* of *sea sickness* appears to be the *horizontal position.* When there is *much pain,* after the stomach has been well cleared, a few drops of *laudanum* may be taken, or an *opium plaster* may be applied over the region of the stomach. *Persons about to proceed to sea* should put their stomach and bowels in proper order by the use of mild aperients, and even an emetic, if required; when it will generally be found, that a glass of warm and weak *brandy-and-water* to which 15 or 20 drops of *laudanum,* or, still better, 1 or 2 drops of *creasote* have been added, will effectually prevent any disposition to sea sickness, *provided* the bowels be attended to, and excess in eating and drinking be at the same time avoided. A spoonful of *crushed ice*, in a wine-glassful of *cold water*, or *weak-brandy-and-water*, will often afford relief when all other means fail. *Smoking at sea* is very apt to induce sickness. M. F. Curie, in the Comptes Rendus, asserts that *drawing in* the breath as the vessel *descends*, and *exhaling* it as it *ascends* on the billows, by preventing the movements of the diaphragm acting abnormally on the phrenetic nerves, *prevent sea sickness.* On this Mr. Atkinson, at a recent meeting of the *British Association*, observed that—if a person, seated on board ship, holding a tumbler filled with water in his hand, makes an effort to prevent the water running over, at the same time allowing not merely his arm, but also his whole body to participate in the movements, he will find that this has the effect of preventing the giddiness and nausea that the rolling and tossing of the vessel have a tendency to produce in inexperienced voyagers. If the *person* is *suffering from sickness* at the commencement of his experiment, as soon as he grasps the glass of liquid in his hand, and suffers his arm to take its course and go through the movements alluded to, he feels as if he were performing them of his own free will, and the nausea abates immediately, and very soon ceases entirely, and does not return so long as he suffers his arm and body to assume the postures into which they *seem* to be drawn. Should he, however, resist the free course of his hand, he instantly feels a thrill of pain, of a peculiarly stunning kind, shoot through his head, and experiences a sense of dizziness and returning nausea.

SEBACIC ACID. *Prep.* Distil *fat, oil,* or *oleine*, in an earthen retort, and treat the product with *boiling water* as long as that liquid deposits anything on cooling; wash the crystals in *cold water*, and re-crystallize from *boiling water*, as before, repeating the process until the crystals become colourless.

Prop., &c. Light, pearly scales, resembling those of benzoic acid; it is very soluble in hot water, ether, and alcohol; it fuses when melted, and sublimes unchanged. Its salts are called *sebates.* Sebacid acid has been recently formed by the action of potassa on castor oil.

SEDATIVES. Syn. *Sedativa*,—Lat. Medicines and agents which diminish the force of the circulation or the animal energy, and allay pain. *Foxglove, henbane, tobacco, potassio-tartrate of antimony*, and several of the *neutral salts* and *acids*, act as sedatives. *Cold* is, perhaps, the most powerful agent of this class.

SEDIMENT. See *Precipitate.*

SEED. Syn. *Semen*,—Lat. The seeds of plants are conspicuous for their vast number and variety, and their extreme usefulness to man. The seeds of certain of the *gramineæ* furnish him with his daily bread, some of those of the *leguminosæ*, in either the immature or ripe state, supply his table with wholesome esculents, or provide a nourishing diet for his domestic animals; whilst those of numerous other plants, dispersed through every class, order, and family, yield their treasures of oil, medicinals, or perfumes, for his use. The value and importance of the seeds of plants is clearly shown by the care which nature has bestowed on their production and preservation. Every other part of the vegetable fabric is made, in some manner or other, subservient to the formation, perfecting, or dispersing of these. These objects appear to be the sole "end and aim" of all the organs of fructification, and, indeed, of the whole existence of plants; since after they are performed the individual either remains dormant for a season, when it becomes re-invigorated for the same special purpose, or, it at once dwindles and dies. The last is the case with the majority of plants. By delaying or arresting the development or maturation of their seeds, *annuals* may be converted into biennials, and the existence of *biennials* extended to the third, or even to the fourth year. See *Species, Vegetables, Worm Seed, &c.*

SELENIC ACID. Syn. *Acidum Selenicum*,—Lat. *Prep.* By fusing *selenium* or *seleniuret of lead* along with *nitrate of potassa* or *of soda*, acting on the *fused mass* with *water*, precipitating the resulting solution of *seleniate of soda* with *acetate* or *nitrate of lead*, and decomposing the precipitate (*seleniate of lead*), diffused in *water*, with *sulphuretted hydrogen.* The *selenic acid*, thus obtained, may be cautiously concentrated in a glass vessel, if necessary; but if this be pushed too far, it is resolved into *selenious acid* and oxygen.

Prop., &c. Selenic acid is a colourless liquid, closely resembling sulphuric acid; its salts (*seleniates*) bear the closest analogy to the sulphates.

SELENIOUS ACID. *Prep.* By digesting *selenium* in *aqua regia* or *nitric acid*, and evaporating the solution to dryness. It may be sublimed unchanged, is soluble in water and alcohol, and forms salts with the bases, termed *selenites.*

SELENIUM. A chemical element, discovered by Berzelius, in 1818.

Prep. (Magnus.) A mixture of *native sulphuret of selenium*, 1 part, and *binoxide of manganese*, 8 parts; is exposed to a low red-heat in a glass retort, the beak of which dips into water; the product, after being washed in *water*, may be purified by re-sublimation.

Prop., &c. A brittle, opaque, dark reddish-brown substance, having somewhat the appearance of lead, when in mass; but, with only a semi-metallic lustre, and forming a deep red powder; sp. gr. 4·30 to 4·32; it softens at 212°; fuses at 220°; and boils at 650° Fahr.; when heated in the air, it exhales a peculiar odour, which has been compared to that from rotten horse-radish. With the metals it forms compounds called *seleniurets*, or *selenides*, which closely resemble the corresponding sulphurets.—*Oxide of selenium* is a neutral, gaseous substance, obtained by heating selenium in a vessel of air, and washing the product with water.—*Sulphuret and phosphuret of selenium* are made by simply fusing their elements together. See *Hydrogen* (Seleniuretted.)

SELENOCYANOGEN and *Selenocyanides.* Substances analogous in their composition and properties to *sulphocyanogen* and the *sulphocyanides.*

SEMOLA (Bullock's). *Wheaten flour*, to which some of the *gluten* of the starch-works has been added, artificially granulated.

SEMOLINA. Syn. *Sémoule*, *Semoulina.* The large hard grains of *wheat flour* retained in the bolting machine, after the fine flour has passed through its meshes. "The best sémoule is obtained from the wheat of the southern parts of Europe. With the sémoule, the fine white Parisian bread called '*gruau*' is baked." (Ure.)

SENEGA. Syn. *Seneka, Snake Root, Rattlesnake do.; Senega,*—Ph. L. E. & D. *Radix Senegæ,*—Ph. L. 1824. "The *root*" of "*polygala senega*, Linn." (Ph. L.) A stimulating diaphoretic, and expectorant; in large doses, diuretic, cathartic, and emetic. In America it is used as an antidote to the bite of the rattlesnake. Drs. Chapman and Hartshorne extol it as an emmenagogue. Dr. Pereira says that it is an exceedingly valuable remedy in the latter stages of bronchial or pulmonary inflammation, when this disease occurs in aged, debilitated, or torpid constitutions. *Dose.* 10 to 30 gr., in powder or decoction, (combined with aromatics, opium, or camphor,) thrice daily.

SENEGINE. Syn. *Seneginum; Polygaline, Polygalic Acid.* A white odourless powder discovered by Gehlin in the bark of seneka root (*polygala senega*). It is *obtained* by exhausting the *bruised root-bark* with *rectified spirit*, evaporating the resulting *tincture* to a syrupy consistence, and then strongly agitating it with *ether;* after repose for some time crystals are deposited, which may be purified in the usual manner.

Obs. Senegine is a powerful errhine and acrid poison. It is volatile, and soluble in both water and alcohol. According to Gehlin, it possesses acid properties. The *polygaline*, of Peschier, is an alkaloid, and exists in the root united to an acid, which he calls the *polygalinic.* Is not this *polygalinate of polygaline* the *senegine* of M. Gehlin?

SENNA. Syn. *Senna, Sennæ Folia,*—Lat. There are three principal varieties:—

1. Alexandrian senna (*senna Alexandrina,*—Ph. L. E. & D.), referred in the Ph. L. to "*cassia officinalis?* (senna officinalis, Roxb.) and *cassia obovata;*" in the Ph. D., to *cassia acutifolia* (Delile); and in the Ph. E., to various species of cassia. The *leaves* are "unequal at the base, ovate acute, or obovate mucronate." (Ph. L.) It is generally mixed with the leaves of *cynanchum argel*, the presence of which is often the occasion of much griping. The *leaf* of *argel* is fully an inch long, warty, regular in its formation, and the lateral nerves are imperfectly seen on the under side; whilst that of the true *Alexandrian senna* never exceeds ¾ inch in length, is oblique, and the nerves on the under side are very conspicuous.

2. Indian senna (*senna Indica,*—Ph. L. & E.) is referred to "*cassia officinalis* (senna officinalis, Roxb.)" in the Ph. L.; and in the Ph. E. & D. to *cassia elongata* (Lemaire, Lisancourt). The leaf is "unequal at the base," and "lanceolate." (Ph. L.)

3. *Tinnevelly senna*, forming the *finest Indian*, now introduced into the Ph. D., is therein described as composed of the leaflets of *cassia oblongata.* These are pale green, thin, flexible, and from 1 to 2 inches long, and nearly ½ inch broad. This variety is equal in medicinal virtue to the best Alexandrian, and is to be preferred, on account of its being imported perfectly free from adulteration.

Senna is *purgative* in *doses* of 20 gr. to 1 dr., either in powder, or made into an infusion or tea with water, combined with *ginger, caraways*, or some other aromatic, to prevent griping. It acts chiefly on the small intestines, and generally effects its purpose within 4 hours after being taken.

SEPIA. A pigment prepared from the "*ink*" or *black fluid* secreted by *sepia* *officinalis* (Linn.), and several other varieties of *cuttle-fish.* The contents of the "ink bags" are inspissated as soon as possible after collection, and then form the *crude sepia* of commerce. This is *prepared* for *artists* by boiling it for a short time in a *weak lye of caustic alkali,* precipitating the solution with an *acid,* and well washing and carefully drying the precipitate by a gentle heat. It possesses a fine brown colour, and is used like Indian ink.

SERPENTARY. Syn. *Virginian Snake-root; Serpentariæ Radix; Serpentaria,*—Ph. L. & E. *Aristolochia Serpentaria,*—Ph. D. An excellent, stimulating diaphoretic and tonic; in typhoid and putrid fevers, dyspepsia, &c. It is admirably suited to check vomiting and to tranquillise the stomach, particularly in bilious cases. (Dr. Chapman.) *Dose.* 10 to 20 gr., every third or fourth hour, its use being preceded by an aperient.

SERUM. Syn. *Seralbumen.* The clear pale fluid in which the blood-globules float, and which separates from blood during its coagulation. It is, essentially, a feebly alkaline solution of albumen. See *Albumen* and *Ovalbumen.*

SESQUI-. See *Nomenclature.*

SETON. Syn. *Setaceum.* An artificial ulcer, made by passing a portion of *silk* or *thread* under the skin by means of a *seton needle,* a part of which is drawn through daily, and thus keeps up a constant irritation. Occasionally, the thread is anointed with some irritating substance, for the purpose of increasing the discharge.

SEVUM (Prepared). Syn. *Sevum Præparatum, Sevum Magneticum,*—Lat. *Prep.* 1. (Pharm. Journ.) *Mould candles,* at *least* 2 years old, melted by a very gentle heat, and strained from the wicks.

2. As *magnetic adeps.* (See *p.* 741.) *Used* to make *mercurial ointment.* Triturated with 8, 12, or 16 times its weight of quicksilver, the globules are completely extinguished in from 10 to 15 minutes.

SHAD. The *siluris glanis* (Linn.), a soft-finned abdominal fish, found chiefly in the rivers of northern Europe. It is the largest European fresh-water fish. It yields *Samovey isinglass,* and its flesh is esteemed as food. The fish called *shad* or *twaite shad* (alosa finta), and *allice* or *allice shad* (alosa communis), are species belonging to a sub-genus of the *clupeidæ* (alosa). The *first* is a small fish only 12 or 14 inches long; the *second* is considerably larger, being often 2 to 3 feet in length.

SHADDOCK. A large species of orange, the fruit of *citrus decumana,* (Linn.)

SHAGREEN. This is prepared from the skins of the horse, wild ass, and camel, as follows:—The *skin,* freed from epidermis and hair by soaking in *water,* and, after dressing with the currier's fleshing-knife, is sprinkled over, whilst still wet and stretched, with the *seeds of a species of chenopodium,* which are imbedded in it by strong pressure, and in this state it is dried; the seeds are then shaken off, and the surface rubbed or shaved down, nearly to the bottom of the seed-pits or indentations; it is next soaked in *water,* by which the skin swells, and the recently depressed surface rises into a number of minute prominences; it is, lastly, dyed and smoothed off. *Black* is given to it with galls and copperas; *blue,* with a solution of indigo; *green,* with copper filings and sal ammoniac; and *red,* with cochineal and alum. *Shagreen* was formerly very extensively used for covering the cases of watches, spectacles, surgical instruments, &c.

SHALLOT. Syn. *Eschalot.* The *allium ascalonicum* (Linn.), a plant allied to the onion, the bulb of which is much used as a sauce or pot-herb.

SHAMPOOING. A practice, common in the East, having for its object the increase or restoration of the tone and vigour of the body, or the mitigation of pain. It is applied either in the bath or immediately after quitting it, generally, the latter, and consists in pressing and kneading the flesh, stretching and relaxing the joints, and laboriously brushing and scrubbing the skin, and rubbing down the rough and hard parts with pumice-stone. It is "most singular. You are laid out at full length, rubbed with a hair-brush, scrubbed, buffeted, and kicked; but it is all very refreshing." (Sir A. Burnes.) An experienced shampooer causes almost every joint of the body to crack. See *Bathing.*

SHAMPOO LIQUID. See *Spirits.*

SHARPS. See *Flour.*

SHAVING. The following are Mr. Mechi's instructions for this, to many persons, troublesome operation:—*Never fail to well wash your beard with soap and cold water,* and to rub it dry, immediately before you apply the lather, of which the *more you use* the easier you will shave. *Never use warm water,* which makes a tender face. Place the razor (closed of course) in your pocket, or under your arm, to *warm it.* The moment you leave your bed is the *best time to shave.* Always put your *shaving brush* away with the *lather on it.*

The razor (being only a very fine saw) should be moved in a *sloping* or *sawing direction,* holding it *nearly flat* to your face, care being taken to *draw the skin as tight as possible* with the left hand, so as to present an even surface and throw out the beard. The practice of pressing on the edge of a razor in stropping generally rounds it; the pressure should be directed to the back, which must never be raised from the strop. If you shave from *heel to point* of the razor, strop it from *point to heel;* but if you *begin with the point*, then strop from *heel to point.* If you *only once* put away your razor *without* stropping or otherwise cleaning the edge, you must no longer expect to shave well, the soap and damp so soon rust the fine teeth or edge. A piece of plate leather should always be kept with the razors.

SHAVING FLUID. See *page* 394.

SHEEP. Syn. *Ovis*—Lat. The *ovis aries*, an animal domesticated almost everywhere. Its *flesh* supplies us with food; its *skin*, with leather; its *fleece*, with wool; and its *intestines*, with catgut. Its *fat* (sevum) is officinal. See *Suet*, *Mutton*, *&c.*

SHELL-FISH. Few articles of food are so liable to disturb the functions of the stomach and bowels as shell-fish. The *oyster* (ostrea edulis, *Linn.*), and the *cockle* (cardium edule, *Linn.*), are, perhaps, the least objectionable. The *crab* (cancer pagurus, *Linn.*), the *crayfish* (cancer astacus, *Linn.*), the *lobster* (cancer gammerus, *Linn.*), the *mussel* (mytilus edulis, *Linn.*), the *prawn* (cancer squilla, *Linn.*), the *periwinkle* (turbo littoreus, *Linn.*), and the *shrimp* (cancer crangon, *Linn.*), with the exception of the *claws* of the *first three*, are always suspicious, particularly in hot weather, and often absolutely *poisonous.* We have seen the most alarming, nay fatal symptoms, follow the use of *mussels*, even amongst those habitually accustomed to take them; whilst it is a well-known fact, that the luscious body of the crab and lobster have too often formed the last supper of the epicure. See *Oysters*, *&c.*

SHELLS (Prepared). Syn. *Testæ Præparatæ*,—Ph. L. 1836. *T. Ostreorum P.*, —Ph. L. 1788. *Prep.* (Ph. L. 1836.) Wash *oyster shells* (ostræ,—Ph. L.) with *boiling water*, having previously freed them from extraneous matters; then prepare them in the manner directed for chalk. The product is similar in constitution and properties to *prepared chalk.*

SHERBET. (*Pers.*) A cooling drink, used in the East, prepared with the *juices of fruit*, and *water*, variously *sweetened* and *flavoured.* The word has been, of late years, commonly employed in these countries in a similar manner. See *Lemonade*, *Orangeade*, and *Powders.*

SHERRY. Syn. *Sherry Wine; Sherris; Vinum Xericum*,—Ph. L. *Vinum Album*,—Ph. E. *Vinum Album Hispanicum*,—Ph. D. This is the only wine ordered in the British Pharmacopœias. See *Wines.*

SHERRY - COBBLER. *Prep.* (Redwood.) Half fill a tumbler with *clean pounded ice;* add a table-spoonful of *powdered white sugar*, a few *thin slices of lemon* with the *peel* (or some *strawberries* or other similar fruit, bruised), and a wineglassful or more of *sherry-wine;* mix them together (lightly), and as the ice melts, suck the liquor through a straw (or a small tube of silver or glass).

Obs. A favorite beverage in the United States of America, and, as prepared there, most excellent in its way. It has been recently introduced to England.

SHINGLES. Syn. *Zoster*, *Herpes Zoster*, *Herpes Zona*,—Lat. A local variety of herpes or tetter, remarkable for forming a kind of belt round or partly round some part of the trunk of the body, chiefly the waist or abdomen. See *Tetters.*

SHOT METAL. *Prep.* From *lead*, 1000 parts, *arsenic*, 3 parts. When the lead is coarse, 6 to 8 parts of metallic arsenic are required to fit it for this purpose.

SHOW COLOURS (Druggist's). The following formulæ are perhaps the best of this class:—

Amber. From *dragon's blood* (in coarse powder), 1 part; *oil of vitriol*, 4 parts; digest, and when solution is complete, dilute the mixture with *distilled* or *soft water*, q. s.

Blue.—*a.* From *blue vitriol*, 2 *oz.; oil of vitriol*, $\frac{1}{2}$ *oz.; water*, 1 pint.—*b.* A solution of *indigo* in *sulphuric acid*, diluted with *water*, q. s.—*c.* A solution of *soluble prussian blue* in *distilled water.*—*d.* A solution of pure ordinary *prussian blue* in either *oxalic* or *hydrochloric acid*, slightly diluted, and afterwards further diluted with *water* to the proper shade of colour.

Crimson.—*a.* From *alkanet root*, 1 *oz.; oil of turpentine*, 1 pint. *Used* chiefly for lamps.—*b.* As *pink* (*b*), below.

Green.—*a.* From *sulphate of copper*, 2 *oz.; bichromate of potash*, 1 dr., or q. s.; *water*, 1 pint.—*b.* A solution of *sulphate of copper*, 2 *oz.; chloride of sodium*, 4 *oz.; water*, 1 pint, or q. s.—*c.* A solution of *distilled verdigris* in *acetic acid*, diluted with *water*, q. s.—*d.* Dissolve *blue vitriol* in *water*, and add *nitric acid* until it turns green.

Lilac.—*a.* Dissolve *crude oxide of cobalt* (zaffre) in *nitric or hydrochloric acid,* add *sesquicarbonate of ammonia,* in excess, and afterwards, sufficient *ammonio-sulphate of copper* to strike the colour.—*b.* As the *purple,* but more diluted.

Olive. Dissolve *sulphate of iron* and *oil of vitriol,* equal weights, in *water,* and add of *nitrate of copper,* q. s. to strike the colour.

Orange.—*a.* A solution of *bichromate of potash* in *water,* either with or without the addition of some *hydrochloric* or *sulphuric acid.*—*b.* Dissolve *gamboge* or *annotta* in *liquor of potassa;* dilute with *water,* and add a *little spirit.*

Pink.—*a.* To a solution of *chloride* or *nitrate of cobalt,* in *water,* add *sesquicarbonate of ammonia,* q. s. to dissolve the precipitate at first formed.—*b.* From *madder* (washed with cold water), 1 *oz.; sesquicarbonate of ammonia,* 4 *oz.; water,* 3 pints; digest, with agitation, for 24 hours, then dilute with more *water,* and filter.

Purple.—*a.* A solution of *sulphate of copper,* 1 *oz.,* in *water,* 1 quart, or q. s.; with the addition of *sesquicarbonate of ammonia,* 1½ *oz.*—*b.* To the last, add a sufficient quantity of the *first pink* (above), to turn the colour.—*c.* To an *infusion of logwood,* add *carbonate of ammonia* or *of potassa,* q. s.—*d. Sugar of lead,* 3 *oz.; powdered cochineal,* 1 *dr.; water,* q. s.—*e.* Add *sulphate of indigo,* nearly neutralized with chalk, to an *infusion of cochineal,* till it turns purple.

Red.—*a.* Dissolve *carmine* in *liquor of ammonia,* and dilute with *water.*—*b.* Digest *powdered cochineal* in a *weak solution of ammonia* or *of sal ammoniac,* and afterwards dilute with *water.*—*c.* Add *oil of vitriol,* 4 *oz.,* to *water,* 1 gall., and digest *dried red-rose leaves,* 8 *oz.,* in the mixture for 24 hours.—*d.* Dissolve *madder lake* in a *solution of sesquicarbonate of ammonia,* and dilute the solution with *water.*

Violet. To a solution of *nitrate of cobalt* in a *solution of sesquicarbonate of ammonia,* add *solution of ammonia-sulphate of copper,* q. s. to strike the colour.

Yellow.—*a.* A solution of *sesquioxide* or *rust of iron,* ½ *lb.,* in *hydrochloric acid,* 1 quart, diluted with *water.*—*b.* To a strong decoction of *French berries* add a little *alum.*—*c.* A simple solution of *chromate* or *bichromate of potash* in *distilled water.*—*d.* A solution of equal parts of *nitre* and either *chromate* or *bichromate of potash,* in *water.*

Obs. Most of the above require filtering, which should be done through *powdered glass,* placed in a *glass funnel,* and *never* through paper. They usually need a second filtration, after being exposed to the light for some weeks; hence it is convenient always to make a little more of them than is required to fill the bottle, as several of them when diluted after filtration become again turbid.

SHRIMP. See *Shell-fish.*

SHRUB. A species of concentrated cold punch, prepared with lemon juice, spirit, sugar, and water. When the word is used in its unqualified form, *rum shrub* is alluded to.

Brandy Shrub.—*a.* Take of *brandy,* 1 gall.; *orange* and *lemon juice,* of each, 1 pint; *peels of* 2 *oranges; do. of* 1 *lemon;* digest for 24 hours, strain, and add of *white sugar,* 4 *lb.,* dissolved in *water,* 5 pints; in a fortnight decant the clear liquid for use.

b. As *rum shrub* (below), but using brandy.

Lemon Shrub, Lemonade do. Concentrated lemonade, either with or without the addition of a *little spirit. Used* to make lemonade or lemon sherbet.

Punch Shrub. Concentrated punch, made with equal parts of *spirit* and *water. Used* to make punch.

Rum Shrub.—*a.* As *brandy shrub,* but substituting *rum* for brandy.

b. Take of *rum,* at proof, 34 gall. (or if of any other strength an equivalent quantity); *essential oils of orange* and *lemon,* of each, 2 *oz.,* dissolved in *rectified spirit,* 1 quart; *good lump sugar,* 300 *lb.;* dissolved in *water,* 20 gall.; mix well by "rummaging," and gradually and cautiously add of *Seville orange juice,* or of a *solution of tartaric acid in water,* q. s., to produce a *pleasant,* but *scarcely perceptible acidity;* next "rummage" well for 15 minutes, then add sufficient *water* to make the whole measure *exactly* 100 *gall.,* and again "rummage" well for at least half an hour; lastly, bung the cask down loosely, and allow it to repose for some days. In a fortnight, or less, it will usually be sufficiently "brilliant" to be *racked.* The *product* is 100 gall., at 66 u. p.

Obs. Rum shrub is the kind in the greatest demand, and that having a slight preponderance of the orange flavour is the most esteemed. If wholly flavoured with lemon it is apt to acquire a kind of "dead" or "musty" flavour by long keeping. The substitution of a *few gallons of brandy* for a *portion* of the *rum,* or the addition, after racking, of about 1 *oz.* each of *bruised bitter almonds, cloves,* and *cassia,* the *peels of about* 2 *dozen oranges,* and a "*thread*" of the *essences of ambergris* and *vanilla*, render it delicious.

SIALOGOGUES. Medicines which increase the flow of saliva. *Mercurials* and *pellitory of Spain* belong to this class.

SICKNESS. Nausea and vomiting frequently arise from the use of improper food, and other articles which offend the stomach; at other times, it is symptomatic of some disease, as colic, cholera, dyspepsia, head affections, incipient fever, &c.; in which case the primary affection should be attended to. "*Nausea* lowers the pulse, contracts the small vessels, occasions cold perspiration, severe rigors, and trembling; and diminishes, as long as it lasts, the actions, and even the general powers of life. The act of *retching*, and *vomiting* more especially, on the contrary, rouses rather than depresses, puts to flight all the preceding symptoms, and often restores the system to itself."

The best *remedies* or *palliatives* in these affections are effervescing saline draughts, either with or without the addition of a few drops of *tincture of henbane* or *tincture of opium*. A glass of *genuine lemonade*, *iced*, or a spoonful of *crushed ice* in a wine-glassful of *mint water*, is also very serviceable. See *Draughts*, *Pregnancy*, *Sea-sickness*, *&c.*

SIFTING is to pulverulent substances what filtration is to liquids; but in this case the *medium* through which the substance passes is, usually, of a simpler and coarser description. *Sieves* are commonly employed for the purpose, which are fitted with *silk* or *brass-wire gauze* for fine purposes, and *horse-hair cloth*, or *wire netting*, for coarser ones. *Drum sieves* are such as are furnished with covers and an enclosed space to receive the fine powder that passes through, by which dust and loss are prevented.

SIGHT. See *Vision.*

SIGNATURES (Fac-similes of). These may be readily obtained as follows:—

1. Let the *name* be written on a piece of *paper*, and while the ink is still wet sprinkle over it some *finely-powdered gum arabic*, then make a rim round it and pour on it some fusible alloy in a liquid state. Impressions may be taken from the plates formed in this way, by means of printing ink and the copperplate press.

2. By the use of *transfer ink* and *lithography*.

SILICA. Syn. *Silex*, *Silicic Acid*, *Oxide of Silicium; Siliceous Earth*, *Earth of Flints*, —Obs. This exists in quartz and rock crystal in a nearly pure state. The sands of rivers and the sea shore, flint, and almost all the scintillating stones, chiefly consist of it. It may be *obtained* in a *state of absolute purity* by passing *gaseous fluoride of silicium* into *water*, collecting the resulting gelatinous precipitate on a calico filter, washing it with *distilled water*, drying it, and heating it to redness. *Another method* is to precipitate a *solution of silicate of soda* or *potassa* (soluble glass) with *dilute hydrochloric acid*, and to treat the precipitate as before.

Prop., *&c.* A fine, white, tasteless, infusible powder, insoluble in all acids, after being heated, except the hydrofluoric; soluble in strong alkaline solutions; its salts are called *silicates*. Sp. gr. 2·66. *Flint glass* is a silicate of lead; *plate glass*, a silicate of potassa. See *Glass*, *Soluble do.*, *Powdered do.*, *Flint Powder*, *&c.*

SILICIUM. Syn. *Silicon.* An elementary substance forming the combustible base of silica. It was first procured by Berzelius in 1824, by the action of *potassium* on *hydrofluosilicic acid;* but it is more *conveniently obtained* from the *double fluoride of silicium and potassium*, previously dried at nearly a red heat. This substance is gently heated with nearly an equal weight of *potassium*, in a glass tube, and the resulting compound washed with *cold water;* the insoluble residuum is *silicium* under the form of a dark brown powder.

Prop., *&c.* Silicium dissolves in a mixture of nitric and fluoric acids, and burns or explodes when heated with the hydrates and carbonates of the alkalies. It is permanent in the air, unless when heated. After being heated to redness in a covered crucible, it becomes darker, denser, and quite incombustible. *Bromide* and *chloride of silicium* have been formed by exposing it in a spongy or pulverulent state to the action of chlorine. They are colourless, fœtid, volatile fluids, with low boiling points (the first, 122° Fahr.) With fluorine it forms *hydrofluosilicic acid.*

SILICO-FLUORIDES. Double fluorides formed by precipitating or saturating *silico-hydrofluoric acid* with the *bases.*

SILK. As an *article of clothing*, as far as "roundness of fibre, softness of texture, absence of attraction for moisture, and power of communicating warmth, are concerned, *silk* is greatly superior to both linen and cotton; moreover it gives the sensation of freshness to the touch which is so agreeable in linen. But, with all these advantages, silk (when worn next the body) has its defects: on the slightest friction, it disturbs the electricity of the skin, and thus becomes a source of irritation. Sometimes, it is true, this irritation is advantageous, as causing a determination of blood to the surface; but when this action is not required, it is disagreeable, and quite equal, in a sensitive constitution, to producing an eruption on the skin. I have seen eruptions occasioned in this manner, and when they have not occurred, so much itching and irritation as to call for the abandonment of the garment." (Eras. Wilson.)

Silk is *characterised* by its fibres appearing perfectly smooth and cylindrical, without depressions, even under a magnifying power of 160. Its *fibres* (even when dyed) acquire a permanent straw-yellow colour when steeped in *nitric acid* of the sp. gr. 1·20 to 1·30. The fibres of white or light coloured silk are similarly stained by a *solution of picric acid.* A thread of silk when inflamed, shrivels and burns with difficulty, evolves a peculiar odour, and leaves a bulky charcoal. By these properties SILK is *distinguished* from *cotton* and *linen.*

The *cleaning* and *renovation* of articles of wearing apparel made of silk, are matters requiring some care. No silk goods look well after being washed, however carefully it may be done; and this method should therefore never be resorted to, but from absolute necessity. It is recommended to sponge *faded silks* with *warm water* and *curd soap*, then to rub them with a dry cloth on a flat board, and afterwards to iron them on the wrongside with an ordinary smoothing iron. *Sponging* with *spirit*, *camphine*, or *pure oil of turpentine*, also greatly improves *old silk*, and is often preferable to any other method. The odour of the camphine and turpentine passes off by exposure for a few days. When the *ironing* is done on the right side, *thin paper* should be spread over the surface, to prevent "glazing." See *Dyeing*, *Gilding*, *&c.*

SILKWORM GUT. See *page* 553.

SILLABUB. *Prep.* Grate off the *yellow peel of a lemon* with *lump-sugar*, and dissolve the *sugar* in ¾ pint of *wine;* add the *juice of* ½ *a lemon*, and a ¼ pint of *cream;* beat the whole together until of a proper thickness, and then put it into glasses. —*Obs.* ¾ to 1 pint of *new milk* is often substituted for the cream, and *strong cider* or *perry* for the wine. *Grated nutmeg* is often added. When "whipt" to a froth it is called "*whipt sillabub.*" See *Whipt Cream.*

SILVER. Syn. *Argentum*,—Lat. This metal, like gold, appears to have been as much valued in the remotest ages of antiquity of which we have any record, as at the present time. It is found in nature both in the metallic state and mineralized, in the state of alloy, and combined with sulphur, chlorine, and other metallic sulphurets. In Great Britain it is found in combination chiefly with lead. It is extracted from its ores principally by the process of *amalgamation*, founded on its easy solubility in mercury, and by subsequent cupellation. It is only prepared on the large scale.

Chemically pure silver may be obtained by any of the methods noticed at page 1138.

Refined Silver, *Virgin do.; Argentum*, —Ph. L.; *A. Purificatum*,—Ph. D.; *A. Cupellatum;* is silver that has passed the cupel.

Prop. Pure Silver has a very white colour, a high degree of lustre, is exceedingly malleable and ductile, and is the best conductor of heat and electricity known. Its hardness is between that of copper and gold; its sp. gr. is 10·475 to 10·500; it melts at about 1873° Fahr., or bright redness (Daniell); is freely soluble in nitric acid, and dissolves in sulphuric acid by the aid of heat; it refuses to oxidize alone at any temperature, but, when strongly heated in open vessels, it absorbs many times its bulk of oxygen, which is again disengaged at the moment of solidification; its surface is rapidly tarnished by sulphuretted hydrogen and by the fumes of sulphur.

Pur. "Entirely soluble in diluted nitric acid. This solution, treated with an excess of muriate of soda, gives a white precipitate *entirely* soluble in ammonia water, and a fluid which is not affected by sulphuretted hydrogen." (Ph. E).

Tests. 1. The *compounds of silver*, mixed with carbonate of soda, and exposed on a charcoal support to the *inner flame* of the blowpipe, afford white, brilliant, and ductile metallic globules, without any incrustation of the charcoal.—2. The *salts of silver* are non-volatile and colourless, but most of them acquire more or less of a black tint by exposure to full daylight.

The *soluble salts of silver* give—1, A *white curdy* precipitate (*chloride of silver*) with hydrochloric acid and the soluble metallic chlorides, which is soluble in ammonia and insoluble in nitric acid, and blackened by exposure to light;—2, *White* precipitates with solutions of the alkaline carbonates, oxalates, and ferrocyanides;—3, *Yellow* precipitates with the alkaline arsenites and phosphates;—4, With the arseniates, *red* precipitates;—5, With the fixed alkalies, *brown* precipitates;—6, With sulphuretted hydrogen and hydrosulphuret of ammonia, a black powder, which is insoluble in dilute acids, alkalies, alkaline sulphurets, and cyanide of potassium, but readily soluble, with separation of sulphur, in boiling nitric acid; and—7, With phosphorus, and with metallic copper or zinc, *pure silver*.

Assay. 1. The method of *assaying silver* by *cupellation* has been explained at *page* 99; and that method is alone applicable when the alloy contains a very small quantity of silver, as a few ounces only per ton. When the reverse is the case, as with the silver of commerce, the following is a much more accurate method:—

2. *Humid assay of silver.—a.* Dissolve 10 gr. of the *silver for assay* in 100 gr. of *nitric acid*, sp. gr. 1·28, by the aid of heat, the solution being made in a tall stoppered glass tube, furnished with a foot; then place it in a very delicate balance, bring it into an exact state of equilibrium, and add the *test solution* (see below), *gradually* and *cautiously*, until the whole of the silver be thrown down; the *number of grains* now required to restore the equilibrium of the balance or scales gives the exact quantity of *pure silver* in 1000 parts of the sample.—*Obs.* To ensure accuracy, after each addition the stopper should be placed in the tube, and the latter violently agitated for a short time, when the liquor will rapidly clear and enable us to see when the operation is concluded. We must then, as a check, add a small quantity of a solution of nitrate of silver to the liquor in the tube, after having first carefully taken the weight. If too much of the test liquor has been added, this will produce a fresh precipitate, and the assay cannot then be depended on.—*Instead* of *weighing* the *quantity* of *test liquor* used, a *tube graduated into* 100 *parts*, and holding 1000 gr., may be employed, every division of which required to throw down the silver, will represent the $\frac{1}{10}$th of a grain. See *Alkalimetry* and *Acidimetry*.

b. The precipitate of *chloride of silver* may be collected in a *paper filter*, and be dried, washed, fused, and weighed. The *previous weight* of the paper, deducted from the *gross weight of the filter and its contents*, gives the quantity of *chloride of silver* present, which multiplied by 0·75278, gives the weight of the PURE SILVER in the sample.

Test liquor. Dissolve 54·27 ($54\frac{1}{4}$) gr. of pure sea salt in 9945·73 gr. (or 22 *oz.* and $320\frac{3}{4}$ gr. avoirdupois) of distilled water; filter, and keep the liquor in a stoppered bottle for use. *Pure sea salt* is obtained by boiling together, for a few minutes, in a glass vessel, a *solution of common salt* with a little pure *bicarbonate of soda;* then adding to the filtered liquor sufficient *hydrochloric acid* to render it *neutral* to litmus and turmeric paper, and, lastly, evaporating and crystallizing.

Obs. The presence of mercury, lead, or sulphuret of silver, interferes with the accuracy of the above assay. When MERCURY is present, the precipitate blackens less readily by exposure to light; and when it contains $\frac{4}{1000}$ or $\frac{5}{1000}$ of chloride of mercury, it remains of a dead white; with $\frac{3}{1000}$ it is not sensibly discoloured by the diffused light of a room, with $\frac{2}{1000}$ only slightly darkened, with $\frac{1}{1000}$ more so, but with pure chloride of silver, the effect is very rapid and intense. When this metal is present, which is, however, seldom the case, the assay sample must be placed in a small crucible, and exposed to a full red heat, before solution in the acid. *Another method*, proposed by M. Levol, and modified by M. Gay-Lussac, is to add to the *nitric solution of the silver* sufficient *acetate of ammonia* or *crystallized acetate of soda* to saturate *all* the *nitric acid* existing in the liquor, either in the free state or combined with the silver. When the alloy contains LEAD, shown by the precipitated chloride being partly soluble in water, it may either be *laminated* and subjected to the action of *acetic acid* before solution in the nitric acid; or, the *test solution of chloride of soda* should be replaced by one of *chloride of lead;* (139·355 gr. of the latter are *equiv. to* 58·732 gr. of the former). The presence of SULPHURET OF SILVER is detected whilst dissolving the sample in nitric acid, by the *black flakes* which may be observed floating about in the liquor in an insoluble state. These flakes may be dissolved by *fuming nitric acid*, or by adding pure *concentrated sulphuric acid* to the solution, which should be then heated for about a $\frac{1}{4}$ hour in a steam-bath. When thus treated, the precipitate produced by the *test-liquor* represents the *whole of the silver* contained the alloy.

Uses, &c. Metallic silver, unless in a state of very minute division, has no action on the human body. A plate of silver is ordered, in the Ph. L., as a test of the presence of nitric acid in the acetic and phosphoric acids; and metallic silver (preferably granulated) is employed by the other colleges in the preparation of the nitrate. Its numerous applications in the arts are well known. The *standard silver* of England contains 111 parts of *silver,* and 9 parts of *copper.*

Concluding Remarks. The researches of Tillet, D'Arcet, and Gay-Lussac, have clearly shown that the per centage of silver in an alloy, as indicated by cupellation, is always below its real richness in that metal, owing to loss in the process; and, that the *cupelled button* always retains a trace of lead and copper, the precise quantity of which is variable. The *following Table* exhibits the additions to be made on this score, when the quantity assayed (*assay pound*) is 20 gr.:—

Weight after cupellation.	Actual richness in *pure Silver.*	Per centage richness in *pure Silver.*
19·979	20	100
18·95	19	95
17·92	18	90
16·917	17	85
15·914	16	80
14·91	15	75
13·905	14	70
12·905	13	65
11·906	12	60
10·906	11	55
9·906	10	50
7·921	8	40
5·948	6	30
3·949	4	20
1·982	2	10

In *assaying lead ores very poor in silver,* the best quantity to be taken for cupellation is 500 gr.; and from that quantity 0·0148 of silver, including compensation for loss, represents one ounce of silver to the ton. "A cupel may absorb its own weight of lead. If the quantity of lead to be absorbed is more considerable, another cupel may be turned topsy-turvy, and the cupel in which the assay is to be made may be placed upon it." See *pages* 96–9, and M. Gay-Lussac's elaborate memoir on the "*Humid Assay of Silver.*"

For the *recovery* or *reduction* of silver from the chloride and its other compounds, several methods are employed:—

a. The *washed chloride* is placed in a *zinc* or *iron cup,* along with a *little water* strongly acidulated with sulphuric acid; or in a *glass* or *porcelain cup* along with a *zinc plate;* the whole may then be left to itself for some hours; or, to hasten the reduction, gently heated, or even boiled; the precipitated silver is washed with *pure water,* and dried.

b. (Hornung.) Digest the *chloride* with some *liquor of ammonia* and *pure copper filings,* for 24 hours, then wash and dry the powder.

c. (M. Levol.) The *washed chloride* is mixed with an equal weight of *sugar,* and the mixture is digested in an excess of a moderately strong *solution of caustic potassa,* with occasional agitation for 24 hours; or the whole is boiled for some time; the reduced silver is washed with distilled water.

d. (Mohr.) The *dry chloride* is mixed with 1-3rd of its weight of *powdered black rosin,* and moderately heated in a crucible until the flame ceases to have a greenish-blue colour; the heat is then suddenly increased so as to melt the metal into a *button* or *ingot.*

e. (M. Gay-Lussac.) If the "*chloride,*" dry it, and throw it, in successive portions, into twice its weight of *carbonate of potassa* fused in a red-hot Hessian crucible; effervescence ensues, and the pure silver subsides to the bottom.—If a "*soluble salt,*" as the nitrate, acidulate the solution, and precipitate it by means of a *polished plate of copper;* the silver is then obtained in the form of *powder.* The *products* of the above processes, when the latter are carefully conducted, are chemically pure silver.

SILVER (Acetate of). Syn. *Argenti Acetas,*—Lat. *Prep.* By adding a *solution of acetate of potassa* to a like *solution of nitrate of silver,* washing the precipitate with *cold water,* redissolving it in a little *hot water,* and setting the solution aside to crystallize. Small colourless needles.

SILVER (Ammoniaret of). See *Fulminating Silver* (Berthollet's, Nos. 1 and 2, *page* 497).

SILVER (Ammonio-chloride of). Syn. *Argento-chloride of Ammonia; Argenti Ammonio-chloridum,* — Lat. *Prep.* Add, gradually, *chloride of silver* (recently precipitated and well-washed) to *concentrated liquor of ammonia,* as long as it is dissolved on agitation, applying a gentle heat towards the end; then heat the solution to the boiling point, concentrate a *little,* and allow it to cool very slowly; collect the crystals which form, dry them by pressure (*with care*) between folds of *bibulous paper,* and at once preserve them from the light and air. *Dose.* $\frac{1}{18}$ to $\frac{1}{8}$ gr.

SILVER (Benzoate of). Thin transparent plates, which are blackened by exposure to the light. See *Benzoates.*

SILVER (Bromide of). Resembles the chloride (which see).

SILVER (Carbonate of). Syn. *Argenti*

Carbonas,—Lat. A white insoluble powder, obtained by precipitating a *cold solution of nitrate of silver* with another of *carbonate of soda.* It is decomposed by heat.

SILVER (Chloride of). Syn. *Muriate of Silver; Argenti Chloridum, A. Murias,* —Lat. *Calx Lunæ,*—Bate. *Prep.* Precipitate a *solution of nitrate of silver* by *dilute hydrochloric acid* or a *solution of common salt;* wash the precipitate, and dry it in the shade. *Dose.* $\frac{1}{4}$ to 3 gr., thrice daily; in epilepsy, chronic dysentery, cholera, diarrhœa, &c. Dr. Perry regards it as preferable to the nitrate. When *fused,* chloride of silver forms *horn silver,* or "*luna cornea*" of the older writers.

SILVER (Cyanide of). Syn. *Hydrocyanate of Silver, Cyanodide of do., Cyanuret of do.; Argenti Cyanidum,*—Ph. L. 1836. *A. Hydrocyanas, Argentum Zootinicum,*—Lat. var. *Prep.* Add *dilute hydrocyanic acid* to a *solution of nitrate of silver,* as long as a precipitate falls; wash this with *distilled water,* and dry it.

Prop., &c. Cyanide of silver is a white powder, soluble in ammonia, and decomposed by contact with vegetable substances; light turns it violet-coloured. *Dose.* $\frac{1}{16}$ to $\frac{1}{8}$ gr.; in syphilis, &c. It has been proposed as a source of hydrocyanic acid. (Everitt.)

SILVER (Fulminate of). See *pages* 497-8.

SILVER (Hyposulphate of). A soluble, crystallizable salt, permanent in the air. See *Hyposulphuric Acid.*

SILVER (Hyposulphite of). Syn. *Argenti Hyposulphis,*—Lat. A white substance, insoluble in water, and very prone to decomposition. It is very soluble in the alkaline hyposulphites forming compounds possessing an intensely sweet taste. See *Hyposulphurous Acid.*

SILVER (Iodate of). Syn. *Argenti Iodas,*—Lat. See *Iodate* and *Iodic Acid.*

SILVER (Iodide of). Syn. *Argenti Iodidum, A. Ioduretum,*—Lat. *Prep.* Precipitate a *solution of nitrate of silver* with another of *iodide of potassium;* wash the precipitate with *distilled water,* and dry it in the shade. Pale greenish-yellow; insoluble in water and in liquor of ammonia; soluble in a solution of hyposulphite of soda. *Used* in some of the French hospitals in the stomach affections of scrofulous subjects; also in epilepsy. *Dose.* $\frac{1}{12}$ to 1 gr.

SILVER (Nitrate of). Syn. *Argenti Nitras,*—Lat. This article is *prepared* under two forms:—

1. Crystallized, (*Argenti nitratis crystalli,*—Ph. D. 1826. *Crystalli Lunares,*—Obs. *Prep.* By dissolving *grain silver* in *nitric acid* diluted with about twice its weight of *water,* evaporating the solution until it is strong enough to crystallize on cooling, and then allowing it to cool very slowly. Colourless, transparent, anhydrous rhombic prisms or tables; soluble in an equal weight of cold, and in half their weight of boiling water; soluble in alcohol; fuse when heated, and at a higher temperature suffer decomposition; blackened by light, and by contact with organic substances. Its solution in distilled water is not sensibly darkened by light, in the absence of organic matter. *Used* for solutions, and in photography.

2. Fused, (*Lunar caustic; Argenti nitras,* —Ph. L. & E. *A. N. Fusum,*—Ph. D. *Argentum Nitratum,*—Ph. L. 1787. *Causticum Lunares, Lapis Infernalis,*—Obs.) *Prep.* (Ph. D.) *Refined silver,* 3 *oz.; pure nitric acid,* 2 fl. oz.; *distilled water,* 5 fl. oz.; mix in a glass flask, and apply a gentle heat until the metal is dissolved; transfer the solution to a porcelain capsule (or a large porcelain crucible), decanting it off a heavy black powder which appears at the bottom of the flask, and, having evaporated it to dryness, raise the heat (in a dark room) until the mass liquefies; then pour it into a brass mould (*iron moulds,*—Ph. E. & Ph. L. 1836), furnished with cylindrical cavities of the size of a goose-quill, and which then admits of being opened by a hinge; preserve the concreted salt in well-stopped bottles impervious to the light. The formulæ of the Ph. E. & Ph. L. 1836, are similar.

Pur., &c. Pure nitrate of silver, whether crystallized or fused, is entirely soluble in water, yielding a colourless solution, from which metallic silver is precipitated by a piece of bright copper; both are originally white, but are darkened by exposure to light and contact with organic matter. "If, after 17 gr. of nitrate of silver have been added to 6 gr. of the chloride of sodium dissolved in water, more of the nitrate be poured into the filtered liquor, nothing more is thrown down." (Ph. L.) —"29 gr. dissolved in 1 fl. oz. of water acidulated with nitric acid, precipitated by a solution of 9 gr. of muriate of ammonia, briskly agitated for a few seconds, and then allowed to rest a little, yields a clear supernatant liquor, which is still precipitable by more of the test." (Ph. E.) Nitre is the most common adulterant of nitrate of silver.

Uses, &c. Nitrate of silver is a powerful tonic, antispasmodic, astringent, and escharotic. *Dose.* $\frac{1}{8}$ to 1 gr., gradually increased, twice or thrice a day, made into a pill with crum of bread; in chorea, epilepsy, &c., preceded by purgatives. It has recently been highly extolled, by Mr. Ross, as a remedy in cholera. Its continued use permanently colours the skin. It is also extensively employed *externally* as a caustic. It is *powerfully poisonous.* A solution of common salt, emetics, and demulcents, constitute the treatment in such cases. Nitrate of silver is much employed in the manufacture of "*indelible ink*" for linen, and hair dyes.

Obs. In preparing this salt, care should be had that the silver is free from copper. *Pure nitrate of silver* may, however, be prepared from silver containing copper, by evaporating the nitric solution to dryness, and cautiously heating the mixed nitrates to fusion. A small portion of the melted mass is examined from time to time, until a little dissolved in water, and treated with ammonia in excess, ceases to strike a blue colour. When this point is arrived at, the fused nitrate is allowed to cool, when it is re-dissolved in water, filtered or decanted from the insoluble black oxide of copper, and evaporated in the usual way.

The heat employed in preparing the *fused nitrate* should not exceed 420° Fahr.; and the fusion should be effected completely, but with moderate expedition, to prevent loss of nitric acid. Formerly, a mass of well-tempered white clay, perforated by means of a well-greased goose-quill, was used instead of metal moulds. In the Ph. E. & Ph. L. 1836, the moulds are ordered to be "*greased;*" when this is done, the sticks of caustic should be wiped clean before rolling them in paper. The moulds should be gently heated before pouring the fused nitrate into them.

SILVER (Oxides of). Two of these are known:—

1. *Suboxide of Silver; Suroxide of do.*,—Berzelius. *Prep.* From dry *citrate of silver* heated to 212° Fahr., in a *stream* of *hydrogen gas*, until it turns dark brown, when it is dissolved in water; the solution (*acid citrate of suboxide of silver*) is next treated with potassa, and the precipitate is carefully washed and dried. A black powder, easily decomposed, and soluble in liquor of ammonia.

2. *Oxide of Silver, Protoxide of do., Argentic Oxide*,—Berzelius; *Argenti Oxydum*,—Ph. D. *Prep.*—*a.* (Mr. Lane.) *Nitrate of silver*, 2 parts; *hydrate of potassa*, 1 part; dissolve each separately in *distilled water*, mix the solutions, and after frequent agitation during an hour, collect and wash the precipitate, and dry it by a gentle heat in the shade. A pale-brown powder.

b. (Gregory.) Recently precipitated *chloride of silver* is boiled in a *solution of caustic potassa* of the sp. gr. 1·25, with frequent stirring and *trituration*, until on testing a little of it, it is found to be *entirely* soluble in dilute nitric acid, when it is washed, and dried, as before. A black and very dense powder; chemically pure.

c. (Ph. D.) *Nitrate of silver*, $\frac{1}{2}$ *oz.; water*, 4 fl. oz.; dissolve, and pour the solution into a bottle containing *lime water*, 2 quarts, or q. s.; agitate the mixture well, collect and wash the sediment, and dry it at a heat not exceeding 212° Fahr. A dark olive-brown powder. Pure.

Prop, &c. Very soluble in solutions of ammonia and of the alkaline hyposulphites; slightly soluble in water; reaction, alkaline; decomposed by light. *Dose.* $\frac{1}{2}$ to 2 gr.; in epilepsy, gastralgic irritations, &c. It is much used in France, and has been highly extolled in menorrhagia. By some, however, it is not considered superior to the nitrate.

SILVER (Sulphate of). Syn. *Argenti Sulphas*,—Lat. *Prep.* By dissolving *silver* in *sulphuric acid* containing $\frac{1}{10}$th part of *nitric acid;* or, by precipitating a *solution of the nitrate* by another of *sulphate of soda.* It dissolves in 80 parts of hot water, and falls in small colourless needles as the solution cools.

SILVER (Sulphuret of). Syn. *Sulphide of Silver; Argenti Sulphuretum*,—Lat. Prepared by passing *sulphuretted hydrogen* through a *solution* of *nitrate of silver;* or, by melting its constituents together. It possesses a grayish black colour, and is a strong *sulphur-base.*

SILVER (Amalgamated). See p. 515.

SILVER (Leaf). Syn. *Argentum Foliatum, A. in libellis*,—Lat. As leaf-gold; but it cannot be reduced to an equally attenuated state as that metal, being fully $\frac{1}{100000}$th of an inch in thickness. *Used* by dentists and for silvering.

SILVER (Nickel). See *German Silver.*

SILVER (Oxidized). The high appreciation in which *ornamental articles* in *oxidized silver* are now held, renders a notice of the process followed interesting. There are two distinct shades in use, one produced by *chlorine*, which has a BROWNISH TINT, and the other by *sulphur*, which has a BLUEISH-BLACK TINT. To produce the *former*, it is only necessary to wash the article with a *solution of sal ammoniac.* A much more beautiful tint may, however, be obtained by employing a *solution* composed of equal parts of *sulphate of copper* and *sal ammoniac* dissolved in *vinegar.* A FINE BLACK TINT may be produced by a *slightly warm solution* of *sulphuret of potassium* or of *sodium.* (*Chem. Techn.*)

SILVER (Recovery of). See *page* 1138.

SILVER (Substitutes for). Of these the principal are *German silver*, *Britannia metal*, and *packfong.* The newly discovered metal *aluminium*, possesses nearly all the properties of silver, with many valuable ones peculiarly its own. (See *pp.* 53, 266, *&c.*) Recently, M. Plée, has made the following announcement in the '*Siècle*:'—"The *pavé* contains *metal*, as beet-roots contain alcohol and sugar; nothing can be more true." "Take a thick lump of *freestone* or quartzeous silex, reduce it to powder, and mix it, when pulverized, with a sufficient quantity of *alkali;* fuse it, and you will obtain a *soluble glass* that you can dissolve so as to precipitate the silicia it contains in the shape of a jelly; then take this last product and redissolve it a second time in a *cyanureted lixivium*, so as to produce a compound cyanuret; this operation will give you a fluid, whence it then only remains to extract the metal called *silicium;* into this liquid plunge your utensils, whether of copper, iron, zinc, tin, or lead; bring the electric process to bear upon them properly, and they will instantly be covered with an adherent plating of *silicium*, which is white as silver, and attains to the highest degree of lustre under the polisher's hand." M. Charles Junot is the name of the man who has discovered this new metal.

SILVER DUST. Syn. *Silver Powder; Argenti Crocus, A. Pulvis*,—Lat. *Prep.* 1. Pure *pulverulent silver* obtained by any of the methods explained at *page* 1138. *Used* to coat pills, by japanners, &c.

2. Heat *oxide of silver* to dull redness in a *porcelain crucible*, cool, triturate the powder in an *agate mortar* and pass it through a fine sieve. Used at the hospital of Montpellier.

SILVER SHELLS. These are *prepared* and *used* like *gold shells.*

SILVERING. The art of covering the surfaces of bodies with a thin coating of silver. *Leather*, *paper*, *wood*, *&c.*, are silvered by covering them with *silver leaf*, by a similar process to that employed for gilding them. (See *p.* 516, *&c.*)

SILVERING (of Glass). Two distinct methods are adopted for this purpose,—one of which consists of a layer of tin-foil and mercury, or some similar alloy, *falsely* called silvering; the other consisting of a coating of *real silver* precipitated from a solution of that metal.

1. *Plane surfaces*, as those of *mirrors, &c.*, are commonly silvered as follows:—A *sheet of tin foil* corresponding to the size of the *plate of glass* is evenly spread on a *perfectly smooth* and *solid marble table*, and every wrinkle on its surface is *carefully* rubbed down with a *brush;* a portion of *mercury* is then poured on, and rubbed over the foil with a clean piece of very soft *woollen stuff*, or a *hare's foot*, after which two rules are applied to the edges, and mercury poured on to the depth of a crown piece, when any oxide on the surface is carefully removed, and the *sheet of glass* made *perfectly clean and dry*, is slid along over the surface of the liquid metal, so that no air, dirt, or oxide, can possibly either remain or get between them. When the glass has arrived at its proper position, gentle pressure is applied, and the table sloped a little to carry off the waste mercury, after which it is covered with flannel and loaded with heavy weights; in 24 hours it is removed to a *wooden table* and further slanted, and this position is progressively increased during a month, until it becomes perpendicular.

For *silvering convex* or *concave surfaces* a mould of *plaster of Paris* is employed, so that the amalgamated foil may be accurately fitted to the surface.

Globes and other *hollow vessels* are commonly silvered by the application of one of the *silvering amalgams* noticed at *pages* 54-5.

2. In the *Humid way.*—*a.* (Mr. Drayton.) A *mixture* is first made of *nitrate of silver* (in coarse powder), 1 *oz.; liquor of ammonia*, $\frac{1}{2}$ *oz.;* and *water*, 2 *oz.;* which, after standing for 24 hours, is filtered (the deposit upon the filter, which is silver, being preserved), and an addition is made thereto of *spirit* (by preference, *rectified spirit* at 60º *o.p.*), or *naphtha*, 3 *oz.;* from 20 to 30 drops of *oil of cassia* are then added; and, after remaining for about 6 hours longer, the solution is ready for use. The glass to be silvered (first well cleaned and polished) is placed in a horizontal position, and a wall of putty, or other suitable material, formed around it; the *above solution* is then poured over it to the depth of from $\frac{1}{8}$ to $\frac{1}{4}$ inch; from 6 to 12 drops of a *mixture of oil of cloves* and *spirit of wine* (in the proportion of 1 part, by measure, of oil of cloves, to 3 of spirit of wine) are next dropped into it, at different places; or the diluted oil of cloves may be mixed with the solution before it is poured upon the glass, a larger quantity, in both cases, increasing the rate of the deposit. When the glass is *suffi-*

ciently silvered, the solution is poured off; and as soon as the silver on the glass is perfectly dry, it is *varnished* with a *composition* formed by melting together equal quantities of *bees' wax* and *tallow.* The *solution*, after being poured off, is allowed to stand for 3 or 4 days, in a close vessel; as it still contains silver, and may be again employed after *filtration*, and the *addition* of a sufficient quantity of *fresh ingredients* to supply the place of those which have been used. 18 gr. of *nitrate of silver* are sufficient for one square foot of glass. *Hollow vessels* may be silvered by pouring the solution into them. By the addition of a small quantity of *oil of caraway*, *oil of cloves*, or *oil of thyme*, the *colour of the silver* may be varied. (*Patent Journ.*)

b. (Thomson & Mellish.) *Nitrate of silver*, 2 *oz.; water* and *rectified spirit*, of each, 3 fl. oz.; dissolve, add of *spirit of hartshorn* or *liquor of ammonia*, 1 fl. oz., mix, and after a short time filter the solution; to *each ounce* of this add of *grape sugar*, ¼ *oz.*, previously dissolved in a mixture of *rectified spirit* and *water*, of each, ½ pint; after 3 or 4 hours' repose it is *fit for use.* This solution is applied to the glass, heated to about 160° Fahr., in a similar manner to the last. *Patented.*

c. (M. Vohl.) *A solution of gun cotton in caustic potassa* is added to a *solution of nitrate of silver*, followed by sufficient *strong liquor of ammonia* to redissolve the precipitate; the resulting *argentiferous liquid* is applied to the glass, which is then slowly heated over a *water bath* until effervescence ensues, and the deposit of silver is complete.

Obs. Various other reducing substances besides those above named, as aldehyde, and several of the acids, cause the deposition of silver in a reguline form from its solutions. Our own plan, which, as practised by us, appears superior to all those patented, is essentially as follows:—A certain proportion of *saccharic acid* is added to a *solution of nitrate of silver*, and when the mixture is complete, and after repose for a short time, the liquid is decanted, and applied to the glass; a *solution of ammonia* is at the same time added, to throw down the metal, followed by the application of a gentle heat, to impart brilliancy to the deposit.

SILVERING (of Metals). 1. *Leaf Silvering.* This is performed with *leaf silver* in the way described at *p.* 517, for the *Gilding of Polished Metals.*

2. (*Cold Silvering.*) Mix *chloride of silver*, 1 part; with *pearlash*, 3 parts; *common salt*, 1½ part; and *whiting*, 1 part; and well rub the mixture on the surface of the *brass* or *copper* (previously well cleaned), by means of a piece of soft leather, or a cork moistened with *water* and dipped into the powder. When properly silvered the metal should be well washed in *hot water slightly alkalized*, and then wiped dry. See *Powder* (Silvering), *Voltaic Silvering*, *&c.*

SILVIC ACID. See *Sylvic Acid.*

SIMAROUBA. Syn. *Simaruba*,—Ph. E. & D. The *root-bark* of *simaruba amara* (*s. officinalis*), or *mountain damson.* Tonic, bitter, and astringent. *Dose.* 20 to 30 gr.; in intermittents, obstinate diarrhœa, dysentery, and dyspepsia. Its bitter principle has been called *quassina.*

SIMILOR. See *Dutch Gold.*

SINAPISINE. A white, crystallizable, inodorous, bitter-tasted substance extracted from the *seed* of *sinapis alba* or *white mustard.*

SINAPISM. Syn. *Sinapismus*,—Lat. A mustard poultice.

SINAPOLINE. A basic substance formed, along with carbonic acid, when the *volatile oil of mustard* is treated with *protoxide of lead.* It is soluble in water and alcohol, has an alkaline reaction, and crystallizes in colourless plates.

SINNAMINE. A basic substance formed, along with sulphuret of lead, when *thiosinnamine* is treated with *protoxide of lead.* It is very bitter-tasted, has a powerful alkaline reaction, and, when slowly obtained from its concentrated aqueous solution, forms brilliant colourless crystals.

SIZE. Obtained like glue from the skins of animals, but is evaporated less, and kept in the soft state. See *Glue* and *Gold Size.*

SKATE. The *raia batis* (Linn.). Other varieties of *raia* also pass under the name. It is a coarse fish, and is principally salted and dried for exportation.

SKIN (The). Syn. *Cutis*, *Dermis*, *Pellis*,—Lat. Every person knows what this is, and its external appearance, and general properties; but, there are many of our readers who may not be aware of its peculiar construction, and its compound character. The skin then, although apparently a single membrane, is composed of three distinct layers or membranes, each of which performs its special duties:—1. The *exterior* of these is called the *cuticle*, *epidermis*, or *scarf-skin.* It is an albuminous tissue, possessing no sensibility, and is found thickest on those parts of the body most exposed to friction or injury.—2. The *mucous net* or *rete mucosum*, which is a thin layer of soft pulpy matter, which lies immediately under the cuticle, and is supposed to be the seat of the colour of the skin.—3. The *derma*, *cutis vera*, or *true skin*, is a highly sensitive, vascular, gelatinous texture, the third, and last in succession from the surface of the body. It is this which, when the scarf-skin and hair have been removed, is converted by the process of *tanning* or *tawing* into leather. See "*Eruptions, &c.*," (and *below.*)

SKIN COSMETICS. The simplest, cheapest, and most generally employed *cutaneous cosmetics* are *soap* and *water*, which at once cleanse and soften the skin. *Soap* containing a *full proportion of alkali*, exercises a solvent power upon the cuticle, a minute portion of which it dissolves; but when it contains a *small preponderance of oily matter*, as the principal part of the milder toilet soaps now do, it mechanically softens the skin and promotes its smoothness. *Almond*, *Naples*, and *Castile soaps* are esteemed for these properties, and *milk of roses*, *cold cream*, and *almond powder* (paste), are also used for a similar purpose. To produce an opposite effect, and to *harden* the cuticle, *spirits*, *astringents*, *acids*, and *astringent salts* are commonly employed. The frequent use of *hard water* has a similar effect. The application of these articles is generally for the purpose of strengthening or preserving some particular part against the action of cold, moisture, &c.; as the *lips*, or *mammæ*, from *chapping*, or the *hands* from contracting *chilblains;* but in this respect, *oils*, *pommades*, and other *oleaginous bodies*, are generally regarded as preferable.

Another class of *cutaneous cosmetics* are employed to remove *freckles* and *eruptions.* Among the most innocent and valuable of these, is *Gowland's lotion*, which has long been a popular article, and deservedly so, for it not only tends to impart a delightful softness to the skin, but is a most valuable remedy for many obstinate *eruptive diseases* which frequently resist the usual methods of treatment. *Bitter almonds* have been recommended to remove *freckles* (Celsus), but moistening them with a *lotion* made by mixing 1 fl. oz. of *rectified spirit* and a tea-spoonful of *hydrochloric acid*, with 7 or 8 fl. oz. of *water*, is said to do this more effectually. A safe and excellent cosmetic is, an *infusion of horseradish* in *cold milk.* (Withering.)

Skin paints and *skin stains* are employed to give an artificial bloom, or delicacy to the skin. *Rouge* and *carmine* are the articles most generally used to communicate a *red colour.* The *first* is the only cosmetic that can be employed, without injury, to brighten a lady's complexion. The *other*, though possessing unrivalled beauty, is apt to impart a *sallowness* to the skin by frequent use. *Starch powder* is employed to impart a *white tint*, and generally proves perfectly harmless. The *American ladies*, who are very fond of painting their necks white, use *finely powdered magnesia*, another very innocent substance. Several *metallic compounds*, as the *trisnitrate*, *subchloride*, and *oxide of bismuth* (pearl white, Fard's white, &c.), *carbonate of lead* (flake white), *white precipitate*, *&c.*, are frequently used to revive faded complexions; but they are not only injurious to the skin, but act as *poisons* if taken up by the absorbents. *Trisnitrate of bismuth* (pearl white), probably the least injurious of these articles, has been known to cause spasmodic tremblings of the muscles of the face, ending in paralysis. (Vogt. Pharm.) The employment of *liquid preparations* containing *sugar of lead*, which are commonly sold under the name of *milk of roses*, *cream of roses*, *&c.*, is equally injurious. *Another disadvantage* of these metallic preparations, is that they *readily turn black* when exposed to the action of sulphuretted hydrogen gas, or the vapours of sulphur, such as frequently escape into the apartment from coal fires. There are many instances recorded of a whole company being suddenly alarmed, by the pearly complexion of one of its belles being thus transformed into a sickly gray or black colour.

In conclusion, it may be remarked, that the best PURIFIERS *of the skin* are *soap* and *water*, followed by the use of a *coarse*, but *not* a *stiff cloth*, in opposition to the *costly* and *smooth diapers* that are commonly employed; and the best BEAUTIFIERS, are *health*, *exercise*, and *good temper.*

SKIN (Goldbeater's). See *page* 539.

SKINS (of Animals). The *preparation* and *preservation* of *fur skins* are noticed under "*Peltry*," the *preparation* and *uses* of the *skins of the larger animals* under "*Leather*," "*Tanning*," "*Tawing*," *&c.*

SKY-LARK. See *page* 676.

SLACK. Small coal, such as is used for kilns.

SLAG. The semi-vitrified compounds produced, on the large scale, during the reduction of metallic ores by fluxes. Those from iron and copper works are often used for building materials, mending roads, &c.

SLATE. The excellence of this material

for *water-cisterns*, deserves a passing notice here. *Irish slate* (lapis Hibernicus) is an argillaceous mineral, said to contain iron and sulphur, found in different parts of Ireland. It is a common remedy, among the vulgar, for internal bruises, taken in a glass of gin.

SLEEP. Syn. *Somnus*,—Lat. After being awake for 16 to 18 hours, a general feeling of weakness and fatigue comes over us; "our motions become more difficult, our senses lose their activity, the mind becomes confused, receives sensations indistinctly, and governs muscular contraction with difficulty. We recognise by these signs the necessity of sleep; we choose such a position as can be preserved with little effort; we seek obscurity and silence, and sink into the arms of oblivion."

The slumberer loses in succession the use of his senses. The *sight* first ceases to act by the closing of the eyelids; the organs of *taste* next become dormant, followed by the sense of *smell;* after these the sense of *hearing* loses its activity, or ceases to act altogether; the susceptibility of *touch* is lost; the complete relaxation of the muscles follow,—at first those of the limbs, then those of the neck, and, *lastly*, those of the spine give way; the respiration becomes slower and deeper, and sleep is sound and complete. In some cases, the *sense of hearing* is the last to fall asleep, and when the other senses have become completely dormant, revels in increased activity. This is the case with the writer of this article, who is conscious of the slightest noise, and hears and understands a conversation passing in his presence nearly as well whilst asleep as when awake. During indisposition his sense of hearing has become so exalted, that even a whisper in a distant apartment has been distinctly audible to him. See *Watchfulness, &c.*

SMALL-POX. See *page* 1068.

SMALT. Syn. *Azure, Powder Blue, Siliceous do., Smalts; Azurum, Smalta.* This consists, essentially, of glass coloured by fusing it with protoxide of cobalt.

Prep. 1. *Cobalt ore* is roasted, to drive off the arsenic, then made into a *paste* with *oil of vitriol*, and heated to redness *for an hour;* the *residuum* is powdered, dissolved in water, and the oxide of iron precipitated with *carbonate of potash*, gradually added, until a rose coloured powder begins to fall; the clear portion is then decanted and precipitated with a *solution of silicate of potash* (prepared by fusing together, for 5 hours, a mixture of 10 parts of potash, 15 parts of finely ground flints, and 1 part of charcoal); the precipitate after being dried, is fused, and reduced to a very fine powder. A very rich colour.

2. *Roasted cobalt ore* and *carbonate of potash*, of each, 1 part; *siliceous sand*, 3 parts; fuse them together, and cool and powder the residuum. *Used* as a blue pigment, also to colour glass, and to get up linen. See *Blue Pigments.*

SMELLING SALTS. See *pages* 58 and 1120.

SMELLOME'S EYE SALVE. See *page* 890.

SMELT. The *salmo eperlanus*, a beautiful little abdominal fish abounding in the Thames, and a few other rivers, between the months of November and February. It is esteemed a great delicacy by epicures, but sometimes proves offensive to the delicate and dyspeptic.

SMILACINE. See *Sarsaparilline.*

SMILASPERIC ACID. See *p.* 562.

SMOKE PREVENTION. Although the full consideration of this subject belongs to public hygiène and civil engineering, its immediate application and advantages are interesting and important to everybody. Few persons are aware, that much the larger proportion of the heat generated by the combustion of fuel in common grates, as well as in ordinarily constructed furnaces, passes up the chimney, and is not only absolutely lost, as far as its original application is concerned, but also tends to darken and poison the atmosphere. This is what occurs every day with the millions of fires which are constantly burning in this country. Yet this loss of fuel, this partial privation of solar light, and this deterioration of the atmosphere, may be easily and economically ameliorated, nay, entirely prevented, by means and appliances which are, or ought to be, within the reach of every manufacturer and householder in the kingdom. The *smoke-bill* of Lord Palmerston, although not sufficiently comprehensive, nor so rigorously enforced as it should be, is nevertheless a real boon to the inhabitants of this great metropolis.

The *history* of "*smoke burning*" scarcely commences before the year 1840, at which date Mr. Chas. Wye Williams obtained a patent for this purpose. Since that time a "thousand-and-one" schemes, either patented or non-patented, professedly for the same object, have been brought before the public. Most of these have been supported by the most reckless statements regarding their value, made by interested parties; and the most serious inconvenience and losses have often followed their adoption. In this dilemma many worthy and well-meaning individuals have become so discouraged, as to eschew all inventions of the kind referred to, and have been led to regard the prevention of smoke as a thing impossible. *Smoke prevention* is now, however, "un fait accompli;" and we should not be performing our duty to our readers, did we not point out to them the methods which they may adopt, with confidence and economy, to realise this desideratum in their workshops and factories, as well as in their household fires. The one most eminently successful and economical is based on the admission of *heated air*, under due regulation, both through the door, and at the bridge or back of the furnace, by which means combustion is rendered absolutely complete, and smoke impossible. This is the principle of "*Lark's Patent Smoke Burner*," approved by the Government Inspectors, and almost invariably mentioned by them, when parties summoned to the Police Courts state their inability to apply a remedy. This invention is now in successful operation upon numerous *steam furnaces* with boilers variously constructed. It has also been extensively tested for the *furnaces* of *coke ovens*, *baker's ovens*, *potteries*, and *chemical works*, and appears equally adapted to them all; whilst from the extreme liberality of the proprietors of the patent ("*The Smoke-burner Company*," Nine Elms), as to charge for license, and the small cost of its application, it is placed within the reach of every manufacturer and tradesman. The *Bakers*, especially, a class of men who have been recently bewailing the extreme difficulty and hardship of their case, have here a cheap and easy remedy. *Ten furnaces* to which this invention has been *successfully applied*, may be seen in daily operation at the Cement Works of Messrs. FRANCIS BROTHERS, Nine Elms.

For *household fires* the smokeless grate, invented by Dr. Arnott, will be found entirely successful, and most economical. Its general introduction would be a great advance in both domestic and public hygiène; and, being hence of national importance, should be enforced by law.

SMOKING. This is done, on the *large scale*, by hanging up the articles (previously more or less salted) in *smoking rooms*, into which smoke is very slowly admitted from smoothered *dry wood fires*, kindled in the cellar, for the purpose of allowing it to cool and deposit its cruder part, before it arrives at the meat. This process requires from six days to as many weeks to perform it properly, and is best done in winter. In *farm-houses*, where dry wood is burnt, *hams*, *&c.*, are often smoked by hanging them up in some *cool part* of the kitchen chimney. When the meat is cut into slices, or scored deeply with a knife to allow the smoke to penetrate it, it is called "*bucaning*."

"The *quality of the wood* has an influence upon the smell and taste of the smoke-dried meat; smoke from *beech wood* and *oak* being preferable to that from *fir* and *larch*. Smoke from the *twigs* and *berries of juniper*, from *rosemary*, *peppermint*, *&c.*, impart somewhat of the aromatic flavour of these plants." (Ure.) The occasional addition of a few *cloves* or *allspice* to the fuel, gives a very agreeable flavour to the meat.

Hung beef, a highly esteemed variety of smoked beef, is prepared from any part, free from bone and fat, by well salting and pressing it, and then drying and smoking it in the usual manner. It is best eaten shredded. See *Putrefaction*, *Salting*, *&c.*

SNAKE-ROOT. See *Senega.* For Virginian snake-root see "*Serpentary.*" Snake-weed (*bistortæ radix*) is the *root* of *polygonum bistorta* (Linn.)

SNIPE. The *scolopax gallinago*, a well-known bird of the Linnean order *grallæ* (waders). It is fine flavoured, but rather indigestible.

SNUFF. Syn. *Pulvis Tabaci; Tabac en poudre*,—Fr. A powder, prepared from tobacco, for the purpose of being snifted up the nose as a stimulant or intoxicant.

The *finer kinds of snuff* are made from the *soft portions* of the best description of *manufactured leaf-tobacco*, separated from the damaged portion; but the *ordinary snuffs of the shops* are mostly prepared from the *coarser* and *damaged portions*, the *mid-ribs*, *stems*, or *stalky parts* that remain from the manufacture of shag tobacco, the *dust* or *powder* sifted from the bales, and the *fragments* that are unfit for other purposes.

Prep. The *proper materials* being chosen, and if not in a sufficiently mature state rendered so by further fermentation, they are sufficiently dried by a gentle heat or exposure to the air, to admit of being pulverized. This is performed, on the *large scale*, in a mill, and, on the *small scale*, with a kind of pestle and mortar. During the operation the *tobacco* is frequently sifted, that it may not be reduced to too fine a powder, and is several times slightly moistened with *rose* or *orange-flower water*, or *eau d'ange*, which are the only ones fit for the superior kinds of snuff. In preparing the *dry snuffs* no moisture is used. The *scent* or other like matters are next added, and, after thorough admixture, the snuff is packed in jars or canisters.

Pur. During the grinding of tobacco it is frequently mixed with *dark-coloured rotten wood*, various *English leaves, colouring*, and other matter. *Ammonia, hellebore, euphorbium*, and *powdered glass*, are common additions to snuffs to *increase their pungency*. We have seen powdered *sal ammoniac* sent by the hundred-weight at one time to a certain celebrated London tobacconist. The *moist kinds of snuff* are generally drugged with *pearlash*, for the triple purpose of keeping them damp and increasing their pungency and colour. The *dry snuffs*, especially *Scotch* and *Welsh*, are commonly adulterated with *quicklime*, the particles of which may be occasionally distinguished even by the naked eye. This addition causes their biting and desiccating effect on the pituitary membrane. We were once severely injured by taking snuff which, after our suspicions were awakened, we found to contain a mixture of *red lead* and *umber*.

Var. Snuffs are divided into two kinds—DRY SNUFFS; as *Scotch, Irish, Welsh*, and *Spanish snuff, Lundyfoot, &c.;* and—MOIST SNUFFS, or RAPPEES, including *black* and *brown rappee, carotte, Cuba, Hardham's mixture*, No. 37, *prince's mixture, princeza, queen's snuff, &c.* The last three also come under the denomination of SCENTED SNUFFS.

The *immense variety of snuffs* kept in the *shops*, independently of the above-named conditions, depend for their distinguishing characteristics on the length of the fermentation, the fineness of the powder, the height to which they are dried, and the addition of odorous substances. *Tonquin beans, essence of do., ambergris, musk, civet, leaves of orchis fusca, root* and *oil of calamus aromaticus, powder* and *essence of orris root*, and the *essences* or *oils of bergamot, cedra, cloves, lavender, petit grain, neroli*, and *roses* (otto), as well as several others, either alone or compounded, are thus employed. *Tabac parfumée aux Fleurs* is perfumed by putting *orange flowers, jasmins, tuberoses, musk roses*, or *common roses*, to the snuff in a close chest or jar, sifting them out after 24 hours, and repeating the infusion with fresh flowers, as necessary. *Another way* is to lay paper, pricked all over with a large pin, between the *flowers* and the *snuff*.

Macouba snuff is imitated by moistening the *tobacco* with a mixture of *treacle* and *water*, and allowing it to ferment well.

Spanish snuff is made from unsifted *Havannah snuff*, reduced by adding *ground Spanish nutshells*, sprinkling the mixture with *treacle water*, and allowing it to sweat for some days before packing.

Yellow snuff is prepared from *ordinary pale snuff* moistened with a mixture of *yellow ochre* diffused in *water*, to which a few spoonfuls of *thin mucilage* has been added; when dry, the colour that does not adhere to the snuff is separated with a fine sieve.

Red Snuff. As last, but using *red ochre.*

SNUFF (Asarabacca). Syn. *Cephalic Snuff, Compound Powder of Asarabacca; Pulvis Asari Compositus*,—Lat. *Prep.* 1. (Ph. D. 1826.) *Asarabacca leaves*, 1 oz.; *lavender flowers*, 1 dr.; (both dried;) mix and powder them.

2. (Ph. E. 1817.) *Asarabacca leaves*, 3 dr.; *leaves of marjoram* and *flowers of lavender*, of each, 1 dr.; as before. See *Cephalic Snuff, Asarabacca, &c.* Both are used as errhines in headaches and ophthalmia.

SNUFF (Cephalic). *Prep.* 1. From *asarabacca leaves* and *Lundyfoot snuff*, of each, 2 *oz.; lavender flowers*, ¼ *oz.; essence of bergamotte* and *oil of cloves*, of each, 2 or 3 drops; mixed and ground to a powder, the perfume being added last.

2. (*Boeli's.*) From *tobacco* or *pure snuff* and *valerian root*, of each, ½ *oz.;* reduced to powder, and scented with the *oils of lavender* and *marjoram*, of each, 5 or 6 drops.

Obs. The first formula is an excellent one; and the product is very useful in nervous headaches, dimness of sight, &c. See *Asarabacca Snuff.*

SNUFF (Eye). *Prep.* From *subsulphate of mercury* (finely levigated), ½ dr.; *pure dry Scotch* or *Lundyfoot snuff*, 1 *oz.;* triturate them well together. A pinch of this, occasionally, has been recommended in inflammation of the eyes, dimness of sight, headache, polypus, &c.; but it should be used with caution, and not too often.

SOAP. Syn. *Sapo*,—Lat. *Savon*,—Fr. SPANISH or CASTILE SOAP, made with olive oil and soda, (*sapo, sapo ex olivæ oleo et sodâ confectus*, — Ph. L.; *Sapo durus*,—Ph. E. & D.,) and SOFT SOAP, made with olive oil and potash, (*sapo mollis*, —Ph. L. & E.; *Sapo ex olivæ oleo et potassa confectus*,—Ph. L.,) are the *only kinds* directed to be *employed in medicine.* The *former* is intended whenever *soap* is ordered, and is the one which is principally employed internally, the *latter* is used in ointments, &c., and in some of the officinal pills.

Prep. The *fatty* or *oleaginous matter* is boiled with a *weak alkaline lye* (soap-lye) rendered *caustic* by quick-lime, and portions of *stronger lye* are added from time to time, the ebullition being still continued, until these substances, reacting on each other, combine to form a tenacious compound, which begins to separate from the water; to promote this separation and the granulation of the newly formed soap, some *common salt* is generally added, and the fire being withdrawn, the contents of the boiler are allowed to repose for some hours, in order that the soap may collect into one stratum, and solidify; when this happens it is put into *wooden frames* or *moulds*, and when it has become stiff enough to be handled, it is cut into bars or pieces, and exposed to the air, in a warm situation, to further harden and to dry.

Var. The principal of these are:—

Almond Soap (*sapo amygdalinus*), made from *almond oil* and *caustic soda*, and chiefly used for the toilet.

Castile Soap, *Spanish do.*, *Marseilles do.*; *Sapo Castiliensis*, *Sapo Hispanicus.* An *olive-oil soda soap*, kept both in the *white* and *marbled* state. The former is said to be the *purest;* the latter, the *strongest.*

Curd Soap, made with *tallow* (chiefly) and *soda.*

Mottled Soap, made with *refuse kitchen-stuff*, *&c.*

Soft Soap (of commerce), made with *whale*, *seal*, or *cod oil*, *tallow*, and *caustic potash.*

Toilet Soaps, prepared from any of the preceding varieties, and variously coloured and scented.

Yellow Soap, *Rosin Soap*, made with *tallow*, *rosin*, and *caustic soda.*

Soaps are also divided into *soft* or *potash soaps*, and *hard* or *soda soaps.*

Pur. See *below.*

Assay. 1. For the *Water.* A piece, *fairly taken* from the sample, and weighing 100 gr., is reduced to thin shavings, which are dried by the heat of boiling water until they cease to lose weight. The *loss* indicates the proportion of FREE WATER. This should not exceed 35% for ordinary *curd* and *mottled soap;* 45% for *yellow soap;* and about 15 to 16% for *Castile soap.*

2. For the *Alkali.* 100 gr. of the *soap* are dissolved in 4 or 5 fl. oz. of *boiling water*, and the solution tested by the common method of alkalimetry. *Curd* and *yellow soap* usually contain from 6 to 7%; *mottled soap*, from 7 to 8%; and *Castile soap*, 8 to 9% of *soda.*

3. For the *Oil* or *Fat.* The *solution* tested for alkali (see No. 2) is heated, and then allowed to cool slowly; when cold, the floating fatty matter is removed, freed from water, and weighed. When the fat or oil has little consistence, 100 gr. of pure white wax is added to the soap solution, before heating it. The *weight obtained*, in grains in the one case, and the excess above 100 gr. in the other, give the proportion of OIL OR FAT present. This, in ordinary *mottled soap*, should be about 68%; in *yellow soap*, 65%; in *curd soap*, 60%; and in *Castile soap*, 75%.

4. *Unsaponified fatty matter.*—*a.* Pure soap is *entirely* soluble in distilled *water* and insoluble in saline solutions; if a film of fatty matter forms on its solution in the former, after repose, *that portion* has NOT BEEN SAPONIFIED.

b. The fat separated from soap (See No. 2) when it has been *perfectly saponified* is *entirely* soluble in alcohol.

5. *Other Impurities.* Pure soap is soluble in *rectified spirit*, forming a colourless, or nearly colourless solution. The *undissolved portion*, if exceeding 1%, is adulteration.

Uses, &c. The common uses of soap need not be enumerated. As a *medicine*, it acts as a mild purgative and lithontriptic, and it has been thought by some to be useful in certain affections of the stomach arising from deficiency of bile. *Externally*, it is stimulant and detergent. *Dose.* 3 to 20 or 30 gr., made into pills, and usually combined with aloes or rhubarb.

Concluding Remarks. Prior to the researches of M. Chevreul, no correct ideas were entertained as to the constitution of soap. It was long known that the fixed *oils* and *fats*, in contact with *caustic alkaline solutions* at a high temperature, undergo the remarkable change which is called *saponification;* but here the knowledge of the matter stopped. Chevreul discovered that if the soap, so produced, be afterwards decomposed by the addition of an acid, the fat which separates is found to be completely changed in character; to have acquired a strong acid reaction when applied in a melted state to test-paper, and to have become soluble with the greatest facility in warm alcohol; in other words,—that a new substance, capable of forming salts, and exhibiting all the characteristic properties of an *acid*, has been generated out of the elements of the neutral fat under the influence of the base. Stearine, when thus treated, yields *stearic acid*, margarin gives *margaric acid*, oleine gives *oleic acid*, and common animal fat, which is a mixture of the three neutral bodies, affords by saponification by an alkali and subsequent decomposition of the soap, a mixture of the three fatty acids in question. These bodies are not, however, the only products of saponification; the change is always accompanied by the formation of a very peculiar sweet substance, called *glycerine*, which remains in the mother-liquor from which the acidified fat has been separated. The process of saponification itself proceeds with perfect facility even in a closed vessel; no gas is disengaged; the neutral fat, of whatsoever kind, is simply resolved into an *alkaline salt of the fatty acid*, which is *soap*, and into *glycerine*, a neutral body resembling syrup, and like that liquid, miscible with water in every proportion.

"When yellow soap is made with the cheaper kinds of fat, it will hardly acquire a sufficient degree of firmness or hardness to satisfy the thrifty washerwoman. It melts away too rapidly in hot water; a defect which may be well remedied by the introduction into the soap of a little (1-20th) *fused sulphate of soda;* and this salt concreting gives the soap a desirable hardness, whilst it improves its colour, and renders it a more desirable article for the washing tub." (Ure.) This process was patented by Dr. Normandy, but soon proved a source of annoyance and molestation to him on the part of the Board of Excise, it being an enormous crime in law to attempt to improve and cheapen soap.

"Soda which contains sulphurets is preferred for making mottled or marbled soap, whereas the desulphuretted soda makes the best white curd soap." "The Barillas always contain a small proportion of potash to which their peculiar value, in making a *less brittle* or *more plastic* hard soap than the factitious sodas, may, with great probability, be ascribed." (Ure.)

The *mottled appearance* is usually given, in the London Soap-works, by watering the nearly finished soap with a strong lye of *crude soda*, by means of a watering can furnished with a rose spout. For *Castile soap*, a solution of sulphate of iron is so employed.

SOAP (Arsenical—Bécœurs). Syn. *Sapo Arsenicalis*,—Lat. *Prep.* From *carbonate of potash*, 12 *oz.; white arsenic, white soap*, and *air-slaked lime*, of each, 4 *oz.; powdered camphor*, $\frac{3}{4}$ *oz.;* made into a paste with *water*, q. s. *Used* to preserve the skins of birds, and other small animals.

SOAP (Black). Syn. *Sapo Niger, S. Mollis Communis*,—Lat. A crude soft soap made of *fish-oil*, and *potash;* but the following mixture is usually sold for it:—*soft soap*, 7 *lb.; train oil*, 1 *lb.; water*, 1 *gall.;* boil to a proper consistence, adding *ivory black* or *powdered charcoal*, q. s. to colour. *Used* by Farriers.

SOAPS (Medicated). A few only of these deserve notice here:—

Antimonial soap; Sapo Antimonialis, Sapo Stibiatus,—Lat. *Prep.* (Hamb. Cod. 1845.) *Golden sulphuret of antimony*, 2 dr; *solution* of *caustic potassa*, 6 dr. (or q. s.); dissolve and triturate the solution with *medicated* (Castile) *soap* (in powder), 1½ oz.; until the mass assumes a pilular consistence. It should be of a greyish-white colour.

Chlorinated Soap; Sapo Calcis Chlorinatæ,—Lat. *Savon Antisyphilitique*,—Fr. *Prep.* From *Castile soap* (in powder), 11 *oz.; chloride of lime* (dry and good), 1 *oz.;* mix, beat them to a mass with *rectified spirit*, q. s.; (holding in solution) *oil of verbena* or *of ginger grass*, ¼ *oz.;* lastly, form the mass into flat tablets, and wrap these in thin sheet gutta percha. A most excellent detergent and stimulant soap in various affections, admirably adapted for hospital use, and for removing stains from the skin and rendering it white. It is the most powerfully known agent against infection from *all* contagious diseases communicable by contact.

Croton Soap; Sapo Crotonis,—Lat. *Prep.* From *croton oil* and *liquor of potassa*, equal parts; triturated together in a warm mortar until they combine. Cathartic. *Dose.* 1 to 3 gr.

Soap of Guaiacum; Sapo Guaiaci, Sapo Guaiacinus,—Lat. *Prep.* (Ph. Bor.) *Liquor of potassa*, 1 oz.; *water*, 2 oz.; mix in a porcelain capsule, apply heat, and gradually add of *resin of guaiacum* (in powder), 6 dr., or as much as it will dissolve; next decant or filter, and evaporate to a pilular consistence. *Dose.* 10 to 30 gr.; in chronic rheumatism, various skin diseases, &c.

Iodine Soap; Sapo Ioduratus,—Lat. *Prep.* From *Castile soap* (sliced), 1 *lb.; iodide of potassium*, 1 *oz.;* (dissolved in) *water*, 3 *fl. oz.;* melt them together in a glass or porcelain vessel, over a water bath. Excellent in varions skin diseases; also as a common soap for scrofulous subjects.

Soap of Jalap. See *page* 654.

Macquer's Acid Soap; Sapo Vitriolicus,—Lat. *Prep.* From *Castile soap*, 4 *oz.;* softened by heat and a *little water;* and then continually triturated in a mortar with *oil of vitriol* (added drop by drop). Detergent. *Used* where alkalies would be prejudicial.

Mercurial Soap; Sapo Mercurialis,—Lat. *Prep.* 1. (*Sapo Hydrargyri Bichloridi.*) From *Castile soap* (in powder), 4 *oz.; corrosive sublimate,* 1 dr.; (dissolved in) *rectified spirit,* 1 fl. oz.; beaten to a uniform mass in a porcelain or wedgewood-ware mortar.

2. (*Sapo Hydrargyri Precipitati Rubri,*—Sir H. Marsh.) From *white Windsor-soap,* 2 oz.; *nitric oxide of mercury* (levigated), 1 dr.; *otto of roses,* 6 or 8 drops; (dissolved in) *rectified spirit,* 1 to 2 fl. dr.; as the last. Both the above are employed as stimulant detergents and repellants, in various skin diseases; also as *savon antisyphilitique.*

Sulphuretted Soap; Sapo Sulphuris, Sapo Sulphuratus—Lat. *Prep.* (Sir H. Marsh.) From *white soap,* 2 *oz.; sublimed sulphur,* ¼ *oz.;* beaten to a smooth paste in a marble mortar with 1 or 2 fl. dr. of *rectified spirit* strongly coloured with *alkanet root,* and holding in solution *otto of roses,* 10 or 12 drops. In itch, and various other cutaneous diseases.

Tar Soap; Sapo Picis Liquidæ, Sapo Piceus,—Lat. *Prep.* From *tar,* 1 part; *liquor of potassa* and *soap* (in shavings), of each, 2 parts; beat them together until they unite. Stimulant. *Used* in psoriasis, lepra, &c.

Turpentine Soap; Starkey's Soap; Sapo Terebinthinæ, S. Terebinthinatus,—Lat. *Savon Térébinthine,*—Fr. *Prep.* (P. Cod.) *Subcarbonate of potash, oil of turpentine,* and *Venice turpentine,* equal parts; triturate them together, in a warm mortar, with a *little water* until they combine; put the product into *paper moulds,* and in a few days slice it, and preserve it in a well-stopped bottle.

SOAPS (Toilet). Of *Toilet-soaps* there are two principal varieties:—

1. (*Hard.*) The basis of these is, generally, a *mixture* of *suet,* 9 parts, and *olive oil,* 1 part, saponified by *caustic soda;* the *product* is variously scented and coloured. They are also made of *white tallow, olive, almond,* and *palm oil soaps,* either alone or combined in various proportions, and scented.—2. (*Soft.*) The basis of these is a *soap made of hog's lard* and *potash,* variously scented and coloured.

On the *small scale,* the *perfume* is generally added to the *soap* melted in a bright copper pan by the heat of a water bath; on the *large scale,* it is mixed with the *liquid soap,* at the soap-maker's, before the latter is poured into the frames.

The following are examples of a few of the leading toilet soaps:—

Savon à la Rose. From a mixture of *olive oil soap,* 36 *lb.; best tallow soap,* 24 *lb.;* (both new and in shavings;) *water,* 1 quart; melted in a covered *bright copper pan,* by the heat of a *water bath,* then coloured with *vermilion* (finely levigated), 2½ *oz.;* and, after the mixture has cooled a little, scented with *otto of roses,* 3 *oz.; essence of bergamot,* 2½ *oz.; oils of cloves* and *cinnamon,* of each, 1 *oz.*

Bitter-almond Soap; Savon d'Amande. From *white tallow soap,* 56 *lb.; essential oil of almonds,* ¾ *lb.;* as before.

Savon au Bouquet. From *tallow soap,* 30 *lb.; olive-oil soap,* 10 *lb.; essence of bergamot,* 4 *oz.; oils of cloves, sassafras,* and *thyme,* of each, 1 *oz.; pure neroli,* ½ *oz.; brown ochre* (finely powdered), ½ *lb.;* mixed as the last.

Cinnamon Soap. From *tallow soap,* 14 *lb.; palm-oil soap,* 7 *lb.; oil of cinnamon* (cassia), 3 *oz.; oil of sassafras* and *essence of bergamot,* of each, ½ *oz.; levigated yellow ochre,* ½ *lb.*

Floating Soap. From good *oil-soap,* 14 *lb.; water,* 3 pints; melted together by the heat of a *steam* or *water bath,* and assiduously beaten until the mixture has at *least* doubled its volume, when it must be put into the frames, cooled, and cut into pieces. Any *scent* may be added.

Honey Soap. 1. From *palm-oil soap* and *olive-oil soap,* of each, 1 part; *curd soap,* 3 parts; melted together and scented with the *oil of verbena, rose-geranium,* or *ginger-grass.*

2. From the *finest bright-coloured yellow soap,* scented with the *oils of ginger-grass* and *bergamot.*

Musk Soap. As *cinnamon soap,* but with *essence of musk,* supported with a little *essence of bergamot* and *oil of cloves,* as perfume, and *burnt sugar,* to colour.

Naples Soap. From *olive oil* and *potash.*

Orange-flower Soap. As *soap à la rose,* with *oil of neroli* or *essence de petit grain,* supported with a little of the *essences of ambergris* and *Portugal,* for perfume.

Palm-oil Soap, Violet do. Made of *palm oil* and *caustic soda lye.* It has a pleasant odour of violets and a lively colour.

Pearl Soap, Almond Cream; Crème d'Amandes. From a *soap* made of *lard* and *caustic potash lye;* when *quite cold,* it is beaten in small portions at a time in a marble mortar, until it unites to form a homogeneous mass, or "*pearls*" as it is called; *essence of bitter almonds,* q. s., to perfume, being added during the pounding.

Shaving Soap. See *page* 940.

Transparent Soap. From perfectly dry *almond, tallow,* or *soft soap,* reduced to shavings, and dissolved, in a closed vessel or still, in an equal weight of *rectified spirit,* the clear portion, after a few hours' repose being poured into moulds or frames; after a few weeks' exposure to a dry atmosphere, the pieces are "trimmed up" and stamped, as desired. It may be scented and coloured, at will, by adding the ingredients to it while in the soft state. A ROSE COLOUR is given by *tincture of archil;* and YELLOW, by *tincture of turmeric* or *annotta.* It does not lather well.

Windsor Soap; Sapo Vindesoræ S. Vindesoriensis.—1. (*White; S. V. Albus.*) The best *English* is made of a *mixture* of *olive oil,* 1 part, and *ox tallow* or *suet,* 9 parts, saponified by *caustic soda. French Windsor-soap* is made of *hog's lard,* with the addition of a little *palm oil.* That of the *shops* is merely ordinary *curd soap,* scented with *oil of caraway,* supported with a little *oil of bergamot, lavender,* or *origanum.* To the finer qualities a *little* of the *essences of musk* and *ambergris* is *occasionally* added. 1½ *lb.* of the *mixed scents* is the common proportion per *cwt.*

2. (*Brown; S. V. Fuscus.*) This merely differs from the last in being coloured with *burnt sugar,* or (less frequently) with *umber.* Originally, it was the white variety that had become mellow and brown with age.

SODA. Syn. *Oxide of Sodium, Protoxide of do.; Soda,*—Lat. *Natron,*—Germ. *Mineral Alkali,*—Obs. This substance bears the same relation to its metallic base *sodium,* as potassa does to potassium. The hydrate of soda (*sodæ hydras*), as well as its solution (*liquor sodæ*), are prepared from *carbonate of soda* in precisely the same way as the corresponding preparations of potassa. The majority of the *salts of soda* may also be obtained in a similar manner to those of potassa.

Tests, &c. Pure soda, its hydrate, and salts, in their *general* deportment and properties, resemble potassa and its corresponding compounds; but its basic and alkaline action are rather less powerful than those of potassa.

Soda and *its salts* are *recognised*—1, by their solubility in water, and not being precipitated by any reagent except the antimoniate of potassa; which gives, in alkaline and neutral solutions, a white crystalline precipitate, the formation of which is greatly promoted by friction with a glass rod against the sides of the vessel; (if carbonate of potassa is present, it should be neutralized with acetic acid before applying this test;) —2, by yielding a salt with sulphuric acid, which by its taste (*intensely bitter*) and form (six-sided prisms, transparent, and extremely efflorescent) is readily recognised as sulphate of soda;—3, by its salts, when exposed by means of platinum wire to the *inner* flame of the blowpipe, imparting a *rich yellow* colour to the *outer* flame;—4, by its muriate or chloride, and other salts, imparting a yellow tinge to the flame of alcohol. Like the other alkalies, it is distinguished in the caustic and carbonated states—5, by turning turmeric *brown,* and vegetable blues *green.* (See p. 1151.)

Soda is *distinguished* from potassa—1, by its hydrate, after it has deliquesced in the air, speedily resolidifying by the absorption of carbonic acid, forming carbonate of soda, a salt marked by being *easily* crystallizable, and rapidly efflorescing when exposed to dry air;—2, by not being precipitated by bichloride of platinum, nor by picric, nor tartaric acid;—3, by all the reactions the preceding paragraph, except the last one.

SODA (Acetate of). Syn. *Sodæ Acetas,* —Ph. D. & Ph. L. 1836. *Terra Foliata Mineralis,*—Obs. Prepared from *carbonate of soda* as the corresponding potassa salt; but the resulting solution is evaporated to a pellicle, and set aside to crystallize. Its crystals are striated oblique rhombic prisms; it effloresces slightly in the air, and is soluble in 4 parts of water at 60° Fahr. Diuretic. *Dose.* 20 to 40 gr.

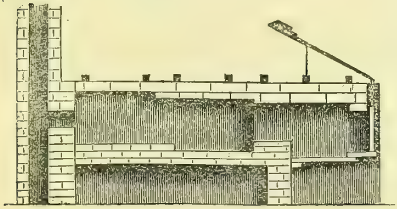
SODA (Arseniate of). This salt (*soda arsenias*), as well as the *superarseniate* or *biarseniate of soda,* are made like, and resemble in their *properties* and *doses,* the corresponding potash-salts.

SODA (Biborate of). See *Borax.*

SODA (Bicarbonate of). See *below.*

SODA (Carbonate of). Syn. *Sodæ Carbonas,*—Ph. L. E. & D. *Sodæ Subcarbonas,* —Ph. L. 1824, & Ph. E. 1839. *Natron Præparatum,*—Ph. L. 1788. *Subcarbonate of Soda, Mild Fossil* or *Mineral Alkali, Aerated Mineral do., Salt of Barilla, Salt of Soda, Natron Carbonicum,*—Obs. var. The carbonate of soda of commerce is either prepared from the *ashes of sea weed* and other marine vegetables, in a somewhat similar manner to that by which carbonate of potash is obtained from the ashes of inland vegetables, or it is prepared from *common salt* or *sulphate of soda* by the action of sulphuric acid, carbonaceous matter, and heat. The *ashes of marine plants* have been long an article of commerce, under the names of *barilla, barilla ashes, kelp, blanquette, &c.,* but the carbonate made from them is of a very impure description. That from the sulphate, when the process has been well-conducted, is much purer. The quantity of carbonate of soda in the ashes of marine plants varies from 3 to 40%.

Prep. 1. From *Sea-salt* or *Sulphate of Soda.* The *latter* is generally obtained by decomposing the *former* with *sulphuric acid;* the evolved gas being passed into *water,* or through flues filled with coak, over which a very small stream of cold water constantly flows, by which it is condensed, and forms "*liquid hydrochloric acid,*" a substance afterwards consumed, in large quantities, in the manufacture of chloride of lime, and for other purposes. The *sulphate of soda,* obtained from this or any other source, is well mixed with an equal weight of *chalk,* and about half its weight of *coal,* each being previously ground to powder, and the mixture is exposed to a strong heat in a reverberatory furnace (see *Engr.*) until the decomposition of the sulphate is complete; the mass during the calcination being frequently stirred about with a long iron rod; the semi-liquid mass is now raked into an iron trough, where it is allowed to cool, whilst the furnace is *recharged* with fresh materials. The crude dark-gray product, thus obtained, is known as "*ball alkali*" or "*British barilla,*" and usually contains about 22 or 23% of *pure soda.* This is now *lixiviated* with *tepid water,* and the solution, after defecation, evaporated to dryness; the residuum is mixed with about half its bulk of *coal-dust,* or an equal bulk of *sawdust* or *charcoal,* and roasted in a reverberatory furnace, at a heat not exceeding 700° Fahr., until *all the sulphur* is expelled. The *product* is the "*soda-ash,*" "*soda salt,*" or "*British alkali,*" of commerce, and contains about 50% of pure soda. When this is *purified* by solution in water, defecation, evaporation, and crystallization, it furnishes *commercial crystallized carbonate of soda.* When this last is redissolved, and the filtered solution is carefully crystallized, it constitutes the ordinary *carbonate of soda* used in *pharmacy* and *medicine.*



Scotch Soda-furnace.

Sulphate of Soda, treated as above, yields about 168% of *crude soda* at 33 per cent.; or 130% of the *crystallized carbonate.* (Ure.)

2. From the *Ashes of Marine plants.* See *above.*

3. (*Chemically pure.*) From *pure bicarbonate* or *acetate of soda* heated to redness in a platinum crucible. (See *p.*1034.)

Prop., &c. This salt forms large, transparent, oblique rhombic prisms, which, as ordinarily met with, contain 10 equivalents of water, but by particular management may be had with fifteen, nine, seven, or sometimes with only one, (Fownes); it is soluble in twice its weight of water at 60°, and less than an equal weight at 212° Fahr. As a *medicine* it is deobstruent and antacid, and is given in *doses* of 10 to 30 gr. It is also, occasionally, used to make effervescing draughts. When taken in an over dose it is poisonous. The *antidotes* are the same as for carbonate of potassa. The *crude* carbonate is largely employed in the manufacture of soap, glass, &c.

Pur. The ordinary carbonate of soda generally contains either sulphates or chlorides, and frequently both. These impurities may be detected in the manner noticed under *Carbonate of Potassa.* "After saturation with hydrochloric acid, chloride of barium throws down nothing from its solution. 100 gr. at a high temperature lose 62·5 gr. of water. A like quantity added to dilute sulphuric acid evolves 15·28 of carbonic acid." (Ph. L.) It should be "totally soluble in water, but not at all in alcohol." (Ph. L. 1836.) "A solution of 21 gr. in 1 fl. oz. of water, precipitated by 19 gr. of nitrate of baryta, remains precipitable by more of the test; and the precipitate is *entirely* soluble in nitric acid." (Ph. E.) Its solution is not disturbed by the addition of a solution of picric acid in alcohol, by which it is *distinguished* from the *carbonate of potassa.*

Assay. See *Alkalimetry* (and *above.*)

SODA (Carbonate of,—Dried). Syn. *Sodæ Carbonas Exsiccata,*—Ph. L. *Sodæ Carbonas Siccatum,*—Ph. E. & D. *Sodæ Subcarbonas Exsiccata,*—Ph. L. 1824. *Prep.* 1. (Ph. L.) Take of *carbonate of soda,* 1 ℔; expose it to heat until the crystals fall to powder, next heat it to redness, and when cold, rub it to powder.

2. Expose the salt, reduced to coarse powder, to the air in a dry and warm situation, when it will rapidly effloresce

and fall into a pulverulent state, not liable to further change.

Obs. 53 gr. of the *dried carbonate of soda* are equal to 143 of the *crystallized salt.* The medicinal properties of both are similar. It has, however, the disadvantage of being difficultly soluble in water. "It is (*entirely*) soluble in water; 100 gr. treated with dilute sulphuric acid, lose 40·7 gr. of carbonic acid." (Ph. L.) *Dose.* 5 to 20 gr. in pills or powder; in calculus, &c.

SODA (Bicarbonate of). Syn. *Sesquicarbonate of Soda; Sodæ Bicarbonas,*—Ph. L. E. & D. *Sodæ Sesquicarbonas,*—Ph. L. 1836. *Sodæ Carbonas,*—Ph. L. 1824 and Ph. E. 1839. *Aerated Soda,*—Obs. This is the soda analogue of the potassa salt noticed at *pages* 1035-6, and is prepared in a precisely similar manner. *Another method* is as follows:—Take of *crystallized carbonate of soda,* 1 part; *dried carbonate of soda,* 2 parts; (both in powder;) triturate them well together, and surround them with an atmosphere of *carbonic acid gas,* under pressure; let the action go on until no more gas is absorbed, (which will generally occupy 10 to 14 hours, according to the pressure employed,) then remove the salt and dry it at a heat not above 120° Fahr.—*Obs.* This process is essentially that of the Ph. E. In that of Mr. Smith, described in the *Phil. Pharm. Journ.*, and now adopted in the Ph. U. S., the salt employed is in crystals. In Scotland the method just described has been adopted with perfect success, and we can, from our own experience, bear testimony to its efficiency. Both the *carbonate* and *bicarbonate of soda* are now placed in the Materia Medica of the Ph. L.

Prop., &c. A crystalline white powder; it is soluble in 10 parts of water at 60° Fahr., but it cannot be dissolved in even warm water without partial decomposition; it is more pleasant tasted and more feebly alkaline than the carbonate of the same base. When absolutely pure it does not darken turmeric paper, or only *very* slightly. The *dose* is from 10 to 40 grains, as an antacid and absorbent. It is much employed in the preparation of *effervescing powders* and *draughts;* for which purpose

20 gr. of *commercial bicarbonate of soda*
are taken with
18 gr. of *crystallized tartaric acid;*
17 gr. of *crystallized citric acid;* or
½ fl. oz. of *lemon juice.*

Pur. It is entirely "soluble in water; from this solution neither bichloride of platinum, nor sulphate of magnesia, throws down anything, unless heat be applied; what is thrown down by chloride of barium is dissolved by hydrochloric acid. 100 gr. added to dilute sulphuric acid evolve 51·7 gr. of carbonic acid." (Ph. L.) "Dissolved in 40 parts of water it does not give a reddish precipitate with a solution of corrosive sublimate." (Ph. E.)

Assay. The *quantity of bicarbonate* any given sample contains may be approximatively determined by well washing 100 gr. of the *salt* with an equal weight of *water,* and filtering the solution. The residuum left upon the filter, dried at a heat of 120° Fahr., and weighed, gives the per centage of *pure bicarbonate of soda* present (very nearly). The solution of this in water will give only a very trifling *white* precipitate with corrosive sublimate; whilst the filtered portion, which was used to wash the salt, will give a *red* one, if it contains the simple carbonate of soda.

SODA (Chloride of). See *Hypochlorite of Soda.*

SODA (Chromate of). As *chromate of potash,* by employing a *salt of soda* instead of one of potassa. This salt has been proposed as a substitute for chromate of potassa, and has the advantage in cheapness.

SODA (Hydrate of). See *page* 1150.

SODA (Hydrosulphate of). Syn. *Sodæ Hydrosulphas Crystallizatum,*—Lat. *Prep.* (P. Cod.) Saturate a *solution of caustic soda* (sp. gr. 1·200) with *sulphuretted hydrogen,* closely cover up the vessel, and set it aside that crystals may form; drain, press them in bibulous paper, and at once preserve them in a well-closed bottle. *Used* to make mineral waters, and in certain skin diseases.

SODA (Hypochlorite of). Syn. *Chloride of Soda; Oxymuriate of do.; Chloruret of Oxide of Sodium; Soda Chlorinata,*—Lat. *Prep.* (Dr. Christison.) *Dried carbonate of soda,* 19 parts; are triturated with *water,* 1 part; and the mixture placed in a proper vessel, and exposed to the prolonged action of *chlorine gas,* generated from a mixture of *chloride of sodium,* 10 parts; *binoxide of manganese,* 8 parts; *sulphuric acid,* 14 parts; (diluted with) *water,* 10 parts. See *Solutions.*

SODA (Hyposulphite of). Syn. *Sodæ Hyposulphis,*—Lat. *Prep.* 1. *Dried carbonate of soda,* 1 *lb.; flowers of sulphur,* 10 *oz.;* mix, and slowly heat the powder in a porcelain dish until the sulphur melts; stir the fused mass freely to expose it to the atmosphere, until the incandescence flags, then dissolve the mass in *water*, and immediately boil the filtered liquid with some *flowers of sulphur;* lastly, carefully concentrate the solution for crystals.

2. A *stream of well washed sulphurous acid gas* is passed into a *strong solution of carbonate of soda*, which is then digested with *sulphur* at a gentle heat during several days; by evaporating the solution at a *moderate temperature* the salt is obtained in large and regular crystals.

3. (*Capaun's process.*) Boil a *dilute solution of caustic soda* with *sulphur* to saturation, then pass *sulphurous acid gas* into the solution until a small portion, when filtered, is found to have a very pale yellow colour; when this is the case, it must be filtered and evaporated, as before.

4. (P. Cod.) Dissolve *carbonate of soda*, 8 parts, in *water*, 16 parts; add of *sublimed sulphur*, 1 part, and pass *sulphurous acid gas*, in excess, into the solution; next boil the liquid in a glass matrass for a few minutes, filter, gently evaporate the filtrate to 1-3d its volume, and set it aside in a cool place to crystallize.

Prop., &c. Hyposulphite of soda crystallizes in four-sided prisms, which, in the dry state, are unalterable in the air; it is freely soluble in water. It may be perfectly freed from sulphuret of sodium by agitating it with about half its weight of alcohol; the alcohol dissolves out the sulphuret, which may then be easily separated. This salt is now very extensively used in the practice of Daguerreotype and photography.

SODA (Muriate of). See *Chloride of Sodium.*

SODA (Nitrate of). Syn. *Cubic Nitre; Sodæ Nitras,*—Lat. This salt is obtained in a similar way to ordinary nitre, and is chiefly imported into England from South America. It is largely employed as a manure, in the preparation of nitric acid, and, recently, in the manufacture of fireworks, on account of the comparative slowness with which it burns. It is deliquescent and very soluble in water.

SODA (Oxymuriate of). See *page* 1152.

SODA (Phosphate of). Syn. *Sodæ Phosphas,*—Ph. L. E. & D. *Tasteless Purging Salt, Tribasic Phosphate of Soda, Rhombic do., Neutral do.; Soda Phosphoratum, Sal Mirabile Perlatum,*—Obs. var. *Prep.* 1. (Ph. E.) Take of *powdered bone ashes*, 10 *lb.; sulphuric acid*, 44 fl. oz.; mix, add gradually of *water* 6 pints, and digest for 3 days, replacing the water which evaporates; then add 6 pints of *boiling water*, strain through linen, and wash the residue on the filter with *boiling water*; mix the liquors, and after defecation, decant and evaporate to 6 pints; let the impurities again settle, and neutralize the clear fluid, heated to boiling, with a *solution of carbonate of soda* in slight excess; crystals will be deposited as the solution cools, and by successively evaporating, adding a little more *soda* to the mother-liquor till it is *feebly* alkaline, and cooling, more crystals may be obtained; these must be kept in closed vessels. The formula of the Ph. D. is nearly similar. It is placed in the materia medica of the Ph. L.

2. (M. Funcke.) To *ground calcined bones*, diffused through water, add a *little dilute sulphuric acid* to saturate any carbonate of lime present; when effervescence ceases, dissolve the whole in *nitric acid*, q. s.; to this solution add as much *sulphate of soda* as the bone-ash used, and distil the whole to *recover* the nitric acid; the residuum is treated with *water*, and the resulting solution filtered, evaporated, and crystallized.

Prop., &c. It forms very beautiful oblique rhombic prisms, which effloresce in the air, dissolve in about 4 parts of cold water, and in 2 parts at 212° Fahr., and fuse when heated. As a *medicine* it is mildly aperient in *doses* of ½ to 1 *oz.*, or even more; and antacid in doses of 20 or 30 gr., frequently repeated. It has a purely saline taste, resembling that of culinary salt, and is commonly taken in broth or soup.

Pur. Its solution "turns turmeric slightly brown. What is thrown down by chloride of barium is white, and dissolves without effervescence in nitric acid. The precipitate thrown down by nitrate of silver is yellow, and is dissolved by the same acid. At a red heat 100 gr. give off 62·3 gr. of water. What is thrown down by nitrate of silver from the remaining salt dissolved in water, is white." (Ph. L.) "45 gr. dissolved in 2 fl. oz. of boiling water, and precipitated by a solution of 50 gr. of carbonate of lead in 1 fl. oz. of pyroligneous acid, still remain precipitable by a solution of acetate of lead." (Ph. E.)

SODA (Potassio-tartrate of). Syn. *Tartrate of Potash and Soda, Rochelle Salt, Seignette's do., Tartarized Soda; Sel de Seignette; Sal Rupellensis, Sal Polychrestum Seignetti; Sodæ Potassio-tartras,*—Ph. L. *Sodæ et Potassæ Tartras,* — Ph. E. & D. *Soda Tartarizata,*—Ph. L. 1824. *Natron Tartarizatum,*—Ph. L. 1788. *Prep.* (Ph. L. 1836.) Take of *carbonate of soda*, 12 oz.; *boiling water*, 2 quarts; dissolve, and add, gradually, of *powdered bitartrate of potash*, 16 oz. (or q. s.); strain, evaporate to a pellicle, and set it aside to crystallize; dry the resulting crystals, and evaporate the mother-liquor that it may yield more of them. The formulæ of the other Colleges are nearly similar.

Prop., &c. Large, transparent, hard, right rhombic prisms, often occurring in halves; slightly efflorescent; soluble in 5 parts of water at 60° Fahr. Its "solution neither changes the colour of litmus nor of turmeric. On the addition of sulphuric acid, bitartrate of potash is thrown down; on adding either nitrate of silver or chloride of barium nothing is thrown down, or only what is re-dissolved by the addition of water." (Ph. L.) By heat it yields a mixture of the pure carbonates of potash and soda.

Potassio-tartrate of soda is a mild and cooling laxative. *Dose.* ¼ to 1 *oz.*, largely diluted with water. It forms the basis of the popular aperient called *Seidlitz Powders.*

SODA (Sesquicarbonate of). See *p.* 1152.

SODA (Stannate of). *Prep.* (Greenwood & Co.) *Caustic soda*, 22 *lb.*, is heated to low redness in an iron crucible, when *nitrate of soda*, 8 *lb.*, and *common salt*, 4 *lb.*, are added; when the mixture is at a "fluxing heat," 10 *lb.* of *feathered block tin* is stirred in with an *iron rod*, both the stirring and heat being continued until the mass becomes red-hot and "pasty," and ammoniacal fumes are given off. The *product* may be purified by solution and crystallization. Patented.

SODA (Stannite of). *Prep.* (Greenwood & Co.) From *caustic soda*, 13½ *lb.*; *feathered block tin* and *common salt*, of each, 4 *lb.*; as the last. *Patented.* Both the above are *used* to prepare *tin* mordants (about 12 *oz.* to *water* 1 gall.). The *stannate* and *stannite of potash* are prepared in a similar manner.

SODA (Sulphate of). Syn. *Glauber's Salt*; *Sal Glauberi*; *Sodæ Sulphas*,—Ph. L.E.& D. *Natron Vitriolatum*,—Ph.L.1788. *Sal Catharticus Glauberi*,—Ph.L.1746. *Sal Mirabile Glauberi, &c.* This is obtained as a secondary product in various chemical processes; but it may be easily formed directly from its constituents.

Prep. (Ph. L. 1836.) Dissolve 2 ℔ of the *salt left in distilling muriatic acid* in 1 quart of *boiling water*, neutralize the solution with *carbonate of lime*, evaporate, and crystallize.

Prop., &c. It forms transparent six-sided, irregular channelled prisms with dihedral summits, which effloresce in the air, and fall to an opaque white powder; soluble in about 3 parts of water at 60°, and in considerably less at 100° Fahr., but at a higher temperature its solubility rapidly lessens; insoluble in alcohol; fuses when heated. It is seldom wilfully adulterated. When *pure*, the solution is neutral to test paper; nitrate of silver throws down scarcely anything from a dilute solution; nitrate of baryta more, which is not dissolved by nitric acid. It loses 55·5% of its weight by a strong heat. (Ph. L.)

Uses. It is purgative, but being extremely bitter-tasted, is now less frequently used than formerly. Its nauseous flavour is said to be covered by lemon juice. *Dose.* ½ to 1 *oz.* The dried salt (*sodæ sulphas exsiccata*) is twice as strong. *Lymington Glauber's Salt* is a mixture of the sulphates of soda and potassa obtained from the mother-liquor of sea salt. A *bisulphate of soda* is also prepared.

SODA (Tartrate of). Syn. *Sodæ Tartras*,—Lat. See *Effervescing Powders* (*page* 1064).

SODA (Valerianate of). Syn. *Sodæ Valerianas*,—Ph. D. *Prep.* (Ph. D.) Dilute *oil of vitriol*, 6½ fl. oz. with *water*, ½ pint; then dissolve of *powdered bichromate of potash*, 9 *oz.*, with the aid of heat in *water*, 3½ pints; when both solutions have cooled, put them into a matrass, and having added of *fusel oil* (alcohol amylicum, Ph. D.), 4 fl.oz., shake them together repeatedly until the temperature, which first rises to 150°, has fallen to 80° or 90° Fahr.; a condenser being connected, next apply heat so as to distil over about 4 pints of liquid; saturate this exactly with a pint, or q. s. of *solution of caustic soda*, separate the liquid from the oil which floats upon the surface, and evaporate it until the residual salt is partially liquefied; the heat being now withdrawn, and the salt concreted, this last, whilst still warm, is to be divided into fragments, and preserved in well-stopped bottles.

Obs. This salt is intended to be used in the preparation of the *valerianates of iron*, *quinia*, and *zinc.*

SODA AND AMMONIA (Phosphate of). See *Microcosmic Salt.*

SODIUM. Syn. *Natrium.* The metallic base of soda. It was first obtained by Sir H. Davy, in 1807, by means of a powerful galvanic battery; but it may be more conveniently and cheaply procured, in quantity, by the method described under *potassium.* The process, when well conducted, is, however, much easier and more certain than that for the last-named metal.

Prep. The *anhydrous carbonate of soda* (or its equiv.), 6 parts; is dissolved in a *little water*, and the solution mixed with *charcoal*, in fine powder, 2 parts; and *charcoal*, in small lumps, 1 part; the whole is then evaporated to dryness, transferred to an iron retort, and treated in the manner described at *page* 1044.

Prop., &c. Sodium is a soft silver-white metal, scarcely solid at common temperatures, fuses at 194° Fahr., and volatilizes at a red heat; it oxidizes very rapidly in the air; when placed on the surface of cold water it decomposes that liquid with great violence, but generally without flame, in which it differs from potassium; on hot water it burns with a bright yellow flame,—in both cases a solution of pure soda being formed. Sp. gr. 0·972 (0·970,—Ure); it is more malleable than any other metal, and may be easily reduced into very thin leaves (Ure); its other properties resemble those of potassium, but are of a feebler character. With oxygen it forms a *protoxide* (anhydrous soda), and a *binoxide*, *teroxide*, or *peroxide*,—with chlorine, a *chloride* (common salt), and—with bromine, iodine, fluorine, sulphur, &c., *bromide, iodide, fluoride, sulphuret, &c., of sodium*, all of which may be obtained by similar processes to the respective compounds of potassium, which, for the most part, they resemble.

Uses. Until recently sodium has been regarded as a mere chemical or philosophical curiosity; it has now, however, become of great practical importance from being employed in the manufacture of the new metal aluminium. *Sulphuret* or *sulphide of sodium* is supposed to be a principal element in the beautiful blue pigment ultramarine.

SODIUM (Chloride of). Syn. *Muriate of Soda, Common Salt, Culinary do., Sea do.; Sodii Chloridum*, — Ph. L. & D. *Sodæ Murias*, — Ph. E. & Ph. L. 1824. This important and wholesome compound appears to have been known in the earliest ages of which we have any record. It is mentioned by Moses (Gen. xix, 26), and by Homer in the Iliad (lib. ix, 214). In ancient Rome it was subjected to a duty (*vectigal salinarium*); and, even at the present day, a similar tax furnishes no inconsiderable portion of the revenue of certain nations. Common salt forms no small portion of the mineral wealth of England, and has become an important article of commerce in every part of the known world. The principal portion of the salt consumed in this country is procured by the evaporation of the water of brine springs. It is also prepared by the evaporation of sea water (hence the term *sea salt*), but this process has been almost abandoned in England, being more suited to hot dry climates, or to very cold ones.

Var.—Bay Salt, Sal marinus, Sal niger; imported from France, Portugal, and Spain, and *obtained* from sea water evaporated in shallow ponds by the sun; large-grained and dark-coloured. — *British Bay Salt, Cheshire large-grained Salt;* by evaporating native brine at a heat of 130° to 140° Fahr.; hard cubical crystals. Both of the above are used to salt provisions for hot climates, as they dissolve very slowly in the brine as it grows weaker.—*Cheshire Stoved Salt, Lump Salt, Basket do.;* obtained by evaporating the brine of salt springs; small flaky crystals. — *London's Patent Solid Salt;* Cheshire rock salt melted and ladled into moulds. — *Rock Salt, Fossil Salt; Sal Gemmæ, Sal Fossilis;* found in mineral beds in Cheshire; has commonly a reddish colour; chiefly exported for purification.

Prop. Pure chloride of sodium is fixed in the air; crystallizes in anhydrous cubes, which are often grouped into pyramids or steps; dissolves in about 2½ parts of water at 60° Fahr.; its solubility is not increased by heat; it is slightly soluble in proof spirit; insoluble in alcohol; decrepitates when heated; fuses at a red heat, and volatilizes at a much higher temperature.

Pur., &c. The common salt of commerce contains small portions of *chloride of magnesium, chloride of calcium*, and *sulphate of lime;* and hence, has commonly a slightly bitter taste, and *deliquesces* in the air. To *separate these*, dissolve the salt in 4 times its weight of *pure water*, and drop into the filtered solution, first, *chloride of barium*, and then *carbonate of soda*, as long as any precipitate falls; filter, and evaporate the clear fluid very slowly, until the salt crystallizes, which is pure chloride of sodium. (Thomson's Chem, ii, 377,) For *medical purposes*, the Ph. E. orders the salt to be dissolved in *boiling water* and the solution to be filtered and evaporated over the fire, skimming off the crystals as they form; which must then be quickly washed in *cold water*, and dried. "A solution of *pure salt* is not precipitated by a solution of carbonate of ammonia, followed by a solution of phosphate of soda: a solution of 9 gr. in distilled water, is not entirely precipitated by a solution of 26 gr. of nitrate of silver." (Ph. E.)

Uses. Common salt is stimulant, antiseptic, and vermifuge, and is hence employed as a *condiment*, and for *preserving* animal and vegetable substances. It is also occasionally used in medicine, in clysters and lotions.

SODIUM (Iodide of). Syn. *Sodii Iodidum, Sodæ Hydriodas,*—Lat. As iodide of potassium. This, as well as *bromide of sodium*, crystallizes in cubes, is very deliquescent, and very soluble in water.

SODIUM (Platino-chloride of). See *page* 1019.

SODIUM (Sulpho-antimoniuret of). Syn. *Sulphuret of Antimony and Sodium; Sodii Sulpho-antimoniatum, Sodii et Antimonii Sulphuretum,*—Lat. See *Schlippe's Salt* (p. 78).

SOIL. The earth in which vegetables grow, and from which their roots absorb nourishment.

Soils are *classified* by agriculturists according to their chief ingredients; as *loamy, clayey, sandy, chalky*, and *peaty* soils. Of these the *first* is the best, but the others may be improved by the addition of the mineral constituents of which they are deficient. *Sand* and *lime* or *chalk* are the proper additions to CLAYEY SOILS, and *clay, gypsum*, or *loam* to SANDY and GRAVELLY ones. *Clayey soils* are expensive to bring into a fertile state, but when this is once effected, and they are well manured, they yield immense crops of wheat, oats, beans, clover, and most fruits and flowers of the rosaceous kinds.

The *fertilization* of *soils* is suggested partly by chemical analysis, practical experience, and geological observations. In cases where a barren soil is examined with a view to its *improvement*, it is, when possible, compared with an extremely fertile soil in the same neighbourhood, and in a similar situation; the difference given by their analyses indicates the nature of the manure required, and the most judicious methods of cultivation; and thus, a plan of improvement is suggested founded upon scientific principles. See *Agriculture, Manures, &c.*

The *analysis* of *soils* may be briefly and generally described as follows:—

1. The general character of the soil, as *loamy, sandy, stoney, rather stoney, &c.*, being noted, 3 or 4 *lb.* of it, fairly selected as an average specimen, may be taken during a period of ordinary dry weather. From this, after crushing or bruising the lumps with a piece of wood, all STONES of a larger size than that of a filbert may be picked out, and *their proportion* to the *whole quantity* duly registered.

2. 1000 gr. of the *remainder*, may be next dried by the heat of boiling water, until the mass ceases to lose weight; and, afterwards, exposed to a moist atmosphere for some time. The *loss* of weight in the *first* case, and the *increase* of weight, in the *second*, indicate the ABSORBENT POWERS of the soil.

3. The *matter from No.* 2, freed from siliceous stones by garbling, may be *gradually* heated to *dull* redness in a shallow open vessel, avoiding waste from decrepitation, &c. The *loss of weight* divided by 10, gives the per centage quantity of VEGETABLE or ORGANIC MATTER present (nearly).

4. *Another* 1000 gr. (see No. 1,) may be next washed with successive portions of cold water as long as anything is removed. The *residuum*, after being dried, indicates the proportion of SAND and GRAVEL (nearly).

5. *Another portion* of the *soil* (100, 200 or more *gr.*, according to its character), is tested in the manner described under *Carbonates* and *Alkalimetry* (p. 42). The *loss of weight* in *carbonic acid* indicates the quantity of CARBONATE OF LIME present in the sample examined; 22 gr. of the former being equal to 50 gr. of the latter.

6. *Another like portion* of the *soil* may be gently boiled for 4 or 5 hours, along with dilute hydrochloric acid, in a flask furnished with a long glass tube passing through the cork, to prevent loss (See *Ether*); after that time the whole must be thrown upon a filter, and, what refuses to pass through (SILICA), washed with distilled water, dried, ignited and weighed.

7. The *filtrate* and *washings* from No. 6 are next successively treated for ALUMINA (*pure clay*), LIME, PHOSPHATE OF LIME, PHOSPHORIC ACID, OXIDE OF IRON, ALKALIES (*potassa* or *soda*), AMMONIA (both *ready formed* and *latent*), &c., &c., in the manner noticed under "*Glass,*" "*Guano,*" and the names of the *respective substances* referred to.

SOLANINE. Syn. *Solania, Solanina,*—Lat. A peculiar basic substance, obtained from various species of the solanaceæ.

Prep. Filter the *juice of ripe nightshade berries* (solanum nigrum,—Linn.), add *ammonia*, filter, wash the sediment, boil it in *alcohol*, filter, and distil off the spirit; the solanine is left as a white powder.

Prop., &c. Insoluble in water; freely soluble in alcohol; bitter; emetic; narcotic, and poisonous. By careful crystallization in alcohol it forms pearly, needle-like crystals, somewhat resembling those of disulphate of quinine. With the acids it forms salts, many of which are crystallizable. It may also be obtained from the leaves and stem of *solanum dulcamara* or *bitter-sweet.*

SOLDERING. The union of metallic surfaces by means of a more fusible metal fluxed between them. The method of *autogenous soldering*, invented by M. De Richmont, is an exception to this definition. (See *p.* 102.) In all cases the surfaces must be perfectly clean, and in absolute contact, and the air must be excluded, to prevent oxidation. For this last purpose the *brazier* and *silversmith* uses powdered borax made into a paste with water; the *coppersmith*, powdered sal ammoniac; and the tinman, powdered rosin. Tin-foil applied between the joints of *fine brass-work*, first wetted with a strong solution of sal ammoniac, makes an excellent juncture, care being taken to avoid too much heat.

SOLDERS. *Prep.* 1. (For *Copper, Iron*, and *Dark Brass.*) From *copper*, and *zinc*, equal parts; melted together. For *pale brass* more zinc must be used.

2. (*Fine Solder.*) From *tin*, 2 parts; *lead*, 1 part. Melts at 350° Fahr. *Used* to tin and solder copper, tin plates, &c.

3. (For *German Silver.*) From *German silver*, 5 parts; *zinc*, 4 parts; melted together, run into thin flakes, and then powdered. *Also* as No 7.

4. (*Glazier's.*) From *lead*, 3 parts; *tin*, 1 part. Melts at 500° Fahr.

5. (For *Gold.*) *Gold*, 12 pennyweights; *copper*, 4 do.; *silver*, 2 do.

6. (For *Lead and Zinc.*) From *lead*, 2 parts; *tin*, 1 part.

7. (For *Pewter, Britannia metal, &c.*) From *tin*, 10 parts; *lead*, 5 parts; *bismuth*, 1 to 3 parts.

8. (For *Silver.*) From *fine-brass*, 6 parts; *silver*, 5 parts; *zinc*, 2 parts.

9. (For *Tin plate.*) From *tin*, 2 parts; *lead*, 1 part. The addition of *bismuth*, 1 part, renders it fit for pewter.

SOLE. The *pleuronectes solea*, a well-known mucilaginous thoracic fish. It is perhaps more frequently eaten than any other flat fish, and when skilfully cooked, exceeds them all in delicacy, nutritiousness, and flavour.

SOLUTION. Syn. *Solutio*,—Lat. Under the head of solutions (*solutiones*), in pharmacy, are properly included only those liquids which consist of water, or an aqueous menstruum, in which has been dissolved an appropriate quantity of any soluble substance to impart to the liquor its peculiar properties. When *spirit* is the menstruum the liquid receives the name of *alcoholic solution, spirit*, or *tincture*. In the Ph. L. & D., *aqueous solutions* are named *liquors* (liquores); whilst in the Ph. E., and in the old pharmacopœias generally, they are termed *waters* (*aquæ*).

The following list embraces all the solutions of the British Pharmacopœias, with a few others likely to be useful to the reader. Some other preparations to which the name has been given will be found under *Liquors, Tinctures, &c.*

SOLUTION (Acetate of Ammonia). Syn. *Liquor of Acetate of Ammonia, Water of do., Mindererus' Spirit; Liquor Ammoniæ Acetatis*,—Ph. L. & D. *Ammoniæ Acetatis Aqua*,—Ph. E., Ph. D. 1826, & Ph. L. 1788. *Prep.* 1. (Ph. L.) From *dilute acetic acid*, 1 pint; exactly neutralized by *sesquicarbonate of ammonia* (in coarse powder), 9 dr., or q. s. Sp. gr. 1·022.

2. (Ph. E.) *Distilled vinegar* (preferably from French vinegar), sp. gr. 1·005, 24 fl. oz.; *carbonate* (sesquicarbonate) *of ammonia*, 1 oz., or q. s. Sp. gr. 1·011.

3. (Ph. D.) *Sesquicarbonate of ammonia*, 2½ *oz.; dilute acetic acid*, 3 pints. Sp. gr. 1·012.

Prop., &c. "Free from colour and odour. It changes the colour neither of litmus nor turmeric. Sulphuretted hydrogen being dropped in, it is not discoloured, neither is anything thrown down on the addition of chloride of barium. What is precipitated by nitrate of silver is soluble in water, but especially so in nitric acid. Potassa being added, it emits ammonia; and sulphuric acid being added, it gives off acetic vapours. The fluid being evaporated, what remains is completely destroyed by heat." (Ph. L.)

Uses, &c. Solution of acetate of ammonia is a very common and excellent febrifuge and diaphoretic, and, in large doses, aperient saline liquor. Taken warm, in bed, it generally proves a powerful sudorific; and as it operates without heat, it is much used in febrile and inflammatory disorders. Its action may likewise be determined to the kidneys, by walking about in the cold air. *Dose.* ½ to ¾ fl. oz., twice or thrice daily, either by itself or along with other medicines. *Externally*, as a discutient and refrigerant lotion; and diluted (1 *oz.* to 9 *oz.* of water), as a collyrium in chronic ophthalmia. For this last purpose it must be free from excess of ammonia.

4. (*Concentrated.*) Saturate *acetic acid*, sp. gr. 1·038, ½ gall., with *sesquicarbonate of ammonia* (in powder), 2½ *lb.*, or q. s.; carefully avoiding excess.—*Obs.* This article is in great demand in the wholesale drug trade, under the name of concentrated liquor of acetate of ammonia (*liq. ammon. acet. conc.*) It is very convenient for dispensing. 1 fl. dr. added to 7 fl. dr. of

water, forms the *liquor ammoniæ acetatis* of the Ph. L.

SOLUTION (Acetate of Lead). See *Solution of Diacetate of Lead.*

SOLUTION (Acetate of Morphia). Syn. *Liquor Morphiæ Acetatis,*—Ph. L. & D. *Prep.* 1. (Ph. L.) *Acetate of morphia,* 4 dr.; *acetic acid,* 15 drops; *distilled water,* 1 pint; *proof spirit,* ½ pint; mix, and dissolve. 60 drops (minims) contain 1 gr. of acetate of morphia. *Dose.* 5 to 15 or 20 drops.

2. (Ph. D.) *Acetate of morphia,* 82 gr.; *rectified spirit,* 5 fl. oz.; *distilled water,* 15 fl. oz. 120 drops (minims) contain 1 gr. of the acetate. *Dose.* 10 to 45 or 50 drops, or similar to that of tincture of opium.

3. (Magendie.) *Each* fl. dr. contains 1½ gr. of *acetate* (nearly). *Dose.* 5 to 15 drops. Anodyne, hypnotic, and narcotic; in those cases in which opium is inadmissible. See *Morphia.*

SOLUTION (Alum,—Compound). Syn. *Bate's Alum Water; Liquor Aluminis Compositus,*—Ph. L. *Aqua Aluminosa Composita,*—Ph. L. 1788. *A. A. Bateana,* &c. *Prep.* (Ph. L.) *Alum* and *sulphate of zinc,* of each, 1 oz.; *boiling water,* 3 pints; dissolve, and filter (if necessary). Detergent and astringent. *Used* as a lotion for old ulcer, chilblains, excoriation, &c.; and, largely diluted with water, as an eye-wash and injection.

SOLUTION (Ammonia). Syn. *Liquor of Ammonia, Water of do.; Liquor Ammoniæ,*—Ph. L. & D. *Aqua Ammoniæ,*——Ph. E. *A. A. Causticæ,*—Ph. D. 1826. See *page* 59.

SOLUTION (Ammonia,—Anisated). See *Spirits.*

SOLUTION (Ammonio-nitrate of Silver). Syn. *Hume's Test; Solutio Argenti Ammoniati,*—Ph. E. *Prep.* (Ph. E.) *Nitrate of silver* (pure crystallized), 44 gr.; *distilled water,* 1 fl. oz.; dissolve, and add *ammonia water,* gradually, until the precipitate, at first thrown down, is *very nearly,* but not *entirely,* redissolved. *Used* as a test for arsenious acid.

SOLUTION (Ammonio-sulphate of Copper). Syn. *Liquor Cupri Ammonio-sulphatis,*—Ph. L. *Cupri Ammoniati Solutio,* —Ph. E. *C. A. Aqua,*—Ph. D. 1826. *Solution of Ammoniated Copper; Blue Eye-water, Aqua Sapphirina, &c.,*—Obs. *Prep.* (Ph. L.) *Ammonio-sulphate of copper,* 1 dr.; *water,* 1 pint; dissolve, and filter. Stimulant and detergent. Applied to indolent ulcers, and when largely diluted, to remove specks on the cornea; also used as a test.

SOLUTION (for Anatomical Preparations, &c.) Syn. *Antiseptic Solution. Prep.* 1. Nearly saturate *water* with *sulphurous acid,* and add a little *creosote.*

2. Dissolve *chloride of tin,* 4 parts, in *water,* 100 parts, to which 3% of *hydrochloric acid* has been added.

3. Dissolve *corrosive sublimate,* 1 part; and *chloride of sodium,* 3 parts; in *water,* 100 parts, to which 2% of *hydrochloric acid* has been added.

4. Mix *liquor of ammonia* (strong) with 3 times its weight (each) of *water* and *rectified spirit.*

5. *Sal ammoniac,* 1 part; *water,* 10 or 11 parts. For the muscular parts of animals.

6. *Sulphate of zinc,* 1 part; *water,* 15 to 25 parts. For muscles, integuments, and cerebral masses.

7. (Dr. Babington.) *Wood naphtha,* 1 part; *water,* 7 parts; or *wood naphtha* undiluted, as an *injection.*

8. (Sir W. Burnett.) *Concentrated solution of chloride of zinc,* 1 *lb.*; *water,* 1 gall. The substances are immersed in the solution for 2 to 4 days, and then dried in the air.

9. (Gannal.) *Alum* and *culinary salt,* of each, ½ *lb.; nitre,* ¼ *lb.; water,* 1 gall.

10. (Goadsby.) *a.* From *bay salt,* 2 *oz.; alum,* 1 *oz.; bichloride of mercury,* 1 gr.; *water,* 1 pint. For ordinary purposes.

b. To the last add of *bichloride of mercury,* 1 gr.; *water,* 1 pint. For very tender tissues, and where there is a tendency to mouldiness.

c. From *bay salt,* ¼ *lb.; bichloride of mercury,* 1 gr.; *water,* 1 pint. For subjects containing carbonate of lime.

d. From *bay salt,* ¼ *lb.; arsenious acid,* 10 gr.; *water,* 1 pint; dissolve by heat. For old preparations.

e. To the last add of *bichloride of mercury,* 1 gr. As the last; when there is a tendency to the softening of parts; and, diluted, for *mollusca.* These solutions are approved of by Prof. Owen.

11. (M. Rèboulet.) *Nitre,* 1 part; *alum,* 2 parts; *chloride of lime,* 4 parts; *water,* 16 or 20 parts; to be afterwards diluted according to circumstances. For pathological specimens.

12. (Dr. Stapleton.) *Alum,* 2¼ *oz.; nitre,* 1 dr.; *water,* 1 quart. For pathological specimens.

13. (For *Feathers,*—Mr. Beasley.) *Strychnine,* 16 gr.; *rectified spirit,* 1 pint.

Obs. These fluids are used for preserving *anatomical preparations, objects of natural history, &c.,* by immersing them therein, in close vessels; or, for *temporary purposes*, applying them by means of a brush or pieces of rag. The presence of corrosive sublimate is apt to render animal substances very hard. See *Putrefaction.*

SOLUTION (Antiseptic). See *above.*

SOLUTION (Arsenical). Syn. *Mineral Solution; Solutio Arsenicalis, Solutio Mineralis,*—Lat. *Prep.* 1. (*De Valingin's.*) See *page* 950.

2. (Devergie.) As *solution of arsenite of potassa,* Ph. L., but of only 1-50th the strength, and *flavoured* with *compound spirit of balm,* and *coloured* to a deep rose with *cochineal.*

3. (Pearson.) *Arseniate of soda,* 4 gr.; *water,* 4 fl. oz.; dissolve. *Dose.* 10 to 30 drops during the day. (See *below.*)

SOLUTION (Arsenious Acid). See *Tasteless Ague Drop* (p. 340).

SOLUTION (Arsenite of Potassa). Syn. *Fowler's Mineral Solution; Liquor Potassæ Arsenitis,*—Ph. L. *Liquor Arsenicalis,*—Ph. E. D. & U. S. *Prep.* 1. (Ph. L. & E.) *Arsenious acid,* coarsely powdered, and *carbonate of potassa,* of each, 80 gr.; *distilled water,* 1 pint; boil until dissolved, and add, to the cold solution, *compound tincture of lavender,* 5 fl. dr.; *water,* q. s. to make the whole *exactly* measure a pint. Tonic, antiperiodic, and alterative. *Dose.* 4 or 5 drops, gradually and cautiously increased; in agues and various scaly skin diseases. It is preferably taken soon after a meal. See *Arsenious Acid, &c.*

SOLUTION (Bichloride of Mercury). Syn. *Solution of Corrosive Sublimate; Liquor Hydrargyri Bichloridi,*—Ph. L. *Prep.* 1. (Ph. L.) *Bichloride of mercury* and *sal ammoniac,* of each, 10 gr.; *water,* 1 pint; dissolve. *Dose.* As an *alterative,* 10 to 30 drops; as an *antisyphilitic,* ½ to 2 fl. dr., in simple or sweetened water. It must not be allowed to touch anything metallic. It also forms a most useful lotion in various skin diseases.

2. See *Lotions.*

SOLUTION (Bimeconate of Morphia). Syn. *Solutio Opii Bimeconas; Liquor Morphiæ Bimeconas,*—Lat. *Prep.* From *liquor opii sedativus,* agitated with a little *animal charcoal,* and filtered. It is a little stronger than the tincture of opium.

SOLUTION (Bleaching). See *page* 1160.

SOLUTION (Brandish's). See *page* 1164.

SOLUTION (Burnett's). See *pages* 330 and 1158.

SOLUTION (Carbonate of Ammonia). See *page* 1165.

SOLUTION (Carbonate of Potassa). Syn. *Oil of Tartar, Water of Subcarbonate of Potash; Liquor Potassæ Carbonatis,*—Ph. L. & D. *L. P. Subcarbonatis,*—Ph. L. 1824. *Potassæ Carbonatis Aqua,*—Ph. D. 1826. *Aqua Kali Præparati,*—Ph. L. 1788. *Aqua Kali,*—Ph. L. 1787. *Lixivium Tartari,*—Ph. L. 1746. *Liquamen Tartari* or *Oleum Tartari per deliquium,*—Ph. L. 1721. *Prep.* 1. (Ph. L.) *Carbonate of potassa,* 20 oz. (10 *oz.,*—Ph. D.); *water,* 1 pint; dissolve and filter (or decant). Sp. gr.—Ph. L., 1·473,—Ph. D., 1·310. *Dose.* 10 drops to 1 dr., as an antacid, &c.

2. (*Henry's.*) Sp. gr. 1·248; equivalent in *saturating power* to an equal measure of *sulphuric acid,* sp. gr. 1·135, or of *nitric acid,* sp. gr. 1·143, or of *hydrochloric acid,* sp. gr. 1·074. *Used* in assaying mineral waters, &c.

SOLUTION (Carbonate of Soda). Syn. *Subcarbonate of Soda Water; Sodæ Carbonatis Liquor,*—Ph. D. *Aqua Sodæ Carbonatis,*—Ph. D. 1826. *Prep.* 1. (Ph. D.) *Carbonate of soda* (in crystals), 1½ *oz.; distilled water,* 1 pint. Sp. gr. 1·026. *Dose.* ¼ to 1½ fl. oz., as an antacid; in heartburn, dyspepsia, &c.

2. (*Henry's.*) Sp. gr. 1·11; 2 measures are equal in saturating power to one of his *carbonate of potash water.*

SOLUTION (Chloride of Arsenic). Syn. *Liquor Arsenici Chloridi,*—Ph. L. *Prep.* (Ph. L.) *Arsenious acid* (in coarse powder), ½ dr.; *hydrochloric acid,* 1½ fl. dr.; *distilled water,* 1 fl. oz.; boil until the solution of the arsenious acid is complete, and, when cold, add enough *distilled water* to make the whole *exactly* measure a pint.

Obs. This is a mere solution of arsenious acid in dilute hydrochloric acid, no chloride being formed, and would, therefore, be more appropriately named "hydrochloric solution of arsenious acid" (*liquor acidi arseniosi hydrochloricus*). *Dose* and *uses;* same as those of *solution of arsenite of potassa.* (See *above.*)

SOLUTION (Chloride of Barium). Syn. *Solution of Muriate of Baryta, Liquor of do.; Liquor Barii Chloridi,*—Ph. L. & D. *Solutio Barytæ Muriatis,*—Ph. E. *Aqua B. M.,*—Ph. D. 1826. *Prep.* (Ph. L. & E.) Dissolve *chloride of barium,* 1 dr. (1 *oz.,*—Ph. D.), in *water,* 1 fl. oz. (8 *oz.,*—Ph. D.); and filter the solution. Sp. gr. (Ph. D.) 1·088. *Dose.* 5 drops, gradually increased to 10 or 12, twice or thrice daily; in scrofula, scirrhous affections, and worms; *externally,* largely diluted, as a lotion in scrofulous ophthalmia; also used as a *test* for sulphuric acid and the soluble sulphates.

Its *susceptibility* of the first is said to be fully 0·00009.

SOLUTION (Chloride of Calcium). Syn. *Solution of Muriate of Lime, Liquor do., Water of do.; Calcii Chloridi Liquor,*—Ph. D. & Ph. L. 1836. *Calcis Muriatis Solutio,*—Ph. E. *C. M. Aqua,*—Ph. D. 1826. *Prep.* 1. (Ph. L. 1836.) *Fused chloride of calcium,* 4 oz.; (*crystals,* 8 oz.,—Ph. E.); *water,* 12 fl. oz.; dissolve, and filter.

2. (Ph. D.) *Fused chloride of calcium,* 3 *oz.; water,* 12 *oz.* Sp. gr. 1·225. *Dose.* 10 drops to 1 dr., or more; in scrofulous and glandular diseases, &c.; also used as a test for sulphuric acid.

SOLUTION (Chloride of Lime). Syn. *Bleaching Liquid, Solution of Chlorinated Lime, Sol. of Hypochlorite of Lime; Solutio Calcis Hypochloris, Sol. Calcis Chloridi; Calcis Chlorinatæ Liquor,*—Ph. D. *Prep.* 1. (Ph. D.) *Chlorinated lime* (chloride of lime), ½ *lb.; water,* ½ gall.; triturate them together, then transfer the mixture to a stoppered bottle, and shake it repeatedly for the space of 3 hours; lastly, filter through calico, and preserve it in a well-stopped bottle.

2. *Chloride of lime* (dry and good, and rubbed to fine powder), 9 *lb.; tepid water,* 6 gall.; mix in a stoneware bottle capable of holding 8 gall., agitate frequently for a day or two, and after 2 or 3 days' repose, decant the clear portion, and keep it in well-corked bottles in a cool situation. If filtered it should be done as rapidly as possible, and only through *coarsely powdered glass* in a covered vessel.

Obs. The last is the usual strength sold in trade, under various attractive names, to give it importance. It is *used* as a disinfectant, bleacher, and fumigation; and, diluted with water, as a lotion, injection, or collyrium, in several diseases. See *Hypochlorite of Lime.*

SOLUTION (Chloride of Potash). Syn. *Javelle's Bleaching Liquid; Eau de Javelle; Liquor Potassæ Chloridi, Liquor Potassæ Chlorinatæ,*—Lat. *Prep.* 1. Dissolve *carbonate of potash,* 1 part; in *water,* 10 parts; and pass *chlorine gas* through the solution to saturation.

2. *Chloride of lime* (dry and good), 1 part; *water,* 15 parts; agitate them together for an hour; next dissolve of *carbonate of potash,* 2 *oz.,* in *water,* ¼ pint; mix the two solutions, and after a time either decant or filter. *Uses, &c.* As the last.

SOLUTION (Chloride of Soda). Syn. *Solution of Hypochlorite of Soda, Sol. of Oxymuriate of do., Sol. of Chloruret of Oxide of Sodium, Labarraque's Disinfecting Liquid; Solutio Sodæ Hypochloris; Hypochloris Sodicus Aqua Solutus,*—P. Cod. *Liquor Sodæ Chlorinatæ,*—Ph. L. & D. *Prep.* 1. (Ph. L.) *Carbonate of soda* (in crystals), 1 ℔; *water,* 1 quart; dissolve, and pass through the solution the chlorine evolved from a mixture of *common salt,* 4 oz.; *binoxide of manganese,* 3 oz.; *sulphuric acid,* 2½ fl. oz. (4 oz.,—Ph. L. 1836); diluted with *water,* 3 fl. oz.; placed in a retort; heat being applied to promote the action, and the gas being purified by passing through 5 fl. oz. of *water* before it enters the alkaline solution.

2. (Ph. D.) *Chlorinated lime,* ½ *lb.;* and *water,* 3 pints; are triturated together in a marble mortar, after which the mixture is transferred to a stoppered bottle, agitated frequently during three hours, and then filtered through calico; in the mean time *carbonate of soda* (cryst.), 7 *oz.;* is dissolved in *water,* 1 pint; the two solutions are next mixed, and, after agitation for about 10 minutes, the whole is filtered as before; the filtrate is to be preserved in a well-stopped bottle.

Obs. This solution is *used* as an antiseptic, disinfectant, and bleaching liquid. *Dose.* 20 to 30 drops, in any bland fluid, in scarlet fever, sore-throat, &c.; it is also made into a lotion, gargle, injection, and eye-water. Meat in a nearly putrid state, unfit for food, is immediately restored by washing or immersion in this liquid.

SOLUTION (Chlorine.) Syn. *Chlorine Water; Solutio Chlorinii; Liquor Chlorinii,*—Ph. L. & D. *Chlorinei Aqua,*—Ph. E. *Aqua Chlorinii,*—Ph. D. 1826. *Prep.* 1. (Ph. L.) On *binoxide of manganese* (in powder), 2 dr., placed in a retort, pour *hydrochloric acid,* 1 fl. oz., and pass the *chlorine* into *distilled water,* ½ pint, until it ceases to be evolved.

2. (Ph. E.) *Muriate of soda,* 60 gr.; *red oxide of lead,* 350 gr.; triturate them together, and put them into 8 fl. oz. of *distilled water,* contained in a stoppered bottle; then add of *sulphuric acid,* 2 fl. dr.; and having replaced the stopper, agitate the whole, occasionally, until the oxide of lead turns *white;* lastly, after subsidence, pour off the clear liquid into another stoppered bottle.

3. (Ph. D.) Introduce into a gas bottle *peroxide of manganese* (in fine powder), ½ *oz.;* add of *hydrochloric acid,* 3 fl. oz.; (diluted with) *water,* 2 fl. oz.; apply a gentle heat, and cause the evolved gas to pass through *water,* 2 fl. oz., and then into a 3-pint bottle containing *distilled water,* 20 fl. oz.; and whose mouth is loosely plugged with tow; when the air has been

entirely displaced by the chlorine, cork the bottle loosely, and shake it until the chlorine is absorbed; it should now be transferred to a pint stoppered bottle, and preserved in a dark and cool place.

Prop., &c. Irritant and acrid, but, when largely diluted, stimulant and antiseptic. *Dose.* ½ to 2 fl. dr., in ½ pint of water, sweetened with a little sugar, in divided doses, during the day; in scarlatina, malignant sore-throat, &c. On the *large scale*, liquid chlorine may be procured by passing the gas obtained by any of the methods named under "*Chlorine*," into *water*, until it will absorb no more.

SOLUTION (Citrate of Ammonia). Syn. *Liquor Ammoniæ Citratis*,—Ph. L. *Prep.* (Ph. L.) Dissolve *citric acid*, 3 oz.; in *distilled water*, 1 pint; and to the solution add of *sesquicarbonate of ammonia* (in powder), 2½ oz., or. q. s. to exactly neutralize the liquor. *Qual., uses, & doses*, similar to those of the acetate. (See *p.* 1157.)

SOLUTION (Citrate of Magnesia). Syn. *Solutio Magnesiæ Citratis*,—Lat. See *page* 737.

SOLUTION (Citrate of Morphiæ). Syn. *Liquor Morphiæ Citratis, Solutio M. C.*,—Lat. *Prep.* (Magendie.) *Pure morphia*, 13 gr.; *citric acid*, 8 or 10 gr.; *water*, 1 fl. oz.; *tincture of cochineal*, 2 fl. dr. *Dose.* 3 to 12 drops.

SOLUTION (Citrate of Potassa). See *Citrate of Potassa & Powders.*

SOLUTION (Copaiba). See *page* 1165.

SOLUTION (Corrosive Sublimate). See *page* 1159.

SOLUTION (Cosmetic). See *Lotions & Washes.*

SOLUTION (Diacetate of Lead). Syn. *Liquor of Diacetate of Lead, Goulard's Extract; Liquor Plumbi; Liquor Plumbi Diacetatis*,—Ph. L. *Plumbi Diacetatis Solutio*,—Ph. E. *Plumbi Subacetatis Liquor*,—Ph. D. & Ph. L. 1824. *Liq. P. Acetatis*,—Ph. L. 1809. *Aqua Lythargyri Acetatis*,—Ph. L. 1788. *Extract of Lead, Extractum Saturni*,—Obs. *Prep.* 1. (Ph. L.) *Acetate of lead*, 27 oz.; *litharge*, in fine powder, 16 oz.; *water*, 3 quarts; boil for ½ an hour, constantly stirring, and then add enough *distilled water* to make the whole measure 3 quarts; lastly, filter, if required, and keep it in a closed vessel. The proportions ordered in the Ph. E. are similar. Sp. gr. 1·260.

2. (Ph. D.) *Acetate of lead*, 6 *oz.; litharge*, 4 *oz.; distilled water*, 1 quart; boil, &c., as before; to produce 1 quart. Sp. gr. 1·066.

3. (*Wholesale.*) From *finely powdered litharge*, 32 *lb.; distilled vinegar*, 32 gall.; boil in a perfectly bright copper pan for 2 hours, cool, add water to make up 32 gall., again simmer for 1 minute, cover up the vessel, and in an hour decant the clear portion. Common *trade strength.* (See *below.*)

SOLUTION (Diacetate of Lead,—Dilute). Syn. *Goulard, Goulard's Lotion* or *Water, Goulard's Vegeto-mineral do.; Liquor Plumbi Diacetatis Dilutus*,—Ph. L. *Plumbi Subacetatis Liquor Compositus*,—Ph. D. *Water of Saturn, Aqua Goulardii, A. Saturni, A Vegeto-mineralis Goulardii*,—Obs. var. *Prep.* 1. (Ph. L.) *Liquor of diacetate of lead*, 1½ fl. dr.; *proof spirit*, 2 fl. dr.; *distilled water*, 1 pint; mix.

2. (Ph. D.) *Solution of subacetate of lead* and *proof spirit*, of each, 2 fl. oz.; *distilled water*, ½ gall.; mix, filter, and preserve it in a well-stopped bottle.

Obs. Both the above preparations were formerly made with common vinegar, and hence were coloured, but those of the Pharm. are white. If wanted coloured, a little spirit colouring may be added. The formula No. 3 will take a quart. The *stronger liquor* is only used diluted; and the *dilute solution* is now seldom prepared by the wholesale druggist. The last (*diluted solution*) is employed as a sedative, refrigerant, and astringent wash, in various affections. Both are *poisonous*. For the *antidotes*, see *Lead.*

SOLUTION (Donovan's). See *page* 1161.

SOLUTION (Ergot,—Essential). See *Essences.*

SOLUTION (Escharotic—Freyburg's). Syn. *Solutio Escharotica*,—Lat. *Prep.* From *camphor*, 30 gr.; *corrosive sublimate*, 60 to 100 gr.; *rectified spirit*, 1 fl. oz.; dissolve. In syphilitic vegetations, and, especially, condylomes. It is spread over the diseased surface, either at once, or after the application of a ligature.

SOLUTION (Evaporating). See *Lotions.*

SOLUTION (Flints). Syn. *Liquor of Flints, Oil of do.; Liquamen Silicum, Liquor Potassæ Silicatis*,—Lat. *Prep.* 1. *Soluble glass* dissolved in *water.*

2. (Bate.) *Powdered quartz*, 1 part; *dry carbonate of potash*, 2 parts (3 parts;—Turner); triturate them together, fuse the mixture in a Hessian crucible, and allow the resulting glass to deliquesce by exposure in a damp situation. *Dose.* 5 or 6 to 30 drops; in gouty concretions, stone, &c. "It resolves the stone, and opens obstructions." (See *p.* 529.)

SOLUTION (Gannal's). See *page* 1158.

SOLUTION (Goadsby's). See *page* 1158.

SOLUTION (Goulard's). See *above.*

SOLUTION (Hahnemann's Prophylactic.)

Syn. *Liquor Belladonnæ, Solutio Prophylactica,*—Lat. *Prep.* From *extract of belladonna* (alcoholic), 3 gr.; *distilled water,* 6 fl. dr.; *rectified spirit,* 2 fl. dr.; dissolve. *Used* against scarlet fever. *Dose.* 2 or 3 drops for a child under 12 months; and an additional drop for every year above that age to maturity.

SOLUTION (Hydriodate of Arsenic and Mercury). Syn. *Donovan's Solution; Solutio Arsenici et Hydrargyri Iodidi; Arsenici et Hydrargyri Hydriodatis Liquor,*—Ph. D. *Prep.* 1. (Mr. Donovan.) Triturate *metallic arsenic,* 6·08 gr.; *mercury,* 15·38 gr.; and *iodine,* 50 gr.; with *alcohol,* 1 fl. dr., until dry; to this add, gradually, of *distilled water,* 8 fl. oz., and again well triturate; next put the whole into a flask, add of *hydriodic acid,* ½ fl. dr.; and boil for a few moments; lastly, when cold, add *distilled water,* q. s. to make the whole measure exactly 8 fl. oz.

2. (Ph. D.) *Pure arsenic,* (in fine powder), 6 gr.; *pure mercury,* 16 gr.; *pure iodine,* 50½ gr.; *alcohol,* ½ fl. dr.; triturate, as before, add, gradually, of *water,* 8 fl. oz.; heat the mixture until it begins to boil, and, afterwards, make up the cold and filtered solution to exactly 8 fl. oz. 6 fl. dr.

3. (*Wholesale.*) From *metallic arsenic,* 61 gr.; *iodine,* 500 gr.; *mercury,* 154 gr.; *rectified spirit,* 1½ fl. oz.; *distilled water,* 2 quarts; *hydriodic acid,* 5 fl. dr.; as No. 1; the *product* being made up with *distilled water* so as to measure *exactly* 4 pints, or 80 fl. oz.; or to weigh 5 *lb.* 1¼ *oz.* (av.), when cold.

Obs. Great care must be taken that the whole of the arsenic be dissolved, which can only be effected by the most careful trituration. Soubeiran recommends the employment of 1 part, each, of the *respective iodides,* with 98 parts of *water,* as furnishing a simpler and equally effective product; proportions which are *almost* exactly those employed by Mr. Donovan. *Dose.* 10 to 30 drops, twice or thrice a day, preferably soon after a meal; in lepra, psoriasis, lupus, and several other scaly skin diseases. It is a most valuable medicine in these affections.

SOLUTION (Hydriodate of Potassa). See *Solution of Iodide of Potassium.*

SOLUTION (Hydrochlorate of Morphia.) Syn. *Solution of Muriate of Morphiæ; Liquor Morphiæ Hydrochloratis,*—Ph. L. *Solutio Morphiæ Muriatis,*—Ph. E. *Morphiæ Muriatis Liquor,*—Ph. D. *Prep.* 1. (Ph. L.) *Hydrochlorate of morphia,* 4 dr.; *proof spirit,* ½ pint; *distilled water,* 1 pint; dissolve by the aid of a *gentle* heat. 60 drops (minims) of this solution contain 1 gr. of hydrochlorate of morphia. *Dose.* 5 to 15 or 20 drops.

2. (Ph. E. & D.) *Muriate of morphia,* 90 gr.; *rectified spirit,* 5 fl. oz.; *distilled water,* 15 fl. oz. 107 drops (minims) contain 1 gr. of the hydrochlorate. *Dose.* 10 to 30 or 40 drops, or nearly as laudanum.

3. (Apothecaries' Hall.) *Muriate of morphia,* 16 gr.; *rectified spirit,* 1 fl. dr.; *water,* 1 fl. oz.; 30 drops (minims) contain 1 gr. *Dose.* 3 to 10 drops. See *Solution of Acetate of Morphia, &c.*

SOLUTION (Hydrosulphuret of Ammonia.) Syn. *Ammoniæ Hydrosulphuretum,*—Ph. D. *Ammoniæ Hydrosulphas,*—Ph. U. S. See *page* 60.

SOLUTION (Hypochlorite of Lime). See *page* 1160.

SOLUTION (Iodide of Arsenic). Syn. *Liquor Arsenici Periodidi,*—Lat. *Prep.* (Wackenroder.) Each *drachm* contains ⅛ gr. of *teriodide of arsenic;* equivalent to $\frac{1}{48}$ gr. of *metallic arsenic,* and $\frac{1}{10}$ gr. (nearly) of *iodine.* (See *p.* 86.)

SOLUTION (Iodide of Potassium,—Compound). Syn. *Ioduretted Water, Compound Solution of Iodine; Liquor Potassii Iodidi Compositus,*—Ph. L. & D. *Liquor Iodinei Compositus,*—Ph. E. *Prep.* 1. (Ph. L. & D.) *Iodide of potassium,* 10 gr.; *iodine,* 5 gr.; *water,* 1 pint; dissolve. *Dose.* 1 to 6 dr.; in the usual cases where iodine is employed.

2. (Ph. E.) *Iodide of potassium,* 1 oz.; *iodine,* 2 dr.; *water,* 16 fl. oz. This is 30 times as strong as the preceding. *Dose.* 5 to 20 drops.

3. (*Lugol's.*) See *Lotions,* and *Baths* (Ioduretted).

SOLUTION (Iodine). See *above.*

SOLUTION (Iodohydrargyrate of Iodide of Potassium). Syn. *Liquor Iodohydrargyratis Potassii Iodidi,*—Lat. *Prep.* 1. (Dr. Channing.) *Iodide of potassium,* 3½ gr.; *biniodide of mercury,* 4½ gr.; *distilled water,* 1 fl. oz.; dissolve. *Dose.* 2 to 5 or 6 drops, three times a day, much diluted; in dyspepsia, indurations, enlargement of the spleen, dropsy, &c. (See *p.* 781.)

SOLUTION (Iron,—Alkaline). Syn. *Liquor Ferri Alkalini,*—Ph. L. 1824. *Prep.* (Ph. L. 1824.) *Iron filings,* 2½ dr.; *nitric acid,* 2 fl, oz,; *water,* 6 fl. oz.; dissolve, decant, gradually add of *solution of carbonate of potash,* 6 fl. oz.; and in 6 hours decant the clear portion. This was intended as an imitation of Stahl's *tinctura martis alkalina.* It is tonic, emmenagogue, &c. *Dose.* 20 to 60 drops.

SOLUTION (Javelle's). See *page* 1160.

SOLUTION (Labarraque's). See *page* 1160.

SOLUTION (Lime). Syn. *Lime Water; Solutio Calcis Hydratis; Liquor Calcis,*—Ph. L. & D. *Aqua Calcis,*—Ph. E. *Prep.* (Ph. L.) Upon the *lime*, ½ *lb.;* first slaked (by sprinkling it) with a *little* of the water, pour the remainder of *water*, 12 pints; and shake them well together (for 5 minutes, —Ph. D.); immediately cover the vessel, and set it aside for three hours; then keep the solution *with the remaining lime* (equally divided) in stoppered glass vessels, and when it is to be used, decant the required portion from the clear solution, (replacing it with *more water*, and agitating briskly, as before;—Ph. E.)

Obs. Cold water dissolves more lime than hot water. 1 pint of water at 32° Fahr. dissolves 13¼ gr., at 60° it dissolves 11½ gr., but at 212°, only 6½ gr. (Phillips.)

Uses, &c. Lime water is antacid, astringent, antilithic, tonic, and vermifuge. *Dose.* A wine-glassful, or more, 2 or 3 times a day, in milk or broth; in dyspepsia, diarrhœa, calculous affections, &c.; and *externally*, as a detersive and discutient lotion.

SOLUTION (Mackenzie's). *Prep.* From *nitrate of silver*, 20 gr.; dissolved in *distilled water*, 1 fl. oz. *Used* to wash the throat and fauces, and to sponge the trachea, in affections of those parts.

SOLUTION (Magnesia). Syn. *Aerated Magnesia Water, Carbonated do., Fluid Magnesia, Condensed Solution of do., Concentrated do. do.; Liquor Magnesiæ Bicarbonatis, Aqua M. Carbonatis,*—Lat. *Eau Magnesienne,*—Fr. *Prep.* (Dinneford's.) *Water* and *Howard's heavy carbonate of magnesia*, in the proportion of 17½ gr. of the *latter* to every *fl. oz.* of the *former*, are introduced into a cylindrical tinned copper vessel, and *carbonic acid*, generated by the action of *sulphuric acid* on *whiting*, is forced into it by steam power, for 5½ hours, during the whole of which time the cylinder is kept in motion. Sir J. Murray's is similar. The Paris Codex orders *recently precipitated carbonate of magnesia* to be used while still moist. Antacid and laxative. See *Fluid Magnesia.*

SOLUTION (Mineral). See *page* 1159.

SOLUTION (Morphia). See *pages* 1158, 1162, and 1166.

SOLUTION (Muriate of Baryta). See *page* 1159.

SOLUTION (Muriate of Lime). See *page* 1160.

SOLUTION (Muriate of Morphia). See *page* 1162.

SOLUTION (Nitrate of Baryta.) Syn. *Solutio Barytæ Nitratis,*—Ph. E. *Prep.* (Ph. E.) *Nitrate of baryta*, 40 gr.; *water*, 800 gr.; dissolve. *Used* as a test for sulphuric acid and the soluble sulphates.

SOLUTION (Nitrate of Silver). Syn. *Liquor Argenti Nitratis,*—Ph. L. *Solutio A. N.,*—Ph. E. *Prep.* (Ph. L.) *Nitrate of silver* (cryst), 1 dr. (40 gr.,—Ph. E.); *distilled water*, 1 fl. oz. (1600 gr.,—Ph. E.); dissolve. *Used* as a test for chlorine, hydrochloric acid, and the soluble chlorides; also used as an escharotic, &c. It should be kept from the light. See *Lotions*, (and *p.* 1139.)

SOLUTION (Opium,—Sedative. See *Liquors.*

SOLUTION (Oxalate of Ammonia). Syn. *Liquor Ammoniæ Oxalatis,*—Lat. *Prep.* Dissolve *oxalate of ammonia* in 10 or 12 times its weight of *pure water. Used* as a test for lime.

SOLUTION (Oxysulphate of Iron). Syn. *Liquor Ferri Oxysulphatis,*—Lat. *Prep.* From *sulphate of iron* (in powder), and *nitric acid*, of each, 3 dr.; triturated together for 15 minutes, and then dissolved in *distilled water*, 1½ fl. oz. *Dose.* 5 or 6 to 12 drops.

SOLUTION (Pernitrate of Iron). Syn. *Solution of Persesquinitrate of Iron; Ferri Pernitras Liquor,*—Ph. D. *Solutio Persesquinitratis Ferri,*—Kerr. *Prep.* (Ph. D.) Take of *pure nitric acid*, 3 fl. oz.; *water*, 16 fl. oz.; mix, add *fine iron-wire*, 1 *oz.;* dissolve, and to the clear solution add as much *water* as will make the whole measure 1½ pint. Sp. gr. 1·107. *Dose.* 5 or 6 to 30 drops, or more; in passive hæmorrhages, mucous discharges, chronic diarrhœa with prostration, &c.

SOLUTION (Phosphate of Soda). Syn. *Solutio Sodæ Phosphatis,*—Lat. *Prep.* (Ph. E.) *Crystallized phosphate of soda*, 175 gr.; *water*, 8 fl. oz.; dissolve and keep it in a corked bottle. *Used* as a test for the salts of lead and magnesia.

SOLUTION (for Plate). Syn. *Plate Liquor; Solutio pro Argento,*—Lat. *Prep.* From *alum*, *cream of tartar*, and *common salt*, of each, 1 *oz.; water*, ½ gall.; dissolve. *Used* to increase the lustre and whiteness of silver plate, the articles being boiled in it.

SOLUTION (Potassa). Syn. *Liquor of Potassa, Potash Water, Caustic do. do.; Liquor Potassæ,*—Ph. L. *Aqua Potassæ,* —Ph. E. *Potassæ Causticæ Liquor,*—Ph. D. *Aq. Potassæ Causticæ,*—Ph. D. 1826. *Aqua Kali Puri,*—Ph. L. 1788. *Lixivium Saponarium,*—Ph. L. 1746. *Aqua Kali*

Causticum, Lixivium Causticum, Potassæ Pura Liquida,—Obs. var. *Prep.* 1. (Ph. L.) *Lime* (recently burnt), 8 oz.; *boiling distilled water*, 1 gall.; sprinkle a little of the water on the lime in an earthen vessel, and when it is slaked and fallen to powder, add of *carbonate of potash,* 15 oz., dissolved in the remainder of the water; bung down, and shake frequently, until the mixture is cold, then allow the whole to settle, and decant the clear supernatant portion into perfectly clean and well-stoppered green-glass bottles. Sp. gr. 1·063. It contains 6·7% of pure potassa.

2. (Ph. E.) *Carbonate of potash* (dry), 4 oz.; *quicklime,* 2 oz.; *water,* 45 fl. oz.; boiling briskly for a few minutes after each addition of the milk of lime; to yield at least 35 fl. oz., by decantation, after 24 hours' repose in a deep narrow glass vessel. Sp. gr. 1·072.

3. (Ph. D.) *Pure carbonate of potassa,* 1 *lb.; distilled water,* 1 gall.; dissolve, heat the solution to the boiling point in a clean iron vessel, gradually add to it of *fresh quicklime,* 10 *oz.;* previously slaked with *water,* 7 fl. oz.; and continue the ebullition for 10 minutes, with constant stirring; next allow it to cool out of contact with the air, and when perfectly clear decant it by means of a syphon, and bottle it as before. Sp. gr. 1·068.

4. (Wöhler.) *Nitrate of potassa,* 1 part; is mixed, in alternate layers, with *clippings of sheet copper*, 2 or 3 parts; and then heated to moderate redness for about ½ an hour in a *copper* or *iron crucible;* when cold, the *potassa* is washed out with *distilled water,* and the solution, after repose in a closed vessel, decanted as before. Not a trace of copper can be detected in the liquid. The *clippings* may be again used if mixed with a little fresh metallic copper. (*Annalen der Chemie und Pharm.*)

5. (*Wholesale.*) From *carbonate of potash* (kali), 1 *lb.*, and *quicklime,* ½ *lb.*, to each gall. of *water.*

6. (*Brandish's Alkaline Solution; Liquor Potassæ Brandishii.*) From *American pearl-ashes,* 6 ℔; *quicklime* and *woodashes* (from the ash), of each, 2 ℔; *boiling water,* 6 gall. (*old meas.*); to each gall. of the clear product is added 12 or 15 drops of *oil of juniper.* This "solution" is much asked for in trade. Ordinary liquor of potassa is generally sold for it.

7. (*Henry's Pure Potash Water.*) Sp. gr. 1·100. *Two* measures possess the same saturating powers as *one* of his carbonate of potash water. *Used* in testing.

Pur. "Nothing, or scarcely anything, is thrown down from this solution on the addition of lime-water; and when it has been first saturated by nitric acid, no precipitate falls on the addition of carbonate of soda, chloride of barium, or nitrate of silver. What is thrown down by bichloride of platinum is yellowish." (Ph. L.)

Assay. 1. See *Alkalimetry.*

2. From the specific gravity, as follows:—

TABLE *of the Densities and Value in Real Alkali of different Solutions of Hydrate of Potassa.* By Dr. DALTON.

Density.	Per centage of real alkali.	Density.	Per centage of real alkali.
1·68	51·2	1·33	26·3
1·60	46·7	1·28	23·4
1·52	42·9	1·23	19·5
1·47	39·6	1·19	16·2
1·44	36·8	1·15	13·0
1·42	34·4	1·11	9·5
1·39	32·4	1·06	4·7
1·36	29·4		

Uses, &c. Liquor of potassa is antacid, diuretic, resolvent, and lithontriptic. *Dose.* 10 to 30 or 40 drops, in any bland diluent (not acidulous); in heartburn, gout, calculi, indurations, scrofula, lepra, psoriasis, &c.

Obs. Quick-lime fails to abstract the carbonic acid from the alkaline carbonates in solutions much stronger than those above referred to. Weaker solutions may, however, be easily concentrated by evaporation in iron vessels. See *Hydrate of Potassa.*

SOLUTION (Potassa, — Effervescing). Syn. *Potash Water* (Effervescing), *Supercarbonate of Potash do.; Aqua Potassæ Effervescens,* — Ph. E. *A. P. Supercarbonatis,* — Ph. E. 1839. *Liquor P. Eff.,*— Ph. L. 1836. *Prep.* (Ph. L. & E.) *Bicarbonate of potash,* 1 dr.; *distilled water,* 1 pint; dissolve, force in *carbonic acid gas,* in excess, and keep it in a well-stoppered bottle. Resembles soda water, but sits better on the stomach. It is almost specific in the early stages of scurvy. An excellent *substitute* for *this preparation* is to pour a *bottle of soda water* into a tumbler containing 20 gr. of *powdered bicarbonate of potash,* and to drink it immediately.

SOLUTION (Potassio-tartrate of Antimony). Syn. *Solutio Antimonii Potassio-tartratis; Antimonii Tartarizati Liquor,*— Ph. D. *Prep.* (Ph. D.) *Tartarized antimony,* 1 *dr.; rectified spirit,* 7 fl. oz.; *dis-*

tilled water, 1 pint; dissolve. *Strength, doses,* and *uses,* similar to those of *antimonial wine* (which see); than which it keeps better.

SOLUTION (Prophylactic). See *page* 1161.

SOLUTION (Sesquicarbonate of Ammonia). Syn. *Solution of Carbonate of Ammonia; Carbonate of Ammonia Water; Liquor Ammoniæ Sesquicarbonatis,* —Ph. L. *Aqua Ammoniæ Carbonatis,* —Ph. E. *Liq. Ammoniæ Subcarbonatis,*—Ph. L. 1824. *L. A. Carbonatis,*—Ph. L. 1809. *Aqua Ammoniæ,*—Ph. L. 1788. *Spiritus Salis Ammoniaci,* — Ph. L. 1746. *Prep.* 1. (Ph. L. & E.) *Sesquicarbonate of ammonia,* 4 oz.; *distilled water,* 1 pint; dissolve. Stimulant and antacid. *Dose.* $\frac{1}{2}$ to 1 fl. dr., in water.

2. (*Henry's.*) Sp. gr. 1·046. *Two* measures are equal in saturating power to *one* of his carbonate of potash water. *Used* in analysis.

SOLUTION (Silicate of Potassa). See *Solution of Flints.*

SOLUTION (Soda). Syn. *Liquor of Soda, Caustic Soda Water; Liquor Sodæ,*—Ph. L. *Sodæ Causticæ Liquor,*—Ph. D. *Prep.* 1. (Ph. L.) *Carbonate of soda* (cryst.), 32 oz.; *lime,* 9 oz.; *boiling distilled water,* 1 gall.; proceed as for *solution of potassa.* "In 100 gr. are contained 1 gr. of (*pure*) soda." (Ph. L.) Sp. gr. 1·061.

2. (Ph. D.) *Carbonate of soda* (cryst.), 2 *lb.; fresh-burned lime,* 10 *oz.; water,* 1 gall. 7 fl. oz.; as *liquor of potassa.* Sp. gr. 1·056.

3. (*Henry's.*) Sp. gr. 1·07. It has the same saturating power as his carbonate of soda water. *Used* in testing.

Obs. The strength of a *solution of caustic soda* may be determined from its *density,* and, more correctly, by its *saturating power.* See *Alkalimetry,* and the following Table by Dr. Dalton.

TABLE *of the Density of Solutions of Caustic Soda.*

Density.	Per centage of real soda.	Density.	Per centage of real soda.
2·00	77·8	1·40	29·0
1·85	63·6	1·36	26·0
1·72	53·8	1·32	23·0
1·63	46·6	1·29	19·0
1·55	41·2	1·23	16·0
1·50	36·8	1·18	13·0
1·47	34·0	1·12	9·0
1·44	31·0	1·06	4·7

SOLUTION (Soda,—Effervescing). Syn. *Soda Water; Liquor Sodæ Effervescens,*—Ph. L. 1836. *Aqua S. E.,*—Ph. E. *A. S. Supercarbonatis,*—Ph. E. 1839. *Sodæ Carbonatis Aqua Acidula,* — Ph. D. 1826. *Prep.* (Ph. E.) *Bicarbonate of soda,* 1 dr.; *distilled water,* 1 pint; dissolve, and force *carbonic acid gas* into the solution, under pressure. *Used* as an antacid and grateful stimulant, often proving gently laxative. The *soda water* of *the shops* cannot be substituted for this preparation, as, in opposition to its name, it is usually made *without* soda.

SOLUTION (Soldering). *Prep.* Dissolve *zinc* in *hydrochloric acid* nearly to saturation, add 1-5th part of *powdered sal ammoniac,* and simmer for 5 minutes. *Used* to make solder flow easily and take well; applied with a feather.

SOLUTION (Specific,—Frank's). Syn. *Specific Solution of Copaiba; Liquor Copaibæ Alkalina,* — Lat. *Prep.* Take of *balsam of copaiba,* 2 parts; *liquor of potassa* (Ph. L.), 3 parts; *water,* 7 parts; boil the mixture for 2 or 3 minutes, put it into a *separator,* and allow it to stand for 5 or 6 days; then draw it off from the bottom, avoiding the upper stratum of oil, and to the *clear liquid* add of *sweet spirit of nitre* (perfectly free from acid), 1 part; should it turn foul or milky, a *very little* liquor of potassa will usually brighten it; if not, place it in a *clean separator,* and let it stand, closely covered, for a few days, and then draw it off from the bottom as before, when it will be *perfectly transparent,* without filtering. *Some persons* add the *sweet spirit of nitre* whilst the solution is still warm, mix it in as rapidly as possible, and immediately cork or fasten up the vessel. This is a good way when the article is wanted in a hurry, but is objectionable from the loss of spirit thereby occasioned, and the danger, without care, of bursting the separator.

Obs. A receipt for this article, upon the authority of Battley, has been going the round of the pharmaceutical works for many years. It is as follows:—"Take 12 oz. of *balsam of copaiba,* and 6 oz. of *calcined magnesia;* rub together, add a pint of *proof spirit,* filter, and then add $\frac{1}{2}$ oz. of *sweet spirits of nitre.*" (*Gray's Supplement.*) The product of this formula, utterly unlike "*Frank's Specific Solution,*" is a colourless tincture, scarcely flavoured with copaiba, and holding very little of the active matter of the balsam in solution, owing to the compound formed with the magnesia being *insoluble* in spirit. Such is the affinity of this earth for copaiba (*copaibic acid*), that it will even take it from caustic potassa. See *Copaiba* and its *preparations*.

SOLUTION (Subacetate of Lead). See *page* 1161.

SOLUTION (Sulphate of Morphia). Syn. *Liquor Morphiæ Sulphatis*,—Lat. *Prep.* From *sulphate of morphia*, as the *solution* of the *acetate* or *hydrochlorate*. The *uses, doses, &c.*, are the same.

SOLUTION (Sulphate of Zinc,—Compound). See *Compound Solution of Alum.*

SOLUTION (Sulphuret of Potassium). Syn. *Solution of Hydrosulphate of Potash; Solutio Potassii Sulphureti, Liquor Potassæ Hydrosulphatis; Aqua Potassæ Sulphureti.* (P. D.) *Prep.* Take of *washed sublimed sulphur*, 1 part; *water of caustic potassa*, 11 parts; mix, boil for 10 minutes, filter, and keep the solution in well-closed bottles. Sp. gr. 1·117. The *product* is a mixed solution of hydrosulphate and hyposulphite of potassa. *Dose.* 10 to 60 drops, diluted in water; and, *externally*, made into a lotion; in itch, and several other eruptive diseases.

SOLVENT. Syn. *Menstruum*,—Lat. The liquid in which any substance is dissolved. The substance dissolved is, occasionally, called the *solvend*. (Kirwan.)

SOLVENT (Glazier's). Syn. *Glazier's Pickle.* From *soft soap* dissolved in thrice its weight of strong *soaper's lye;* or, from *freshly slaked lime* made into a thin paste or cream with twice its weight of *pearlash* dissolved in a little *water*. Very caustic. *Used* to soften old putty, and to remove old paint.

SOLVENT MINERAL (Valangin's). See *page* 950.

SOOT. Syn. *Fuligo*,—Lat. *Wood soot* was formerly officinal, and reputed vermifuge and antiseptic. The *soot* from *pitcoal* contains, besides empyreumatic matter, sulphate of ammonia; hence, it is valuable as a manure, when not too freely applied. It is also employed by gardeners to kill insects.

SOPORIFICS. Hypnotics (which see).

SORBIC ACID. Malic acid obtained from the *berries* of the *sorbus aucuparia* (Linn.) or *mountain ash.*

SOUJEE. Syn. *Soojee.* A species of semolina. *Semoletta* (*semola rarita*) is a still smaller variety of *pearled wheat*, separated from the others by means of a sieve. Baster's *soojee* is said to be a mixture of ordinary *wheat-flour* and *sugar*.

SOUR-KROUT. This is either eaten as a pickle, or stewed in its *own juice* with *bacon, pork*, or other *fat meat*. It is laxative and antiscorbutic. The value of *sauer-kraut* in scurvy was noticed by Capt. Cook. (See *p.* 1125.)

SOUP. A strong decoction of *flesh*, properly *seasoned* with *salts, spices, &c.*, for the table. The different tastes of people require more or less of the *flavour of spices, salt, garlic, butter, &c.*, which can, therefore, never be ordered by general rules. If the cook has not a good taste, and attention to that of his or her employers, not all the ingredients which nature and art can furnish will give an exquisite flavour to the dishes. The *proper articles* should be always at hand, and must be proportioned until the true zest be obtained. A variety of flavours may be given to different dishes served at the same time, or even to the same soup, by varying the *condiments* and *spices*. At a Parisian restaurant *one cauldron* is made to produce almost every imaginable variety of soup.

SOUP (Portable). Syn. *Glaze.* From *shin of beef*, or other like part; the soup being gently simmered until reduced to the consistence of a thin syrup, and then poured into small upright jelly-pots, with covers, or, upon flat dishes, to lie about ¼ inch deep. The latter, when set, is divided into pieces, which are dried. *Used* to make *extemporaneous soup* and *glazes*. A similar article, prepared on the *large scale*, now generally forms part of every ship's stores.

SOURING. See *Malt-liquors* and *Wines.*

SOY. Genuine soy is a species of thick black sauce, imported from China. *Prep.* Take of the *seeds of dolichos soja* (white haricots or kidney beans may be used for them), 1 gall.; boil them in *water*, q. s., until soft, add of *bruised wheat*, 1 gall., and keep the mixture in a warm place for 24 hours; then add of *common salt*, 1 gall.; *water*, 2 gall.; put the whole into a stone jar, and bung it up loosely for two or three months, shaking it very frequently during the whole time; lastly, press out the liquor and bottle it; the residuum may be treated afresh with *water* and *salt*, for soy of an inferior quality.

Obs. The soy of the shops, is, in nine cases out of ten, a spurious article made in this country, by simply saturating *molasses* or *treacle* with *common salt*. A better, and a really wholesome imitation is made as follows:—*Malt syrup*, 1 gall. (or, 13½ *lb.*); *treacle*, 5 *lb.; salt*, 4¼ *lb.; mushroom juice*, 1 quart; mix, with a gentle heat, and stir until the union is complete; in a fortnight decant the clear portion.

SPANIOLITMINE. See *page* 381.

SPANISH FLIES. See *Cantharides.*

SPARADRAP. Syn. *Sparadrapum*,—

Lat. Originally, a cerecloth; now, applied to spread plasters; as, *sparadrapum commune*, common strapping or adhesive plaster; *s. vesicatorium*, blistering plaster or tissue, &c.

SPARROW. The *fringilla domestica*, a well-known bird of the order *passeres* (passerinæ). It was formerly used in medicine—the *dung*, against toothache; the *fat*, to resolve hard tumours; and the *flesh*, against epilepsy.

SPARTEINE. A volatile oily liquid, possessing basic properties, obtained from *spartium scoparium* or *broom*. It is highly poisonous, and resembles conia and nicotine in its general properties.

SPASMS. Syn. *Cramp: Spasmus*,—Lat. An involuntary contraction of the muscles, generally of the extremities, accompanied with pain, more or less severe. Spasms are distinguished into *clonic spasms* or convulsions, in which the contractions and relaxations are alternate, as in epilepsy; and into *tonic spasms*, in which there is continued rigidity, as in locked-jaw. That form which commonly attacks muscles of the legs and feet, especially after great exertion or exposure to cold, is commonly called *cramp*. The best *treatment* for this is immediately to stand upright, and to well rub the part with the hand. The application of *strong stimulants*, as spirits of ammonia, or of *anodynes*, as opiate liniments, has been recommended. When *spasm* or *cramp* occurs in the *stomach*, a tea-spoonful of *sal volatile* in water, or a table-spoonful of *good brandy* may be swallowed immediately. When *cramp* comes on during *cold bathing*, the limb should be thrown out as suddenly and violently as possible, which will generally remove it, care being also taken not to become flurried or frightened; as presence of mind is very essential to personal safety on such an occasion. A *common cause* of *spasm* is indigestion, and the use of acescent liquors; these should, therefore, be avoided, and bitters and absorbents had recourse to. See *Antispasmodics*, and the *names* of the principal spasmodic diseases.

SPEARMINT. See *page* 791.

SPECIES. Mixtures of dried plants, or parts of plants, in a divided state, which, for convenience, are kept mixed for use. The dry ingredients of pills, conserves, electuaries, mixtures, &c., that do not keep well when made up, or which are in little demand, may be economically and conveniently preserved in this state. The word, thus applied, is obsolete out of the pharmaceutical laboratory.

SPECIES (Anthelmintic). Syn. *Species Anthelminticæ*,—Lat. The *dried flowering tops* of *tansy* and *wormwood*, and the *flowers of chamomile*, equal parts; mix, and keep them in a close vessel. (P. Cod.)

SPECIES (Aperitive). See *below*.

SPECIES (Aromatic). Syn. *Aromatic Powder; Species Aromaticæ*,—Lat. *Prep.* (Ph. Bor.) *Leaves* of *balm* and *curled-leaf mint* (mentha crispa), of each, 4 oz.; *lavender flowers*, 2 oz.; *cloves*, 1 oz.; dry them by a gentle heat, and then powder them. See *Species* (Vulnerary).

SPECIES (Astringent). Syn. *Species Astringentes*,—Lat. The *roots* of *bistort* and *tormentil*, and *bark* of *pomegranate*, equal parts. (P. Cod.)

SPECIES (Bitter). Syn. *Three Bitter Herbs; Species Amaræ, Herbæ Amaræ*,—Lat. The *leaves* of *germander*, and *dried tops of lesser centaury* and *wormwood*, equal parts. (P. Cod.)

SPECIES (Capillary). Syn. *Five Capillary Herbs; Herbæ Quinque Capillares*,——Lat. *Hart's tongue, black maiden-hair, white do., golden do.*, and *spleenwort*, equal parts. (Ph. L. 1720.)

SPECIES (Cordial). Syn. *Four Cordial Flowers; Species Cordiales*,—Lat. The *flowers* of *borage, bugloss, roses*, and *violets*, equal parts. (Ph. L. 1720.)

SPECIES (Diuretic). Syn. *Aperient Roots, Aperitive Species; Species Diureticæ*,—Lat. 1. (*Five greater Aperitive roots*,—P. Cod., & Ph. E. 1744.) The *dried roots* of *asparagus, butcher's broom, parsley, smallage*, and *sweet fennel*, equal parts.

2. (*Five lesser Aperitive roots.*) Those of *caper, dog-grass, eryngo, madder*, and *rest-harrow*.

SPECIES (Emollient). Syn. *Species Emollientes*,—Lat. 1. (*Three Emollient Meals; Farinæ Emollientes.*) The *meal* of *barley, linseed*, and *rye*, equal parts. (P. Cod.)

2. (*Five Emollient Herbs; Herbæ Quinque Emollientes.*)—*a.* The *dried leaves* of *groundsel, common mallow, marsh-mallow, great mullein*, and *wall pellitory*, equal parts. (P. Cod.)

b. The *leaves of mallow, marsh-mallow, French mercury, pellitory of the wall*, and *violet*. (Ph. E. 1744.)

SPECIES (for Enemas). Syn. *Herbs for Clysters; Herbæ pro Enemate*,—Lat. *Mallow leaves*, 2 parts; *chamomile flowers*, 1 part.

SPECIES (for Fomentations). Syn. *Species pro Fotu, Herbæ pro Fotu*,—Lat. *Leaves of southernwood, tops of sea-worm-*

wood, and *flowers of chamomile*, of each, 2 parts; *bay leaves*, 1 part.

SPECIES (Hot).—1. (*Four greater Hot seeds.*) The *seeds of anise, caraway, cumin*, and *fennel.*

2. (*Four lesser Hot seeds.*) The *seeds of bishop's weed, smallage, stone parsley*, and *wild carrot.*

SPECIES (Laxative). Syn. *St. Germain Laxative Powder; Species Laxantes St. Germain*,—Lat. *Prep.* (Ph. Bor.) *Senna leaves* (exhausted with spirit), 4 oz.; *elder flowers*, 2½ oz.; *aniseed* and *fennel seed*, of each, 1¼ oz.; reduce them to coarse powder, and, when dispensing, add of *powdered cream of tartar*, 1 dr., to each 1½ oz. of the mixture.

SPECIES (Narcotic). Syn. *Four Narcotic Herbs; Species Narcoticæ*,—Lat. *Dried leaves* of *belladonna, black nightshade, henbane*, and *thorn-apple*, equal parts.

SPECIES (Pectoral). Syn. *Species Bechicæ, Species ad Infusum Pectorales*,—Lat. 1. *Mallow root*, 4 oz.; *coltsfoot leaves*, 2 oz.; *liquorice root*, 1½ oz.; *aniseed, great-mullein flowers*, and *red-poppy flowers*, of each, 1 oz.; *orris root*, ½ oz. (Ph. Bor.)

SPECIES (Refrigerant).—1. (*Four Cold seeds.*) The *seeds of cucumber, gourd, melon*, and *water-melon.*

2. (*Four lesser Cold seeds.*) The *seeds* of *endive, lettuce, purslane*, and *succory.*

SPECIES (Resolvent). Syn. *Farinæ Resolventes*,—Lat. The *meal* of the *seeds* of *barley, bean, tare*, and *white lupin.*

SPECIFIC GRAVITY is the density of the matter of which any body is composed, compared to the density of another body, assumed as the standard, or 1·000. This standard is pure distilled water for liquids and solids, and atmospheric air for gaseous bodies and vapours. In England the sp. gr., unless when otherwise expressed, is always taken at 60° Fahr.; but in France it is taken at 32°, or the temperature of melting ice. In the *London Pharmacopœia* "whenever specific gravity is mentioned, the substance spoken of is supposed to be of the temperature of 62° Fahr." In most cases, however, it is sufficient merely to note the temperature, and to apply a correction, depending on the known density of water, or air, at the different degrees of the thermometric scale.

To *determine* the *specific gravity* of a *solid*, we weigh it, first in the air, and then in water. In the latter case it loses, of its weight, a quantity precisely equal to the weight of its own bulk of water; and hence, by comparing this weight with its total weight, we find its specific gravity. The rule is—*Divide* the *total weight* by the *loss of weight in water;* the *quotient* is the *specific gravity.*

The *specific gravity* of a substance which is *lighter* than *water*, may be determined by attaching it to some substance, as a piece of lead, the sp. gr., &c., of which are known. In this way, by *deducting* the *loss in weight of the two substances* when weighed in water, from the *loss sustained by the lead alone*, when so weighed, we obtain a difference (a) which, added to the weight of the substance taken in air (b), gives the respective densities. From these the sp. gr. is found by the rule of three:—

$$(a + b) : 1 :: b : sp.\ gr.$$

The *specific gravity* of *substances* which are *soluble in water* are taken in pure *oil of turpentine, rectified spirit, olive oil*, or some other liquid, the density of which is exactly known. Sometimes, for rough purposes, the article is covered with a coating of mastic varnish. This last method answers for mercurial pill.

The *specific gravity* of a *liquid* or a *gas*, is found by weighing it in a *sp. gr. bottle, glass flask*, or other vessel of known capacity, and dividing that weight by the weight of the same bulk of water; the *quotient* is, as before, the specific gravity. A *bottle* of the capacity of 1000 water-grains (*specific gravity bottle*) gives the density of a liquid at once, by simply filling it to the given mark, and then accurately weighing it.

The *specific gravity* of a substance in *fragments*, or in *powder*, may be found by putting a portion (say 100 gr.) into a sp. gr. bottle, filling the latter with distilled water, and then weighing it. The *weight of water* which it is found to contain deducted from 1000 (the weight of the bottle when filled with distilled water), gives a *difference* (a) which bears the same relation to the *sp. gr. of water* (1·000), as the *weight of the powder* (b) put into the bottle, does to the *required sp. gr.* Or—

$$a : 1{\cdot}000 :: b : sp.\ gr.$$

The *sp. gr.* of *alloys* and *mixtures*, when no condensation has occurred, is equal to the *sum of the weights* divided by the *sum of the volumes*, compared to *water* reckoned as unity; and is not merely the arithmetical mean between the two numbers denoting the two sp. gr., as is frequently taught. See *Alligation, Beads* (Lovi's), *Hydrometer, Mixtures* (Arithmetic of), and the *Appendix.*

SPECULUM, METAL. *Prep.* 1. Take of *copper*, 64 parts; *pure tin*, 29 parts;

melt them separately under a little *black flux;* next incorporate them thoroughly by stirring with a wooden spatula, and run the metal into the moulds, so that the face of the intended mirror may be downwards; lastly, allow the whole to cool very slowly.

2. *Pure copper,* 2 parts; *pure tin,* 1 part. *Used* to make the mirrors of reflecting telescopes. The addition of a little metallic arsenic renders it whiter.

SPELTER. See *Zinc.*

SPERMACETI. Syn. *Cetaceum,*—Ph. L. E. & D. "A concretion prepared from the *oily matter* of the *head* of the *physeter macrocephalus,* or *spermaceti whale.*" (Ph. L.) It is demulcent and emollient; chiefly *used* in ointments and cerates.

SPHERICAL HEAT. It is found that water, and other volatile liquids, thrown on a metallic plate heated to dull redness, are not resolved into vapour, but assuming a somewhat globular form, remains intact, until the temperature becomes sufficiently lowered to allow of contact between the liquid and the heated surface. It is then immediately volatilized. M. Boutigny, who fully investigated this subject, has also shown, that the same thing happens when a solid body containing water, is substituted for the liquid in the above and similar experiments. Thus, the *finger* or *hand,* under certain restrictions, *may be thrust,* with perfect impunity, *into a stream of molten metal,* and *ice* may be produced by *throwing water* into a *red-hot crucible.* This last experiment, as performed by MM. Boutigny and Prevostaye, is essentially as follows:—A thick platinum crucible, of the capacity of 1 fl. oz., is heated to redness over a *powerful spirit lamp,* and some *liquid anhydrous sulphurous acid* (a very volatile substance) poured into it by means of a *pipette;* the acid assumes the spherical form, and not a drop evaporates; a few drops of *water* are now introduced into the *sulphurous acid* in the same way; the diluted and slightly cooled acid instantly flashes off in vapour, and robbing the water of its caloric, leaves the latter in a *frozen state;* and, if the operator seizes the right moment, a *solid lump of ice* may be thrown out of the red-hot crucible before his astonished audience, as has been repeatedly done at the Polytechnic Institution.

SPICE (Horse). Syn. *Cow Spice; Species Equinus,*—Lat. *Prep.* 1. *Aniseed, allspice, cumin seed, ginger, liquorice,* and *turmeric,* equal parts.

2. *Turmeric,* and *cumin seed,* of each, 5*lb.; ginger,* 2½ *lb. Used* by farriers.

SPICE (Kitchen). Syn. *Mixed Spice, Kitchen Pepper,* &c. *Prep.* From *black pepper,* 2 *lb.; ginger,* 1 *lb.; cinnamon, allspice,* and *nutmegs,* of each, 8 *oz.; cloves,* 1 *oz.; dry salt,* 6 *lb.;* well ground together. *Useful* to flavour gravies, soups, &c.

SPICE (Mixed). As the last, omitting half the salt.

SPICE (Pease). See *Powders.*

SPICE (Ragout). *Prep.* From *dry salt,* 1 *lb.; flour of mustard, black pepper,* and *grated lemon peel,* of each, ½ *lb.; cayenne pepper,* 2 *oz.; allspice* and *ginger,* of each, 1 *oz.; nutmeg,* ½ *oz,;* all separately powdered.

SPICE (Sausage,—French). Syn. *Epice Fines. Prep.* From *black pepper,* 5 *lb.; ginger,* 2½ *lb.; cloves* and *nutmegs,* of each, 1 *lb.; aniseed* and *coriander seeds,* of each, ½ *lb.;* powder and mix them.

SPICE (Savoury). *Prep.* 1. (*Kidder's.*) From *cloves, mace, nutmegs, pepper,* and *salt,* equal parts. *Used* by cooks.

2. (*Dr. Kitchener's.*) See *Ragout Spice* (above).

SPICE (Soup). Syn. *Kitchener's Soup-herb Powder, Kitchener's Vegetable Relish, &c. Prep.* From *parsley, lemon thyme, sweet marjoram,* and *winter savoury,* of each, dried, 2 *oz.; sweet basil* and *yellow peel of lemon,* of each, dried, 1 *oz.;* mix, and powder.

SPICE (Sweet—Kidder's). *Prep.* From *cinnamon, cloves, mace, nutmegs,* and *sugar,* equal parts. *Used* in pastry.

SPIGELIA. Syn. *Carolina Pink-root; Spigelia,*—Ph. E. The *root* of *spigelia Marilandica* or *worm grass.* It is purgative, narcotic, and vermifuge. *Dose* 10 to 40 gr., in powder or infusion, night and morning, until the worms are expelled. Rhubarb or calomel is commonly added to it.

SPINAL AFFECTIONS. See *Surgery* (Popular).

SPIRIT. Syn. *Spiritus,*—Lat. Under this term are included all the inflammable and intoxicating liquors obtained by distillation, and used as beverages; as *brandy, gin, rum, &c.,* each of which is noticed in its alphabetical order. Spirit may also be obtained by fermentation and distillation from all vegetable juices or solutions that contain sugar.

The *spirit* used in *pharmacy* and *chemistry* is distinguished by names which have reference to its richness in alcohol. (See *below.*)

	Sp. gr.	
Alcohol, Ph. D.	0·795	nearly pure Alcohol.
,, Ph. E.	0·796	
,, Ph. D. 1826	0·810	or 70% o. p.
,, Ph. L. 1836	0·815	,, 68% ,,
Stronger Spirit (Spiritus Fortior), Ph. D.	0·818	,, 66% ,,
**Rectified Spirit* (Spirit of Wine; Spiritus Rectificatus), Ph. L. & E.	0·838	,, 56% ,,

	Sp. gr.	
Rectified Spirit, Ph. D. . .	0·840	or 54¾% o.p.
Proof Spirit (Spiritus Tenuior), Ph. E. . .	0·912	,, 6¼% ,,
,, Ph. L. & D. . .	0·920	,, proof.
,, Ph. L. 1824 . .	0·930	,, 8½% u. p.
Alcohol (absolu), P. Cod . .	0·797	,, —
,, (at 40°) ,, . .	0·810	,, 70%. o. p.
,, (du commerce), P. Cod .	0·863	,, 41% ,,
,, (faible) ,, .	0·923	,, 2½% u. p.

* "This *spirit* can be reduced to the standard of the *weaker* (or proof) *spirit*, by adding, to every 5 pints of it, 3 pints of *distilled water*, at 62° Fahr." (Ph. L.)

TABLE *of the principal Spirituous Liquors sold in England, with their usual Strengths, &c.* By MR. COOLEY.

Denomination.	Excise Mark.	Import Strength.	Limits to the strength by the Excise.	Usual Selling Strength.			Specific Gravity at 60° Fahr.
				By *Permit.*	Contains Alcohol of 0·825.	Contains absolute Alcohol.	
*Gin (*strongest*) . .	X (17 u. p.)	. . .	Not stronger than 17 u. p.	17 u. p.	. . .	40%	0·9395
*Do. (*best ordinary*) .	X (22 u. p.)	. . .	do.	22 u. p.	. . .	37%	0·9445
†Do. (*cordial*) . .	X (22 u. p.)	. . .	do.	22 u. p.	. . .	do.	¶0·
†Do.	X (24 u. p.)	. . .	do.	24 u. p	. . .	36·5%	¶0·
‡Peppermint . .	X mint.	. . .	do.	60 u. p.	. . .	21%	¶0·
‡Do.	do.	. . .	do.	64 u. p.	. . .	18%	¶0·
‡Cloves . .	X (64 u. p.)	. . .	do.	64 u. p.	. . .	do.	¶1·065 to 1·080
‡Bitters . .							
‡Raspberry .							
‡Noyau . .							
‡Cinnamon .							
‡Tent . .							
‡Aniseed . .							
‡Caraway . .							
‡Lovage . .							
‡Usquebaugh .							
‡Orange cordial .							
‡Citron . .							
§Rum	R.	About 10 o. p. to 43 o. p.	From 17 u. p. to 43 o. p.	11 u. p.	. . .	43%	0·9329 to 0·8597
‡Rum Shrub . .	R. Sh.	. . .	do.	64 u. p.	. . .	18%	¶0·
‡Do.	do.	. . .	do.	60 u. p.	. . .	21%	¶0·
§French Brandy . .	F.	About 5 o. p. to 8 or 10 u. p.	do.	10 u. p.	. . .	44%	0·9318
‖Spirit of Wine . .	S. W.	. . .	43 o. p. and upwards.	54 to 64 o. p.	. . .	. . .	0·8415 to 0·8221
Malt, grain, or molasses spirit (*sent out by British distillers*) . . .	P. S.	. . .	25 or 11 o. p. to 10 u. p.	. . .	. . .	. . .	0·8869 to 0·9318
Hollands . . .	Geneva.	. . .	not under 17 u. p.	. . .	51·60%	47·77%	0·9385
Whiskey (*Irish*) . .	P. S.	. . .	. . .	. . .	54%	50%	
Do. (*Scotch*) .	P. S.	. . .	. . .	. . .	54·3%	50·2%	

* Frequently retailed at 25 to 35 u. p.

† Though "permitted" at 22 or 24, are generally from 25 to 35 u. p., or even weaker.

‡ These though "permitted" at 60 or 64 u. p. are generally 75 or 80 u. p.

§ Generally retailed as low as the Excise Laws allow; viz., 17 u. p.

‖ Usual strength 54 o. p.

¶ The specific gravity is no guide when sugar is present, as in compounds.

Spirituous liquors, like all other fluids at common temperatures, expand when they are heated, and diminish in volume when they are cooled. It is found that 1000 gall. of proof spirit measured at the temperature of 50° Fahr., will, if re-measured at 59°, be found to have increased in bulk to fully 1004¼ gall.; whilst 1000 gall. of the same spirit measured at 77° Fahr., will be only equal to 991½ gall. at 59°. These changes are still more marked at higher strengths, and at extreme temperatures, and from not being recognisable by the hydrometer, often lead to serious losses in trade, and to serious fluctuations in "stock," which, to those unaware of the action of temperature, are perfectly unaccountable. A *gallon* of *proof spirit* only weighs 9⅕ *lb.* at 60° Fahr. At a higher temperature it will weigh *less*,—at a lower one, *more;* but as this weight constitutes the standard gallon at the temperature the proof is calculated for, it is manifest that any variations from it must result in loss either to the buyer or seller. Hence the equity of buying and selling liquors by *weight*, instead of by *measure*. The stock-keeper in every wholesale house, as well as every Excise officer, should be aware of this fact, and on "taking stock" should as regularly enter the *temperature* of his cellars in his stock book, as he does the "dip" or "wet inches." See *Alcohol*, *Alcoholmetry*, *Ebullioscope*, *Porter*, *Specific Gravity*, *&c.*

SPIRIT (Acetic). See *Acetone.*

SPIRIT (Amylic). See *page* 872.

SPIRIT (Dyer's). See *Tin Mordants.*

SPIRIT (Proof). See *above.*

SPIRIT (Pyroacetic). See *Acetone.*

SPIRIT (Pyrolyxic). Syn. *Pyroligneous Spirit*, *Wood do.*, *Medicinal Naphtha*, *Wood do.*, *Hydrated Oxide of Methyle*, *Bihydrate of Methylene;* *Spiritus Pyroxylicus*,—Ph. D. A light volatile liquid, discovered by Mr. P. Taylor, in 1812, among the liquid products of the distillation of dry wood. It has been shown by MM. Dumas and Peligot to be "really a second alcohol, forming an ether, and a series of compounds (*methyl-series*) exactly corresponding with those of vinous spirit, and, in some points, even more complete than the latter."

Prep. 1. (*Commercial.*) By saturating *crude pyroligneous acid*, after it has been separated from the tar, with *quick-lime*, and then distilling it. About 1% of spirit is obtained, which is purified by 2 or 3 rectifications. In this state it contains acetone and other inflammable fluids, from which it may be separated by distilling it with an excess of *chloride of calcium*, in a water bath, as long as any volatile matter passes over, which is the impurities. A quantity of water equal to the spirit employed is then added, and the distillation continued. The *product* is now nearly pure *pyroxylic spirit* combined with a little water, from which it may be freed by distillation along with *quick-lime.*

2. (*Medicinal.*) The *pyroxylic spirit* of *commerce* is agitated along with about 5 times its volume of *water*, and, after repose, any oily matter which separates and floats on it, is carefully removed; the spirit is then separated by careful distillation, and the product is freed from water as before. Berzelius recommends the *crude spirit* to be agitated with a *fatty oil*, to remove empyreumatic matter, and then to rectify it, first, from *recently burnt charcoal*, and next with *chloride of calcium.*

Prop., *&c.* Pure pyroxylic spirit is a transparent colourless liquid, having a penetrating ethereal smell, and a hot disagreeable taste; it is very inflammable, burning with a pale blue flame, by which it may be readily distinguished from pyroacetic spirit. It is neutral to test paper, mixes with water, alcohol, and ether in all proportions; and boils at 150° Fahr., sp. gr. 0·798 at 68° Fahr. (Regnault and Liebig.) Dr. Ure states the sp. gr. to be 0·824 at 60°; the Dublin College makes it 0·846. That of the latter must therefore have contained a little water. It does not dissolve Indian rubber and gutta percha, like mineral or true naphtha.

Pyroxylic spirit is *distinguished* from *acetone* or *pyroacetic spirit*, by the character or its flame, and by *freely* dissolving chloride of calcium, which is quite insoluble in the latter. In a mixture of these two liquids, two distinct strata are formed when this substance, either in powder or concentrated solution is added.

Pyroxylic spirit is *distinguished* from *vinous spirit* by the action of potassa (see *p.* 33), and by its lower boiling point. The *presence of alcohol* in a *mixture* of the two is readily detected by the violent effervescence which follows the addition of a little concentrated nitric acid (sp. gr. 1·45). The *proportion* of *alcohol* may be determined by treating the mixture with a recent solution of mercury in nitric acid (1 mercury to 5 or 6 of acid), aiding the action, if required, by a gentle heat. The effervescence which ensues, and the formation of a detonating precipitate (*fulminating mercury*), are not only characteristic of the presence of alcohol, but the weight of the fulminate thus formed, is nearly equal to that of the alcohol contained in the wood spirit. (Ure.)

Uses, &c. Chiefly to dissolve resins and volatile oils, especially shell lac. As a *medicine,* it is anodyne and sedative; and has been beneficially employed by Drs. Christison, Hastings, and Neligan, to allay the harassing cough, troublesome vomiting, and excessive expectoration in phthisis, and some other affections. *Dose.* 5 to 30 drops, thrice a day, in water.

SPIRIT (Raisin). *Prep.* From *raisins* fermented along with *water,* and the wash distilled by a quick fire. *Used* to give a brandy flavour to malt spirit. 1 gall. added to 150 gall. of *plain spirit,* along with some *colouring,* and a little *catechu,* either with, or without, a little *acetic ether,* makes a very decent "*British Brandy.*"

SPIRIT (Rectified). See *page* 1170.

SPIRIT OF SALT. See *page* 571.

SPIRIT OF SOUP-HERBS. As *essence of soup-herbs,* but substituting 1 quart of *brandy* or *proof spirit* for the rectified spirit.

SPIRIT OF WINE. See *pages* 1170.

SPIRITS (Culinary). These are prepared in the same way as the "*Tinctures for Kitchen use*" noticed at *page* 396.

SPIRITS (Medicinal). Syn. *Spiritus Medicinales,*—Lat. The spirits of *pharmacy* are either *prepared* by macerating the *bruised seeds, flowers, herbs &c.,* in the *spirit* for 2 or 3 days before distillation, and then drawing it off by a gentle heat; or *extemporaneously,* by adding a proper proportion of *essential oil* to *pure spirit* of the prescribed strength. This plan is very generally adopted in the new Ph. D. In the *first method,* when a naked fire is employed, a *little water* is put into the still along with the spirit, to prevent empyreuma. These spirits are principally employed as aromatics and stimulants, in *doses* of *¼ oz.* to *½ oz.,* or as adjuvants in draughts and mixtures.

The following are the *principal medicinal spirits:*—

Spirit of Ammonia; Spiritus Ammoniæ,—Ph. E., Ph. L. 1836, & Ph. D. 1826. *Alcohol Ammoniatum,*—Ph. E. 1839. *Sp. Salis Ammoniaci Dulcis,*—Ph. L. 1746. *Prep.* 1. (Ph. E.) Take of *quick-lime,* 12 oz.; slake it with *water,* 6½ fl. oz.; add of *finely powdered hydrochlorate of ammonia,* 8 oz.; and distil in a glass retort furnished with a tube reaching nearly to the bottom of a bottle containing *rectified spirit,* 2 pints; and kept well cooled. A sand heat is to be employed, and the distillation continued as long as anything passes over. The product has a sp. gr. about 0·845, and should not effervesce with acids. The alkali is here in the caustic state, and in this respect it resembles the *spirit of ammonia,* Ph. U. S. and Dzond's *caustic spirit of ammonia,* Ph. Bor.

2. (Ph. L. 1836.) *Hydrochlorate of ammonia,* 10 oz.; *carbonate of potassa,* 16 oz; *rectified spirit* and *water,* of each, 3 pints; mix, and let 3 pints distil.

3. (Ph. D. 1826.) Dissolve 3½ oz. of *carbonate of ammonia,* in *rectified spirit,* 3 wine pints.

Obs. The ammonia in the last two preparations exists in the carbonated state. They are chiefly employed to make other preparations.

Anisated Spirit of Ammonia; Liquor Ammoniæ Anisatus, Spiritus Ammoniæ Anisatus,—Lat. *Prep.* (Ph. Bor.) *Rectified spirit,* 12 oz.; *oil of aniseed,* 3 dr.; dissolve, and add of *caustic solution of ammonia* (0·960), 3 oz.

Aromatic Spirit of Ammonia, Spirit of Sal Volatile; Spiritus Ammoniæ Aromaticus,—Ph. L. E. & D. *Alcohol Ammoniatum Aromaticum,*—Ph. E. 1839. *Sp. A. Compositus,*—Ph. L. 1788. *Sp. Volatilis Aromaticus,*—Ph. L. 1746. *Sp. Salis Volatilis Oleosus,*—Ph. L. 1721. *Prep.* 1. (Ph. L.) Take of *hydrochlorate of ammonia,* 6 oz.; *carbonate of potassa,* 10 oz.; *cinnamon* and *cloves,* of each, bruised, 2½ dr.; *fresh lemon peel,* 5 oz.; *rectified spirit* and *water,* of each, 2 quarts; mix, and distil 3 quarts. Sp. gr. 0·918.

2. (Ph. E.) *Spirit of ammonia,* 8 fl. oz.; *oil of rosemary,* 1½ fl. dr.; *oil of lemon peel,* 1 fl. dr.; mix.

3. (Ph. D.) *Rectified spirit,* 3 pints; *oil of lemon,* ½ fl. oz.; *oil of nutmeg,* 2 fl. dr.; *oil of cinnamon,* ½ fl. dr.; dissolve, and add of *stronger solution of ammonia,* 6 fl. oz. Sp. gr. 0·852.

Obs. The ammonia exists in the state of neutral carbonate in the product of the *first* formula; but in the caustic state in those of the others. *Dose.* ½ to 1 fl. dr., in water, or any bland liquid; as a diffusible stimulant and antacid, in debility, low spirits, dyspepsia, heartburn, flatulent colic, hysteria, &c. The *spirit of sal volatile* of the *shops* is generally a spurious compound of little more than ½ the above strength.

Fœtid Spirit of Ammonia; Spiritus Ammoniæ Fœtidus,—Ph. L. E. & D. *Alcohol Ammoniatum Fœtidum,*—Ph. E. 1817. *Tinctura Assafœtidæ Ammoniata,*—Ph. E. 1839. *Sp. Volatilis Fœtidus,*—Ph. L. 1746. *Prep.* 1. (Ph. E.) *Hydrochlorate of ammonia,* 10 oz.; *carbonate of potassa,* 16 oz.; *assafœtida,* 5 oz.; *rectified spirit* and *water,* of each, 3 pints; mix well, then slowly distil 3 pints. Sp. gr. 0·861.

2. (Ph. E.) *Spirit of ammonia*, 10½ fl. oz.; *assafœtida* (broken small), ½ oz.; digest for 12 hours, then distil 10½ fl. oz., by the heat of a vapour (water) bath.

3. (Ph. D.) *Assafœtida*, 1½ *oz.; rectified spirit*, 1½ pint; digest for 24 hours, then distil off the whole of the spirit, and mix the product with *stronger solution of ammonia*, 3 fl. oz. Sp. gr. 0·849.

Obs. The *dose, &c.*, are the same as those of the last, but it is preferred for hysterical and spasmodic affections.

Amylic Spirit,—Ph. D. See *page* 872.

Spirit of Aniseed; Spiritus Anisi,—Ph. L. *Prep.* 1. (Ph. L.) *Oil of aniseed*, 3 fl. dr.; *proof spirit*, 1 gall.; dissolve. Carminative. *Dose.* ½ fl. dr. to 4 fl. dr.

2. (*Essentia Anisi*,—Ph. D.) *Oil of aniseed*, 1 fl. oz.; *rectified spirit*, 9 fl. oz.; mix with agitation. Chiefly used to make *aniseed water*.

Compound Spirit of Aniseed; Spiritus Anisi Compositus,—Ph. D. 1826. *Prep.* (Ph. D. 1826.) *Aniseed* and *angelica seed*, of each, ½ ℔; *proof spirit*, 1 gall.; *water*, q. s.; distil 1 gallon. When coloured with saffron, or sap green, it closely resembles the Irish *Usquebaugh*. (Montgomery.) *Dose.* 1 to 4 fl. dr.

Arquebusade Spirit. See *Vulnerary Spirit* (below).

Compound Spirit of Balm, Balm Water, Carmelite do.; Eau des Carmes, Eau de Melisse des Carmes; Aqua Melissæ Composita, Spiritus M. Compositus,—Lat. *Prep.* 1. (P. Cod.) *Fresh flowering tops of balm*, 24 oz.; *fresh lemon-peel*, 4 oz.; *cinnamon, cloves*, and *nutmegs*, of each, 2 oz.; *coriander seed* and *dried angelica root*, of each, 1 oz.; *rectified spirit*, 8 ℔; macerate for 8 days, and distil in a water bath to dryness. This spirit is much esteemed in France as a stomachic, a cosmetic, and a stimulant.

Bathing Spirit. Soap liniment.

Spirit of Camphor, Camphorated Spirit; Spiritus Camphoræ, — Ph. L. *Tinctura Camphoræ*,—Ph. L. 1836. *Spiritus Camphoratus*,—Ph. D. 1826. *Prep.* (Ph. L.) *Camphor*, 5 oz.; *rectified spirit*, 1 quart; dissolve. *Used* as an application to chilblains, and in chronic rheumatism, cholera, &c. See *Drops, Essences*, and *Tinctures*.

Spirit of Caraway; Spiritus Carui,—Ph. L. & E., & Ph. D. 1826. *Prep.* 1. (Ph. L.) *Oil of caraway*, 2 fl. dr.; *proof spirit*, 1 gall.; dissolve.

2. (Ph. E.) *Caraway seeds* (bruised), ½ lb.; *proof spirit*, 7 pints; macerate for 2 days in a covered vessel, then add of *water*, 1½ pint; and distil 7 pints. Aromatic and carminative. *Dose.* 1 to 4 fl. dr. A similar spirit, "sweetened with sugar, is drunk in Germany as a dram, (*Kümelliqueur; Kümelbrandtwein*." (Pereira.)

3. (*Essentia Carui*,—Ph. D.) *Oil of caraway*, 1 fl. oz.; *rectified spirit*, 9 fl. oz. *Used* to make caraway water.

Spirit of Cassia; Spiritus Cassiæ,—Ph. E. *Prep.* From *coarsely powdered cassia*, 1 lb.; *proof spirit*, 7 pints; *water*, 1½ pint, or q. s.; draw off 7 pints. *Dose, &c.* As the last. It is almost universally substituted for *spirit of cinnamon*.

Spirit of Cinnamon; Spiritus Cinnamomi,—Ph. L. & E., & Ph. D. 1826. *Prep.* 1. (Ph. L.) *Oil of cinnamon*, 2 fl. dr.; *proof spirit*, 1 gall.; dissolve.

2. (Ph. E.) From *cinnamon*, as *spirit of cassia*. *Dose.* 1 to 4 fl. dr.

3. (*Essentia Cinnamomi*,—Ph. D.) *Oil of cinnamon*, 1 fl. oz.; *rectified spirit*, 9 fl. oz. *Used* to make cinnamon water, &c.

Spirit of Ether, Spirit of Sulphuric do.; Spiritus Ætheris Sulphurici,—Ph. E., & Ph. L. 1824. *Æther Sulphuricus cum Alcohole*,—Ph. E. 1839. *Sweet Spirit of Vitriol, Sp. Ætheris Vitriolici, Sp. Vitrioli Dulcis*,—Obs. var. *Prep.* (Ph. E. & Ph. L. 1824.) *Sulphuric ether*, 1 part; *rectified spirit*, 2 parts. Sp. gr. 0·809. *Obs.* This preparation should be neutral to test paper, mix (clear) with water, and when shaken with twice its volume of concentrated solution of chloride of calcium, 28% of ether should separate. *Dose.* ½ to 2 or 3 fl. dr.; as a stimulant and anodyne.

Compound Spirit of Ether, Hoffman's Anodyne Liquor; Spiritus Ætheris Compositus,—Ph. L. 1851 & 1809. *Sp. Ætheris Sulphurici Compositus*,—Ph. L. 1836. *Sp. Ætheris Oleosus*,—Ph. D. *Sp. Æth. Vitriolici Co.*,—Ph. L. 1788. *Prep.* 1. (Ph. L.) *Ether*, 8 fl. oz.; *rectified spirit*, 16 fl. oz.; *ethereal oil*, 3 fl. dr.; mix.

2. (Ph. D.) Mix in a glass matrass, *oil of vitriol*, 1½ pint; with *rectified spirit*, 1 pint; connect this with a Liebig's condenser, apply heat, and distil until a black froth begins to rise; then separate the upper stratum of the *distilled liquid*, and having exposed it to the air for 24 hours, let the oil be transferred to a moist paper filter, and washed with a little cold water; lastly, dissolve it in a mixture of *rectified spirit*, ½ pint; *sulphuric ether*, 5 fl. oz.

Obs. This compound is anodyne, and antispasmodic, and was once held in very great repute. *Dose.* ½ to 2 fl. dr.

Aromatic Spirit of Ether, *A. Sp. of Sulphuric do.*, *Sweet Elixir of Vitriol; Elixir Vitrioli Dulce; Spiritus Ætheris Aromaticus,*—Ph. L. 1824. *Prep.* (Ph. L. 1824.) *Bruised cinnamon*, 3 dr.; *cardamoms*, 1½ dr.; *long pepper* and *ginger*, of each, 1 dr.; *rectified spirit*, 10 fl. oz.; *sulphuric ether*, 5 fl. oz.; mix, and digest 14 days. The last two preparations are also frequently called "*Sweet Elixir of Vitriol.*"

Freeman's Bathing Spirits. See *page* 489.

Spirit of Hartshorn; Liquor or *Spiritus Volatilis Cornu Cervi,*—Lat. Originally distilled from hartshorn. Dilute liquor of ammonia is now generally sold for spirit of hartshorn.

Compound Spirit of Horse-radish; Spiritus Armoraciæ Compositus,—Ph. L. & Ph. D. 1826. *Prep.* (Ph. L.) *Sliced horse-radish* and *dried orange peel*, of each, 20 oz.; *bruised nutmegs*, 5 dr.; *proof spirit*, 1 gall.; *water*, 1 quart, or q. s.; distil 1 gallon. Stimulant and diuretic. *Dose.* 1 to 4 fl. dr.; in dropsies, when there is much debility. It is usually combined with infusion of juniper berries or foxglove.

Spirit of Hydrochloric Ether, Spirit of Muriatic do., Clutton's Febrifuge Spirit; Æther Hydrochloricus Alcoholicus, Spiritus Ætheris Muriatici,—Lat. *Prep.* 1. From *hydrochloric ether* and *rectified spirit*, equal parts; mixed together.

2. (Ph. E. 1744.) *Hydrochloric acid*, 1 part; *rectified spirit*, 3 parts; digest some days, and distil in a sand bath. *Dose.* ½ to 3 fl. dr.; in dyspepsia, liver complaints, hectic fever, &c.

Compound Spirit of Juniper; Spiritus Juniperi Compositus,—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Oil of juniper*, 1½ fl. dr.; *oils of caraway* and *fennel*, of each, 12 drops; *proof spirit*, 1 gall.; dissolve.

2. (Ph. L. 1836.) *Juniper berries*, bruised, 15 oz.; *caraway* and *fennel seed*, of each, bruised, 2 oz.; *proof spirit*, 1 gall.; *water*, 1 quart, or q. s.; distil 1 gallon.

Obs. This spirit is stimulant and diuretic. *Dose.* 2 to 4 fl. dr. Mixed with twice or thrice its weight of proof spirit and sweetened with a little sugar, it makes no bad substitute for Hollands gin.

Spirit of Lavender; Spiritus Lavandulæ,—Ph. E., & Ph. L. 1836. *Prep.* From *fresh lavender*, 2½ lb.; *rectified spirit*, 1 gall.; *water*, 1 quart, or q. s.; distil 1 gallon, (7 pints,—Ph. E.)

2. (*Wholesale.*) From *Mitcham oil of lavender*, 3 *oz.*; *rectified spirit*, 1 gall.; dissolve. Cordial and fragrant. See *page* 1177.

Compound Spirit of Lavender. See *Tinctures.*

Spirit of Nitric Ether, Spirit of Nitrous Ether, Sweet Spirit of Nitre, Nitrous Ethereal Spirit, Nitre Drops; Spiritus Ætheris Nitrici,—Ph. L. & E. *Spiritus Æthereus Nitrosus,*—Ph. D. *Sp. Æ. Nitrosi,*—Ph. L. 1788. *Sp. Nitri Dulcis,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) Take of *rectified spirit*, 1 quart; *nitric acid*, 3½ fl. oz.; add the acid, by degrees, to the spirit; then mix them, and let 28 fl. oz. distil over. An earthenware still and condensing worm should be employed. Sp. gr. 0·834.

2. (Ph. E.) *Pure hyponitrous ether* (Ph. E.), 1 part; *rectified spirit*, 4 parts; (both by volume;) mix. Sp. gr. 0·847.

3. (Ph. D.) *Nitrous* or *hyponitrous ether* (which has been washed with half of its volume of liquor of ammonia), 4 fl. oz.; *rectified spirit*, 42 fl. oz.; mix, and preserve the compound "in small, strong, and accurately stopped bottles."

4. (Dr. Geisler.) *Alcohol* of 0·840, 24 oz.; are mixed with *sulphuric acid*, 4 oz.; and the compound is left to stand for 8 days, when it is poured into a retort containing of *dried nitre*, 4½ oz.; 20 oz. of the liquid are next distilled over at a gentle heat, and the product is then rectified over magnesia. Copper retorts and a tinned cooling apparatus may be employed in this process without any disadvantage. The preparation is also pretty constant in its amount of ether.

Pur., *&c.* Pure spirit of nitric ether boils at about 160° Fahr., scarcely reddens litmus paper, and "gives off no bubbles of carbonic acid gas, on the addition of carbonate of soda." (Ph. L.) "When agitated with twice its volume of concentrated solution of chloride of calcium, 12% of ether slowly separates." (Ph. E.) *Dose.* ½ to 3 fl. dr., as a febrifuge, a diaphoretic, diuretic, antispasmodic, &c.; in various affections.

Obs. The mass of the sweet spirits of nitre of the shops is of very inferior quality, and is scarcely, if ever, made directly from spirit that has paid the duty. One, and a very large portion, is obtained from Scotland; another, from the manufacturers of fulminating mercury; and, a third, and in fact the principal part, from certain persons in the neighbourhood of the metropolis who employ contraband spirit for its preparation, as this article is not under the excise. Very recently *methylated spirit* has been employed for the purpose.

Sweet spirits of nitre, sp. gr. ·850, is now commonly and publicly sold, in quantity, at a price which is only about 2-3rds that of the spirit in it, if the latter had paid duty. The spirit obtained from the manufacturers of fulminating mercury frequently contains no inconsiderable quantity of prussic acid.

The mere admixture of nitric or hyponitrous ether with alcohol does not afford an officinal *Spir. æther. nitr.*, as this always contains *aldehyde*, which, according to Prof. Liebig, is an essential constituent of the officinal compound.

Spirit of Nutmeg; Spiritus Myristicæ,—Ph. L. & E. *Sp. Nucis Moschatæ*,—Ph. D. 1826, & Ph. L. 1788. *Aqua N. M.*,—Ph. L. 1746. *Prep.* 1. (Ph. L. & E.) *Bruised nutmegs*, 2½ oz.; *proof spirit*, 1 gall.; *water*, 1 pint, or q. s.; distil a gallon. Cordial and carminative. *Dose.* 1 to 4 fl. dr.; chiefly used to flavour mixtures and draughts.

2. (*Essentia Myristicæ Moschatæ*,—Ph. D.) *Oil of nutmegs*, 1 fl. oz.; *rectified spirit*, 9 fl. oz. *Used* in dispensing.

Oily Ethereal Spirit. See *page* 1173.

Spirit of Pennyroyal: Spiritus Pulegii,—Ph. L. *Sp. Menthæ Pulegii*,—Ph. L. 1836. *Prep*, 1. (Ph. L.) *Oil of pennyroyal*, 3 fl. dr.; *proof spirit*, 1 gall.; dissolve. Stimulant, antispasmodic, and carminative. *Dose.* ½ to 2 fl. dr.

2. (*Essentia Menthæ Pulegii*,—Ph. D.) *Oil of pennyroyal*, 1 fl. oz.; *rectified spirit*, 9 fl. oz. *Used* chiefly in dispensing.

Spirit of Peppermint; Spiritus Menthæ Piperitæ,—Ph. L., & Ph. D. 1826. *Sp. Menthæ*,—Ph. E. *Aqua Menthæ Piperitidis Spirituosa*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Oil of peppermint*, 3 fl. dr.; *proof spirit*, 1 gall.; dissolve.

2. (Ph. E.) *Green peppermint*, 1½ lb.; *proof spirit*, 7 pints; macerate 2 days; add of *water*, q. s., and distil 7 pints. *Dose.* ½ to 2 dr.

3. (*Essentia Menthæ Piperitæ*,—Ph. D.) *Oil of peppermint*, 1 fl. oz.; *rectified spirit*, 9 fl. oz. See *Essence of Peppermint*.

Spirit of Pimento, Spirit of Allspice; Spiritus pimentæ,—Ph. L. & E., & Ph. D. 1826. *Prep.* 1. (Ph. L.) *Oil of pimento*, 2 fl. dr.; *proof spirit*, 1 gall.; dissolve.

2. (Ph. E.) From *pimento*, bruised, ½ ℔; and *proof spirit*, 7 pints; as *spirit of caraway*. Carminative and stomachic. *Dose.* 1 to 4 fl. dr.; in flatulent colic, dyspepsia, &c.

3. (*Essentia Pimentæ*,—Ph. D.) *Oil of pimento*, 1 fl. oz.; *rectified spirit*, 9 fl. oz. *Used* to make *pimento water* and in dispensing.

Spirit of Pine-tops; Spiritus Turionum Pini,—Lat. See *Riga Balsam*.

Spirit of Rosemary; Spiritus Rorismarini; Sp. Rosmarini,—Ph. L. & E., & Ph. D. 1826. *Prep.* 1. (Ph. L.) As *spirit of pimento*.

2. (Ph. E.) *Rosemary tops*, 2½ ℔; *rectified spirit*, 1 gall.; as *spirit of lavender*. Fragrant and stimulant.

3. (*Essentia Rosmarini*,—Ph. D.) As *essence of pimento*.

Spirit of Scurvy Grass. See *page* 948.

Spirit of Spearmint; Spiritus Menthæ Viridis,—Ph. L., & Ph. D. 1826. *Sp. Menthæ Sativæ*,—Ph. L. 1788. *Aqua M. Vulgaris Spirituosa*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) As *spirit of peppermint*, Ph. L.

2. (*Essentia Menthæ Viridis*,—Ph. D.) As *essence of peppermint*, Ph. D. The *uses* and *doses* are also the same.

Spirit of Sulphuric Ether. See *page* 1173.

Compound Spirit of Sulphuric Ether. See *page* 1173.

Sweet Spirit of Vitriol. See *Aromatic Spirit of Ether.*

Vulnerary Spirit, Vulnerary Water, Arquebusade; Spiritus Vulnerarius, Eau D'Arquebusade; Aqua Vulneraria, Aq. Vul. Spirituosa, Aq. Sclopetaria,—Lat. var. *Prep.* 1. *Dried tops* of *sage, wormwood, fennel, hyssop, marjoram, savory, thyme, rosemary, calamint, balm, peppermint*, and *scordium, fresh leaves of angelica* and *basil*, and *lavender flowers*, of each, 4 oz.; *proof spirit*, 2 gall.; digest for 14 days, and distil over 1½ gall.

2. *Rosemary leaves*, 1½ ℔; *leaves of thyme* and *summits of millefoil*, of each ½ ℔; *juniper berries*, 3 oz.; *proof spirit*, 2 gall.; distil over 5 quarts.

Obs. This preparation is stimulant and vulnerary, and is in great repute on the Continent as a cosmetic and cordial.

SPIRITS (Perfumed). Syn. *Spiritus Odoriferi, Odores Spirituosi*,—Lat. The odoriferous spirits of the perfumer are, for the most part, prepared from various aromatic and odorous substances, by a similar process to that described under *Essences* and *Spirits* (Medicinal); but in this case a *perfectly pure, flavourless*, and *scentless* spirit must be employed. The *distillation* should also be preferably conducted by steam, or the heat of a water bath, and the distilled spirit should be kept for some time in a cellar, or other cold situation, previously to being used. When *simple solution* of an *essential oil* in the *spirit* is adopted, care should be taken that the oil is pale and new; or, at least, has not been much exposed to the air; as in that case it would contain resin, which would make the perfumed spirit, or essence, liable to stain delicate articles of clothing to which it may be applied. Most of the *eaux* and *esprits* of the perfumers, are prepared by one or other of the above methods. It is found, however, that the *perfumed spirits* of some of the more *delicate flowers* cannot be well obtained by either *infusion* or *distillation*, or by the *simple solution* of their *essential oils* in spirit; or, at least, they are not usually so prepared by the foreign perfumers. The *spirits* of *orange flowers, jasmin, tuberose, jonquille, roses*, and of some *other flowers*, and of *cassia, vanilla, &c.*, are commonly prepared by digesting *pure rectified spirit* for 3 or 4 days on half its weight of the respective *pommades* or *oils*, obtained by infusion or contact. The operation is performed in a *closed vessel* placed in a *water bath*, and frequent agitation is employed for 3 or 4 days, when the perfumed spirit is decanted into a second digester, containing a like quantity of oil to the first. The whole process is repeated a *second*, and a *third* time, after which the spirit is allowed to settle and is then decanted. It now forms the most fragrant and perfect odoriferous spirit (*extrait*) of the Continental perfumer. The *product* is called "*esprit*" or "*extrait of the first infusion.*" The three portions of oil are then treated again with *fresh spirit* in the same manner, and thus spirits or essences of inferior quality are obtained, which are distinguished by the perfumers as No. 2, 3, 4, &c.; or *esprits* or *extraits* of the *first, second, third*, &c., operation or infusion. In some, though only a very few cases, the spirits are afterwards distilled.

The *strength* of the *spirit* for the concentrated essences should not be less than 56 o. p. (sp. gr. 0·8376); that for *eaux, esprits*, and *extraits*, not less than 35 o. p. (sp. gr. 0·8723). The strength of the *second quality* of the last three must be fully *proof* (sp. gr. 0·920). See *Alcohol, Distillation, Essences, Oils, Pommades, &c.* (and *below*).

Eau d'Ambre Royale. From *essences of ambergris* and *musk*, of each, 1 fl. oz.; *spirit of ambrette* and *orange-flower water*, of each, 1 pint; *rectified spirit*, 1 quart; mix.

Eau d'Ange. From *flowering tops of myrtle* (bruised), 1½ *lb.; rectified spirit*, 7 pints; *water*, 3 pints; digest a week, add of *common salt*, 2 *lb.;* and distil 1 gall.

Eau d'Arquebusade. See *page* 1175.

Eau de Bouquet. From *spirits of rosemary* and *essence of violets*, of each, 1 fl. oz.; *essences of bergamot* and *jasmine*, of each, 1 fl. dr.; *oils of verbena* and *lavender*, of each, ½ fl. dr.; *orange-flower water*, 1 fl. oz.; *eau de rose*, ½ pint; *rectified spirit*, 1 quart; mix.

Eau de Bouquet de Flore. From *spirits of rosemary* and *roses*, and *essence of violets*, of each, ½ fl. oz.; *oil of cedra* and *essence of ambergris*, of each, 1 fl. dr.; *orange-flower water*, 5 fl. oz.; *rectified spirit*, 1 pint.

Eau des Carmes. See *page* 1173.

Eau de Cologne, Cologne Water; Aqua Coloniensis, Aq. C. Spirituosa, Spiritus Coloniensis. For the production of good eau de Cologne it is absolutely essential that the spirit be of the purest description, both *tasteless* and *scentless*, and that the oils be not only *genuine*, but *recently distilled;* as old oils are less odorous and contain a considerable quantity of resin and camphor, which prove injurious. When flowers and the flowering tops of plants are ordered, it is also necessary that they be either fresh gathered, or well preserved, without drying them. To produce an article of the *finest quality*, distillation should be had recourse to. A very excellent eau de Cologne may, however, be produced by simple solution of the *oils* or *essences* in the spirit, provided they be *new, pale-coloured*, and *pure*. The mass of the eau de Cologne prepared in England, some of which possesses the most delicate fragrance, and is nearly equal to the best imported, is made *without* distillation. In the shops two kinds of this article are generally kept,—*French* and *German.* That prepared by Farina of Cologne is esteemed the best, and is preferred in the fashionable world.

Prep. 1. From *essences* of *bergamot* and *lemon*, of each, 1 fl. dr.; *oil of orange*, ½ dr.; *oil of neroli*, 20 drops; *oil of rosemary*, 10 drops; *essences* of *ambergris* and *musk*, of each, 1 drop; *rectified spirit*, ½ pint; mix.

2. *Essence of bergamot*, 3 fl. oz.; *essence of lemon*, 3 fl. dr.; *essence of cedrat*, 2 fl. dr.; *oils of neroli* and *rosemary*, of each, 1½ fl. dr.; *oil of balm*, ½ fl. dr.; *rectified spirit*, 1½ gall.; mix.

3. (Cadet Gassincourt.) Take of *pure neroli, essences* (oils) *of cedrat, orange, lemon, bergamot*, and *rosemary*, of each, 24 drops; *lesser cardamom seeds*, ¼ *oz.; spirit* at 32° Baumé (sp. gr. 0·869), 1 quart; digest a few days, and then distil 1½ pint.

4. (Farina.) Take of *rectified spirit*, 5 gall.; *calamus aromaticus, sage*, and *thyme*, of each, ½ dr.; *balm-mint* and *spear-mint*, of each, 1 oz.; *angelica root*, 10 gr.; *camphor*, 15 gr.; *petals of roses* and *violets*, of each, 3 dr.; *lavender flowers*, 1½ dr.; *orange flowers*, 1 dr.; *wormwood, nutmeg, cloves, cassia lignea*, and *mace*, of each, 20 gr.; *oranges* and *lemons*, sliced, of each, 2 in no.;

bruise or slice the solids, macerate, with agitation, for 48 hours, then distil off 2-3rds, and add to the product—*essences* of *lemon*, *cedrat*, *balm-mint*, and *lavender*, of each, 1 fl. dr.; *pure neroli* and *essence of the seeds of anthos*, of each, 20 drops; *essences of jasmine* and *bergamot*, of each, 1 fl. oz.; mix well, and filter, if necessary.

5. (P. Cod.) *Oils of bergamot*, *lemon*, and *cedrat*, of each, 3 oz.; *oils of rosemary*, *lavender*, and *neroli*, of each, 1½ oz.; *oil of cinnamon*, ¾ oz.; *spirit of rosemary*, 1 quart; *compound spirit of balm* (eau de melisse des carmes), 3 pints; *rectified spirit*, 3 gall.; digest for 8 days, then distil 3 gall.

6. (Dr. A. T. Thomson.) *Oils of bergamot*, *orange*, and *rosemary*, of each, 1 fl. dr.; *cardamom seeds*, 1 dr.; *rectified spirit* and *orange-flower water*, of each, 1 pint; mix, digest for a day, and then distil a pint.

7. (Trommsdorff.) *Oils of neroli*, *citron*, *bergamot*, *orange*, and *rosemary*, of each, 12 drops; *Malabar cardamoms*, bruised, 1 dr.; *rectified spirit of wine*, 1 quart; mix, and after standing 2 or 3 days, distil a quart.

Obs. Eau de Cologne is principally used as a perfume, but a very large quantity is consumed by fashionable ladies, as a cordial and stimulant, to drive away the vapours. For this purpose it is dulcified with sugar. A piece of linen dipped in Cologne water, and laid across the forehead, is a fashionable remedy for headache.

Eau d'Elegance. From *spirit of jessamine*, 1 pint; *rectified spirit*, and *spirits of hyacinth* and *storax*, of each, ½ pint; *tinctures of star-anise* and *tolu*, of each, 2 fl. oz.; *tincture of vanilla*, 1 fl. oz.; *essence of ambergris*, ½ dr.; mix, and in a week decant the clear portion.

Eau de Framboises. From *strawberries*, bruised, 16 *lb.*; *rectified spirit*, 1 gall.; digest, and distil to dryness in a salt-water or steam bath.

Eau d'Heliotrope. From *essence of ambergris*, ½ fl. dr.; *vanilla*, ½ oz.; *orange-flower water*, ½ pint; *rectified spirit*, 1 quart; digest a week, and filter.

Eau d'Hongrie, Eau de la Reine d'Hongrie; Aqua Hungarica, Spiritus Rosmarini Compositus; Hungary Water. A fragrant stimulant and cosmetic. Sweetened with sugar it is also used as a liqueur.

Prep. 1. *Rosemary tops*, in blossom, 4 *lb.*; *fresh sage*, ½ *lb.*; *bruised ginger*, 2 *oz.*; *rectified spirit*, 1½ gall.; *water*, ½ gall.; macerate for 10 days, add of *common salt*, 3 *lb.*; and then distil 11 pints.

2. From *oil of rosemary* (genuine), 1½ fl. dr.; *oil of lavender*, ½ dr.; *orange-flower water*, ½ pint; *rectified spirit*, 1½ pint; mix. *Spirit of rosemary* (see *p.* 1175) is now commonly sold for it.

Eau d'Ispahan. From *oil of the bitter orange*, 2 fl. oz.; *oil of rosemary*, 2 dr.; *oils of cloves* and *neroli*, of each, 1 fl. dr.; *oil of spearmint*, ½ fl. dr.; *eau de rose*, 1 pint; *rectified spirit*, 7 pints; mix. It is better for distillation. *Used* as eau de Cologne.

Eau de Jasmin. See *Esprit de Jasmin* (below).

Eau de Lavande; Lavender Water; Double distilled do.; Aqua Lavandulæ, Aq. L. Odorifera, Spiritus L.,—Lat. var. *Prep.* 1. From the *flowering tops of lavender* (freshly and carefully picked), 7 ℔; *rectified spirit*, 2 gall.; macerate for a week, add of *water*, ½ gall.; (holding in solution) *common salt*, 3 *lb.*; and distil 2 gallons.

2. From *Mitcham oil of lavender*, 8 *oz.*; *essence of musk*, 4 *oz.*; *essence of ambergris* and *oil of bergamot*, of each, 1½ *oz.*; *rectified spirit*, 2 gallons; mix well. Very fine.

3. (Brande.) *Oil of lavender*, 20 *oz.*; *oil of bergamot*, 5 *oz.*; *essence of ambergris* (finest), ½ *oz.*; *rectified spirit*, 5 gall.; mix.

Obs. The products of the last two formula are better for distillation; but in that case the essences of ambergris and musk should be added to the distilled spirit. The oils should be of the best quality, and newly distilled, and the spirit should be perfectly scentless.

It may be useful to observe here, that the common *lavender water*, *double distilled do.*, or *spirit of lavender* of the *shops*, is made with spirit at proof, or even weaker; hence its inferior quality to that of the more celebrated perfumers. 1 *oz.* of *true English oil of lavender* is all that will properly combine with 1 gall. of *proof spirit*, without rendering it muddy or cloudy.

Eau de Lavande is a most agreeable and fashionable perfume. The article produced by the *second* formula, under our inspection, has received the commendation of her Majesty and many of the nobility.

Eau de Lavande Ammoniacal. 1. To *lavender water*, 1 pint; add of *liquor of ammonia*, ½ fl. oz.

2. (P. Cod.) *English oil of lavender*, 1 oz.; *spirit of ammonia*, 2 ℔; dissolve. *Used* as a stimulating scent in fainting. See *Perfumes* (Ammoniated).

Eau de Lavande de Millefleurs. To *each* quart of the *last* (Nos. 2 or 3), add of *oil of cloves*, 1½ fl. dr.; *essence of ambergris*, ½ fl. dr.

Eau de Luce. See *Compound Tincture of Ammonia.*

Eau de Maréchale, Extrait de Maréchale. 1. From *ambergris* and *grain musk*, of each, 20 gr.; *oils of bergamot, lavender*, and *cloves*, of each, 1 *oz.; oils of sassafras* and *origanum*, of each, ½ fl. dr.; *rectified spirit*, 2 quarts; macerate with agitation for a week.

2. *Rectified spirit*, 1 pint; *essence of violets*, 1 *oz.; essences of bergamot* and *œillets*, of each ¼ *oz.; orange-flower water*, ½ pint; mix.

Eau de Melisse. See *page* 1173.

Eau de Miel; Honey Water, Sweet scented do.; Aqua Mellis, Aq. M. Odorifera,—Lat. *Prep.* 1. Take of *spirit of roses* (No. 3), 2 quarts; *spirit of jasmin* and *rectified spirit*, of each, 1 quart; *essence of Portugal*, 1 fl. oz.; *essences of vanilla* and *musk*, of each (No. 3), 4 fl. oz.; *flowers of benzoin*, 1½ dr.; mix, agitate, and add of *eau de fleurs d'oranges*, 1 quart. Delightfully fragrant.

2. *Honey* (finest), ¼ *lb.; essence of bergamot*, ½ *oz.; essence of lemon*, ¼ *oz.; oil of cloves*, 12 drops; *musk*, 12 gr.; *ambergris*, 6 gr.; *orange-flower* and *rose water*, of each, 1 quart; *rectified spirit*, 1 gall.; macerate for 14 days, with frequent agitation, and filter.

Obs. The last is often coloured with 20 or 30 gr. of saffron, and made into a *ratifia* with sugar. *Honey water for the hair* is a different article to the above. It is obtained by the *dry distillation* of *honey*, mixed with an equal weight of *clean sand*, a gentle heat only being employed. The product is yellowish, and acidulous, from the presence of acetic acid. This last is used to promote the growth of the hair.

Eau de Millefleurs, Extrait de Millefleurs. 1. From *grain musk*, 12 gr.; *ambergris*, 20 gr.; *essence of lemon*, 1½ *oz.; oils of cloves* and *lavender* (English), of each, 1 *oz.; neroli* and *oil of verbena*, of each, ½ dr.; *rectified spirit*, 2 quarts; macerate in a closed vessel, and a warm situation, for a fortnight.

2. *Balsam of Peru* (genuine), and *essence of cloves*, of each, 1 *oz.; essences of bergamot* and *musk*, of each, 2 *oz.; essences of neroli* and *thyme*, of each, ¼ *oz.; eau de fleurs d'oranges*, 1 quart; *rectified spirit*, 9 pints; mix well. Very fine.

3. *Essence of bergamot*, ¼ *oz.; eau de lavande* and *essence of jasmin*, of each, 1 *oz.; orange-flower water*, 8 fl. oz.; *rectified spirit*, 1 pint; mix.

Eau de Mousseline. From *eau de fleurs d'oranges* and *spirit of clove-gilly flower*, of each, 1 quart; *spirit of roses* (No. 3), *spirit of jasmin* (No. 4), and *spirit of orange flowers* (No 4), of each, 2 quarts; *essences of vanilla and musk*, of each (No. 3), 2 fl. oz.; *sanders wood*, ½ *oz.* Very fine.

Eau de Naphe. See *Waters.*

Eau Romain. From *essence of ambergris*, 1 fl. oz.; *tincture of benzoin*, 4 fl. oz.; *spirit of tuberose*, ½ pint; *spirit of acacia flowers* and *tincture of vanilla*, of each, 1 pint; *spirit of jessamine*, 3 pints; mix.

Eau de Rosieres. From *spirit of roses*, 1 pint; *spirits of cucumber, angelica root*, and *celery seeds*, of each, ½ pint; *spirits of jasmine* and *orange flowers*, of each, ¼ pint; *tincture of benzoin*, 2 fl. oz.; mix.

Eau sans Pareille. 1. From *essence of bergamot*, 5 dr.; *essence of lemon*, 8 dr.; *essence of citron*, 4 dr.; *Hungary water*, 1 pint; *rectified spirit*, 6 quarts; mix, and distil.

2. *Grain musk*, 20 gr.; *ambergris*, 25 gr.; *oils of lavender* and *cloves*, of each, 1 *oz.; essence of bergamot*, ½ *oz.; oils of sassafras* and *origanum*, of each, 20 drops; *rectified spirit*, 1 gall.; macerate for 14 days.

Eau de Violette. See *Esprit de Violette* (below).

Esprit d'Ambrette. See *Essences.*

Esprit de Bergamotte. From *essence* (oil) *of bergamot* (best), 5 *oz.; essence of ambergris* (pale), 2 fl. oz.; *essence of musk*, ½ fl. oz.; *oil of verbena*, 2 fl. dr.; *rectified spirit*, 1 gall.; mix.

Esprit de Bouquet. From *Mitcham oil of lavender*, 1 *oz.; oils of cloves* and *bergamot*, of each, 3 fl. dr.; *essence of musk*, 1 fl. dr.; *otto of roses*, 10 drops; *rectified spirit*, 1 quart.

Esprit de Fleurs. See *page* 1179.

Esprit de Jasmin, Eau de Jasmin. See *page* 1176.

Esprit de Jasmin Odorante. From *spirit of jasmin*, and *rectified spirit*, of each, 1 pint; *essence of ambergris*, 1 fl. dr.

Esprit de Jonquille. See *page* 1176.

Esprit de la Reine. From *oil of bergamot*, 1 fl. oz.; *essence of ambergris*, 2 fl. dr.; *otto of roses*, 1 fl. dr.; *rectified spirit*, 1 quart.

Esprit de Rondeletia, Extrait de Rondeletia. From *Mitcham oil of lavender*, 3 oz.; *oil of cloves*, 1¼ oz.; *oil of bergamot*, 1 oz.; *essences of musk* and *ambergris*, of each, 2 fl. dr.; *rectified spirit*, 3 pints.

Esprit de Rose. 1. From *spirit of roses*, 1 pint; *essence of ambergris* and *oil of rose-geranium*, of each, ½ fl. dr.

2. From *otto of roses*, 2 dr.; *neroli*, ½ dr.; *rectified spirit*, 1 gall.; dissolve, add of *chloride of calcium* (well dried and in powder), 1½ *lb.;* agitate well, and distil 7 pints. Very fine.

Esprit de Suave. From the *essences of cloves* and *bergamot*, of each, 1½ fl. dr.; *neroli*, ½ fl. dr.; *essence of musk*, 1 fl. oz.; *spirit of tuberose* and *rectified spirit*, of each, 1 pint; *spirits of jasmin* and *cassia*, of each, 1 quart; dissolve, then add of *eau de rose*, 1 pint; and mix well.

Esprit de Tain; Spirit of Lemon Thyme; Spiritus Thymi. From *tops of lemon thyme*, 2 *lb.; proof spirit*, 1 gall.; distil 7 pints.

Esprit de Violettes; Spirit of Violets, Essence of do.; Essence of Orris. From *Florentine orris root*, reduced to coarse powder, ¼ *lb.; rectified spirit*, 1 pint; by simple maceration for a fortnight. A stronger and finer article (*essence of violets*) is prepared from *orris root*, 5 *lb.*, to *rectified spirit*, 1 gall.; by percolation. See *Essences.*

Essences (Various). See *pages* 382 to 396.

Curious Essence. From *otto of roses*, 1 dr.; *essence of musk*, 3 fl. dr.; *rectified spirit*, 1 pint.

Extract of Nosegay. See *page* 437.

Extract of Peach-blossoms. See *page* 439.

Extrait de Bouquet. See *page* 437.

Extrait de Maréchale. See *page* 1178.

Extrait de Millefleurs. See *page* 1178.

Extrait de Rondeletia. See *Essences*, and *above.*

Odeur Délectable. From *oils of lavender, bergamot, rose-geranium*, and *cloves*, of each, 1 fl. dr.; *eaux de rose* and *fleurs d'orange*, of each, ¼ pint; *rectified spirit*, 1½ pint.

Odeur Suave. See *Esprits* (above).

Spirits. All the *simple perfumed spirits* or *esprits* may be prepared in one or other of the manners noticed at *pages* 1175-6. They are principally used for making the *compound eaux* and *esprits.* The same may be said of the *odoriferous tinctures* employed by perfumers. The common strength of those prepared with the oils is about ½ fl. dr. of *otto*, 1 fl. dr. of *neroli*, ½ fl. oz. of the ordinary *essential oils*, or, 2 fl. oz. of the *concentrated essences* to each pint of *spirit* at about 30 o.p. (0·880), or never weaker than proof (0·920).

Spirit of Cytherea. From the *spirits of violets, tuberose, clove-gilly-flower, jasmine* (No. 2), *roses* (No. 2), and *Portugal*, of each, 1 pint; *orange-flower water*, 1 quart; mix.

Spirit of the Flowers of Italy; Esprit de Fleurs. From the *spirits of roses* (No. 1), *jasmine* (No. 2), *oranges* (No. 3), and *cassia* (No. 2), of each, 4 pints; *orange-flower water*, 3 pints; mix.

Victoria Perfume. See *Esprit de la Reine.*

SPIROYLOUS ACID. Salicylous acid.

SPITTING OF BLOOD. See *Hæmoptysis.*

SPLINTS. See *Surgery* (Popular).

SPONGE. Syn. *Spongia*,—Lat. *Spongia Officinalis*,—Linn. Sponge is a cellular fibrous tissue produced by very small marine animals, which are called *polypi* by naturalists. The *finest quality* is imported from Smyrna, and is known as *Turkey sponge;* another called *West Indian* or *Bahama sponge* is much less esteemed, being coarse, dark coloured, and very rotten.

Sponge, as collected, and also as generally imported, contains many impurities, more especially sand, most of which may be removed by beating it, and by washing it in water. Amusing disputes often arise between the smaller importers and the wholesale purchasers, on this subject,—the privilege of beating it before weighing it, the number of minutes so employed, and even the size of the stick, being often made important matters in the "haggling."

Bleached Sponge (*White Sponge; Spongia Dealbata*) is prepared by soaking *ordinary sponge* in *very dilute hydrochloric acid*, to remove calcareous matter, then in *cold water*, changing it frequently, and squeezing the sponge out each time, and next, in *water holding a little sulphuric* or *sulphurous acid*, or still better a *very little chlorine in solution;* the sponge is, lastly, repeatedly washed and soaked in clean water, scented with *rose* or *orange-flower water*, and dried.

Burnt Sponge (*spongia usta*,—Ph. D.) is prepared by heating the *cuttings* and *unsaleable pieces* in a closed iron crucible until they become black and friable, avoiding too much heat, and allowing the whole to cool before exposing it to the air. It was formerly in great repute in bronchocele and scrofulous complaints.—*Dose.* 1 to 3 dr. in water, or made into an electuary or lozenges. —*When good*, burnt sponge evolves violet fumes of iodine on being heated in a flask along with sulphuric acid.

Compressed or Waxed Sponge (*spongia cerata, s. compressa*) is sponge which has been dipped into *melted wax*, and then compressed between two iron plates until cold. When cut into pieces it forms "*sponge tents*," which are used by surgeons to dilate wounds.

SPOTS and STAINS.—1. *Oil and grease spots* on *boards, marble, &c.*, when recent, may be removed by covering them with a *paste* made of *fuller's earth* and *hot water*, and the next day, when the mixture has become perfectly dry, scouring it off with *hot soap-and-water.* For *old spots*, a *mixture* of *fuller's earth* and *soft soap*, or a *paste* made of *fresh slaked lime* and *pearlash* will be better; observing not to touch the last with the fingers.

2. *Recent spots* of *oil, grease*, or *wax*, on *woollen cloth* or *silk*, may be removed with a little *clean oil of turpentine* or *naphtha;* or with a little *fuller's earth* or scraped *French chalk* made into a paste with *water*, and allowed

to dry on them. They may also be generally removed by means of a *rather hot flat-iron* and *blotting paper* or *spongy brown-paper*, more especially if the cloth, or one of the pieces of paper, be first slighty damped. *Old oil* and *grease spots* require to be treated with *ox-gall* or *yelk of egg* made into a paste with *fuller's earth* or *soap*. *Paint spots*, when recent, generally yield to the last treatment. *Old ones*, however, are more obstinate, and require some *fuller's earth* and *soft soap* made into a *paste* with either *ox-gall* or *spirit of turpentine*.

Fruit and *wine stains*, on *linen*, commonly yield easily to *hot soap and water*. If not, they must be treated as those noticed below.

Ink spots and *recent iron moulds* on *washable fabrics*, may be removed by dropping on the part a little *melted tallow* from a common candle, before washing the articles; or, by the application of a little *lemon juice*, or of a little *powdered cream of tartar* made into a paste with hot water. *Old ink spots* and *iron moulds* will be found to yield almost immediately to a very little *powdered oxalic acid*, which must be well rubbed upon the spot previously moistened with *boiling water*, and kept hot over a basin filled with the same.

Stains arising from *alkalies* and *alkaline liquors*, when the colours are not destroyed, give way before the application of a little *lemon juice;* whilst those arising from the *weaker acids* and *acidulous liquids* yield to the *fumes of ammonia*, or the application of a little *spirit of hartshorn* or *sal volatile*.

Stains of marking ink may be removed by soaking the part in a *solution of chloride of lime*, and afterwards rinsing it in a little *solution of ammonia* or of *hyposulphate of soda ;* or they may be rubbed with *tincture of iodine*, and then rinsed as before. See *Balls, Clothes, Hands, Scouring, &c.*

SPRAIN. Syn. *Subluxatio*,—Lat. An injury of a joint, in which it has been strained or twisted in an unnatural manner, without actual dislocation Pain, swelling, and inflammation, are the common consequences, which must be combated by purgatives, repose, and a low diet, with refrigerant lotions, or warm fomentations according to circumstances. In extreme cases, blood should be taken. Where there is simple stiffness and weakness, exercise is often serviceable.

SPRAT. The *clupea sprattus* (Linn.), a small fish of the herring family, abounding on our coasts. Gutted, coloured, and pickled, it is sold for *anchovies*, or as *British anchovies*, and much used to make the sauce of that name.

SPRUCE. See *Beer*, *Essences*, and *Powders*.

SPUNK. See *Amadou.*

SQUILL. Syn. *Scilla*,—Ph. L. E. & D. "The *recent bulb*" of "*urginea scilla, Steinheil* (*scilla maritima*, Linn.)" "Dry this as ordered for colchicum." (Ph. L.) In *small doses* squill acts as a stimulating expectorant and diuretic; in *larger ones*, as an emetic and purgative. With the first intention it is generally given in substance (powder), in *doses* of 1 to 3 or 4 gr.; with the latter, either made into vinegar or oxymel (which see). It is an excellent remedy in coughs, &c., after the inflammatory symptoms have subsided.

STAINED GLASS. The art of *painting* or *staining glass* resembles enamel painting, in the effect being produced by fluxing certain metallic substances, as oxides or chlorides, on its surface, by means of heat applied in a suitable furnace. The operations it embraces are difficult, and require great promptitude and experience to prove successful. The *colours* or *compounds* employed are, for the most part, similar to those noticed under *Enamels* and *Pastes*.

STAINS (Blood). *Spots of dried blood* on *wood, linen, &c.*, however old, are easily recognised by the microscope; but simple stains or marks of blood of a slight character, especially those occurring on *iron* or *steel*, are recognised with greater difficulty. To obviate this, H. Zollikofer adopts the following plan:—The *spot* is removed by scraping, from the *surface of the metal*, and the resulting *powder* is digested in *tepid water*, when a liquid is obtained which exhibits the following reactions:—

1. The *liquid* is neutralized with *acetic acid*, and heated to ebullition, when opalization or a dirty-red coagulum forms.

2. The *coagulum* is dissolved in *hot liquor of potassa;* the solution, if blood (*hæmatine*) be present, is diachromatic, or appears *green* by transmitted light, and *red* by reflected light.

3. By the addition of *concentrated chlorine water*, in excess, to either solution, white flocks of *albumen* and *chlorhæmatine* separate, which are free from iron, as tested by sulphocyanide of potassium.

Obs. The last two reactions are said to be characteristic. Very old spots must be boiled in water containing a little liquor of potassa.

STAINS (Bookbinder's). See *Leather, Marbling, &c.*

STAINS (Confectioner's). These are

similar to those noticed under *Liqueurs* (p. 705-6). *Mineral colours,* especially mineral blues, greens, and yellows, must on no account be used, as they are nearly all *dangerous poisons;* nor is there any inducement to use them, since the vegetable substances referred to afford, by proper management, every shade that can be possibly required. These *stains* are also used for *cakes* and *pastry.*

STAINS (Liqueur). See *Liqueurs.*

STAINS (Map). See *Maps, Velvet Painting,* and *Water Colours.*

STALL-FEEDING. See *Fattening.*

STAMMERING. Syn. *Blæsitas,*—Lat. Occasionally, this depends on some organic affection, or slight malformation of the parts of the mouth or throat immediately connected with the utterance of vocal sounds; but, much more frequently, it is an habit resulting from carelessness, or acquired from example or imitation. When the latter is the case, it may be generally removed by *perseveringly* adopting the plan of never speaking without having the chest moderately filled with air, and then only slowly and deliberately. Hasty and rapid speaking must not be attempted until the habit of stammering is completely subdued. Nervous excitement and confusion must be avoided as much as possible, and the general health attended to, as circumstances may direct. This variety of stammering is commonly distinguished by the party being able to *sing* without hesitation. *Stammering depending* on *elongation* of the *uvula,* and other like causes, may be generally removed by a very simple, safe, and almost painless operation, which in the hands of Mr. Yearsley, the eminent Surgeon-aurist, of Savile Row, does not occupy more than a few seconds.

STANNIC ACID. Peroxide of tin.

STARCH. Syn. *Amylum,*—Lat. Starch, or *pure fecula,* is one of the most important and widely diffused of the proximate principles of vegetables, being found, in greater or less quantity, in every plant. The mealy and farinaceous seeds, fruits, roots, and the stem-pith of certain trees, consist chiefly of it, in a nearly pure state. *Wheat* contains about 75%, and *potatoes* about 15% of this substance. From these sources the fecula is obtained by rasping or grinding to pulp the vegetable structure, and washing the mass upon a sieve, by which the torn cellular tissue is retained, whilst the starch passes through with the liquid, and eventually settles down from the latter as a soft, white, insoluble powder, which after being thoroughly washed with *cold water,* is dried in the air, or with a very gentle heat.

Wheat starch (*amylum,*—Ph. L. E. & D.) is commonly prepared by steeping the *flour* in *water* for a week, or a fortnight, during which time the saccharine portion ferments, and the starch granules become freed, for the most part, from the glutinous matter which envelopes them, by the disintegrating and solvent action of the lactic acid generated by the fermentation. The sour liquor is then drawn off, and the feculous residue washed on a sieve; what passes through is allowed to settle, when the liquid is again drawn off, and the starch thoroughly washed from the slimy matter; it is then drained in perforated boxes, cut up into square lumps, placed on porous bricks to absorb the moisture, and, lastly, air or stove-dried.

In the *preparation* of *starch* from *potatoes,* and other like vegetable substances, the *roots* or *tubers,* after being washed and peeled, either by hand-labour or by machinery, are rasped by a revolving grater, and the pulp washed on hair sieves until freed from feculous matter. Successive portions of the pulp are thus treated until the vessel over which the sieves are placed, or into which the washings run, is sufficiently full. The starch held in suspension in the water having subsided to the bottom, the water is drawn off, and the starch stirred up with fresh water, and again allowed to subside. This operation is repeated several times, with fresh water, until the starch is rendered sufficiently pure for commercial purposes, when it is washed and dried as before. The *waste fibres* and the *washing waters* are used as *manure.* See *Arrow-root.*

In the *manufacture* of *starch* from *rice* and *Indian corn,* a very dilute solution of *caustic soda,* containing about 200 gr. of alkali to each gallon of liquid, is employed to facilitate the disintegration and separation of the gluten and other nitrogenized matters. A weak solution of *ammonia,* or *sesquicarbonate of ammonia,* is also similarly employed with advantage. The gluten may be recovered by saturating the alkali with dilute sulphuric acid. Such starch does not require boiling, and is less apt than wheat starch to attract moisture from the atmosphere.

To *whiten* the *starches* from *damaged roots* and *grains,* and the *coarser portions* of those from sound ones, a little *solution of chloride of lime* is occasionally added to the water, followed by another water containing a *very little dilute sulphuric acid;* every trace of the last being afterwards removed by the copious use of pure soft or spring water.

The *ordinary bluish-white starch* used

by laundresses is *coloured* with a mixture of *smalts* and *alum* in *water*, and is regarded as unfit for medicinal purposes.

Prop., &c. Starch is insoluble in cold water, and in alcohol and most other liquids, but it readily dissolves in, or at least forms a gelatinous compound with water at 175° Fahr.; alcohol and most of the astringent salts precipitate it from its solutions; infusion of galls throws down a copious yellowish precipitate, containing tannic acid, which is redissolved by heating the liquid; heat and dilute acids convert it into dextrine and grape sugar; strong alkaline lyes dissolve it, and ultimately decompose it. Sp. gr. 1·53.

To the naked eye it presents the appearance of a soft, white, and often glistening powder; under the microscope it is seen to be altogether destitute of crystalline structure, but to possess, on the contrary, a kind of organization, being made up of multitudes of little rounded transparent bodies, upon each of which a series of depressed parallel rings surrounding a central spot or *hilum*, may be traced. The *starch-granules* from different plants vary both in magnitude and form. Those of *potato-starch* and *tous les mois* are the largest, and those of the *millet* the smallest, the dimensions ranging from the $\frac{1}{200}$ to the $\frac{1}{3000}$ of an inch. The *granules* of *arrow-root* and *tous les mois*, are ovoids, those of *potato starch* truncated ovoids, those of *tapioca* mullar-shaded, and those of *wheat starch* insulated globules.

Identif. One of the commonest frauds practised upon the profession and the public is the admixture of the cheaper kinds of starch, chiefly potato farina, with *arrow-root*, and vending *manufactured* for *genuine tapioca, sago*, and other articles of diet, used for invalids and children. These sophistications are most easily detected with a good microscope. M. Gobley has proposed a method for this purpose which is very simple, consisting in merely placing the various kinds of starch, in a moist state, in watch-glasses, and covering them over with a bell-glass under which there is also placed a capsule containing a little *iodine*, and leaving them in this state for 24 hours. The vapour of the iodine acts upon, and colours, all kinds of starch, but the colour it imparts varies with the different kinds. Thus the vapour of iodine colours—

Wheat-starch, violet;
Potato-starch, dove gray;
Arrow-root, bright chocolate colour;
Tapioca (unbroken), uniformly yellowish;
Tapioca (powdered), chamois colour;
White sago (entire), some granules violet gray, others yellowish;
Do. (powdered), chamois colour; and
Dextrine, unaltered.

This method, at all events, renders the detection of *potato-starch* very easy, and also whether common or potato-starch is substituted for tapioca powder; and, probably, some modification of it will render it still further applicable. See *Arrow-root, &c.*

The *measurements* and *microscopical appearances* of all the commercial starches will be found accurately described and figured in Pereira's *Elem. of Therap.* and *Mat. Med.*, vol. ii and iii.; and their *manufacture*, in Ure's *Dict. Arts. Manuf. and Mines.*

STARCH (Iodide of). Syn. *Amyli Iodidum, Amyli Iodatum*,—Lat. *Prep.* (Ph. Castr. Ruthena.) *Iodine*, 24 gr.; *rectified spirit*, a few drops; rub them to a powder; then add of *starch*, 1 oz., and again triturate, until the mass assumes a uniform colour. Recommended by Dr. A. Buchanan, of Glasgow, as producing the alterative effects of iodine, without the usual irritant action of that medicine. *Dose.* A tea-spoonful, or more, in water-gruel, or any *bland* liquid, twice or thrice a day.

STARCHING (Clear). *Muslins, &c.*, are "*clear-starched*" or "*got-up*" by laundresses in the following manner:—Rinse the *articles* in *three waters*, dry them, and dip them into thick *made-starch* which has been previously strained through a piece of muslin; squeeze them, shake them gently, and again hang them up to dry; when they are dry, dip them twice or thrice into *clear water*, squeeze them, spread them on a *linen cloth*, roll them up in it, and let them lie an hour before ironing them. Some persons put a morsel of *sugar* into the *starch* to prevent it sticking whilst ironing; and others, stir the starch with a candle to effect the same end; both these practices are as injurious as unnecessary. The best plan to *prevent sticking* is simply to use the *best starch*, and to *make it well*, and to have the *irons quite clean* and *highly polished.*

STAVESACRE. Syn. *Stavesacre Seeds; Staphisagriæ Semina; Staphisagria*,—Ph. L. & D. "The *seed* of *delphinium staphisagria*, Linn." (Ph. L.) This article is powerfully emetic and cathartic, but is now scarcely ever used internally. Mixed with hair-powder, it is used to kill lice. An infusion, or ointment, made with it is said to be infallible in itch, but its use requires some caution.

STARS. *Prep.* 1. (*Brilliant,*—Marsh.) *Nitre,* 52½ parts; *sulphur* and *black antimony,* of each, 13 parts; reduce them to powder, make this into a stiff paste with *isinglass,* 1½ part, dissolved in a mixture of *vinegar,* 6½ parts, and *spirits of wine,* 13 parts; lastly, form this into small pieces, and, whilst moist, roll them in *meal gunpowder.*

2. (*White,*—Ruggieri.) *Nitre,* 16 parts; *sulphur,* 7 do.; *gunpowder,* 4 do.; as the last.

3. (*Golden Rain.*)—*a.* (Ruggieri.) *Nitre* and *gunpowder,* of each, 16 parts; *sulphur,* 10 do.; *charcoal,* 4 do.; *lamp-black,* 2 do.; mix, and pack it into small paper tubes.

b. (Ruggieri.) *Nitre,* 16 parts; *sulphur* and *gunpowder,* of each, 8 do.; *charcoal* and *lamp-black,* of each, 2 do.; as the last.

c. (Marsh.) *Mealed gunpowder,* 66¾ parts; *sulphur,* 11 do.; *charcoal,* 22¼ do.; as before. *Used* for the "garniture" of rockets, &c.

STAYS or *corsets,* "before womanhood, are *instruments* of *barbarity and torture,* and then they are needed *only* to give beauty to the chest. It is the duty of every mother, and every guardian of children, to inquire the purpose for which stays were introduced into female attire. Was it for *warmth?* If so, they certainly fulfil the intention very badly, and are much inferior to an elastic woollen habit, or one of silk quilted with wool. Was it to *force the ribs,* while yet soft and pliable, *into the place of the liver and stomach,* and the *two latter* into *the space allotted for other parts,* to *engender disease* and *deformity to the sufferer and her children for generations?* Truly, if this were the object, the device is most successful, and the intention most ingeniously fulfilled." (Eras. Wilson.)

"Only observe," exclaimed Dr. John Hunter, "only observe, if the statue of the Medicean Venus were to be dressed in stays, and her beautiful feet compressed into a pair of execrably tight shoes, it would extort a smile from an Heraclitus, and a horse-laugh from a Cynic."

The *Italian ladies,* the most beautiful perhaps in the world, are innocent of the use of corsets. "The *Turkish ladies* express *horror* at seeing Englishwomen so tightly laced." (Lady M. W. Montague.)

STEAM. The application of steam in the laboratory, as a source of heat, is commonly effected by means of *double pans,* to the space between which steam, at a moderate pressure, is introduced; the arrangement being such as to permit of the condensed steam, or distilled water, being removed, by means of a cock, nearly as soon as formed, or as may be desirable. *Another plan* is to place *coils of metal pipe* along the bottom of *cisterns, vats, &c.,* formed either of *wood* or *metal,* and to keep them supplied with high-pressure steam.

"It is quite susceptible of positive proof, that by no arrangement yet discovered, can more than two thirds of the heat generated by a given quantity of coal, during combustion, be fairly absorbed and utilized in any of our manufactories; and, moreover, there are undeniable facts, which demonstrate that seldom, in the burning of coal, are more than three fourths of the total heat, which might be eliminated, actually obtained; thus justifying the supposition, that one half of all the coal now consumed" (even under the best circumstances) "is virtually wasted, and lost to society." To lessen, as much as possible, this loss, various improvements have been made, which, "for the most part, have consisted in lengthening the flues, and exposing a larger surface of the boiler to the action of the heated air passing from the furnace to the chimney." "Remembering that air is an extremely bad conductor of heat, and that water about to be converted into steam is also a bad conductor, it is evident that *time* must form an important element in the perfect transmission of heat from one of these to the other; and hence, with a great velocity of current existing in the flues, very little heat would pass from air, however high its temperature, to water contained in a boiler, and so circumstanced in respect to its all but gaseous condition." The results of the experiments on fuel made at the Museum of Practical Geology by Sir H. De la Beche and Dr. Lyon Playfair, go clearly to show, that "to open the damper of a steam-boiler furnace is pretty generally to diminish the effective power of the fuel." "Great waste of coal now arises from this simple circumstance; and much of the heat of the fire, which ought to go to the boiler, is lost by its (too) hasty transmission up the chimney. If, however, there be thus far room for improvement in the direction just indicated, still wider is the vacant space, caused by imperfect combustion, or, in technical phrase, 'bad stoking,'" "merely because the stoker, to economize his labour, and to avoid trouble, throws on to the bars of his furnace a thick layer of fuel, by which loss is caused in two or three directions." These are, principally, imperfect combustion, and the volatilization of the fuel, as smoke, &c., from an insufficient supply of air, and from a mass of mere red-hot coke or cinder two or three inches thick, lying between the boiler and the hottest part of the furnace; which last, according to Dr. Kennedy, is about one inch above the fire-bars. Besides which, "in passing over this red-hot coke, the carbonic acid would be converted into carbonic oxide, and thus not only remove a quantity of carbon equal to its own, without yielding any additional heat, but actually with the production of cold, or in other words, the absorption of heat." (*Dict. Arts, M. & M.*) This points to the evident policy of using a smoke-consuming furnace, as noticed elsewhere.

Another matter worthy of remark, is the *constant waste* of *heat*, and consequently of *fuel*, in laboratories and manufactories in which steam is employed, owing to the exposed condition of the *pipes*, *boilers*, and *pans*. All of these should be well "clothed" or covered by some non-conducting medium, to prevent loss of heat by radiation, and by contact with the atmosphere. Not only does economy dictate such a course, but the health and comfort of the workpeople demand that the atmosphere in which they labour should be as little heated and poisoned as possible.

TABLE *of corresponding Pressures and Temperatures of Steam.* By MM. ARAGO and DULONG.

Pressure in Atmospheres.*	Temperature, Fahr.	Pressure in Atmospheres.*	Temperature, Fahr.
	Degrees.		Degrees.
1	212·	13	380·66
1½	234·	14	386·94
2	250·5	15	392·86
2½	263·8	16	398·48
3	275·2	17	403·83
3½	285·	18	408·92
4	293·7	19	413·78
4½	300·3	20	418·46
5	307·5	21	422·96
5½	314·24	22	427·28
6	320·36	23	431·42
6½	326·26	24	435·56
7	331·7	25	439·34
7½	336·86	30	457·16
8	341·78	35	472·73
9	350·78	40	486·59
10	358·88	45	499·14
11	366·85	50	510·6
12	374·		

* Estimating 14·6 *lb.* = 1 atmosphere.

A cubic inch of water during its *conversion into steam*, under the ordinary pressure of the atmosphere, *expands* into 1696 cubic inches, or nearly a cubic foot.

One part, by weight, of *steam*, at 212° Fahr., when *condensed* into cold water, is found to be *capable of raising* 5·6 parts of the latter from the *freezing* to the *boiling point.* See *Fuel, Pit Coal, Smoke, &c.*

STEARINE. The solid portion of fats which is insoluble in cold alcohol.

Prep. Pure strained *mutton suet*, is melted in a glass flask along with 7 or 8 times its weight of *ether*, and the solution allowed to cool; the soft pasty semi-crystalline mass is then transferred to a cloth, and is strongly pressed as rapidly as possible, in order to avoid unnecessary evaporation; the solid portion is then redissolved in ether and the solution allowed to crystallize, as before. The *product* is nearly *pure.*

Prop., &c. White; semi-crystalline; insoluble in water and cold alcohol; soluble in 225 parts of cold ether, and freely so in boiling ether. It melts at 130° Fahr. The *stearine* of *commerce* is stearic acid.

STEARIC ACID. Syn. *Stearine* (Commercial), *Hypomargarulic Acid.* This is the previous substance after saponification.

Prep. 1. Repeatedly dissolve and crystallize *commercial stearic acid* in *hot alcohol,* until its melting point becomes constant at not less than 158° Fahr. Pure.

2. (Chevreul.) Saponify *mutton suet* with *caustic potassa*, and dissolve the *newly formed soap* in 6 times its weight of *hot water;* to the solution add 40 or 50 parts of *cold water*, and set the mixture aside in a temperature of about 52° Fahr.; after a time separate the pearly matter (*bistearate* and *bimargarate of potassa*) which falls, drain and wash it on a filter, and dissolve it in 24 parts of *hot alcohol* of sp. gr. 0·820; collect the *bistearate of potassa* which falls as the liquid cools, recrystallize it in *alcohol*, and decompose it, in *boiling water*, with *hydrochloric acid;* lastly, wash the disengaged *stearic acid* in *hot water*, and dry it.

3. (*Commercial.*) Ordinary *tallow* is boiled in large wooden vessels, by means of high-pressure steam, with about 16$\frac{0}{0}$ of *hydrate of lime* (equiv. to 11$\frac{0}{0}$ of pure lime) for 3 or 4 hours, or until the combination is complete, and an earthy soap is formed, when the whole is allowed to cool; the product (*stearate of lime*) is then transferred to another wooden vessel, and decomposed, by adding to it 4 parts of *oil of vitriol* (diluted with water) for every 3 parts of *slaked lime* previously employed, the action being promoted by steam heat, and brisk agitation; after repose the liberated fat is decanted from the sediment (*sulphate of lime*) and

water, and is then well washed with *water*, and by blowing steam into it; it is next allowed to cool, when it is reduced to shavings by means of a number of knives worked by machinery, and in this divided state is placed in canvass bags and submitted to the action of a *powerful hydraulic press*, by which a large portion of the oleine which it contains is expelled; the *pressed cakes* are then a second time exposed to the action of *steam* and *water*, again cooled, and coarsely powdered, and again submitted to the joint action of *steam* and *pressure;* they are lastly melted and cast into blocks for sale.

Prop., &c. Pure stearic acid forms brilliant pearly scales, which are soluble in ether, and in cold alcohol, and form salts with the bases called *stearates.* The commercial acid is made into candles. See *Fat, Fixed Oils*, and *Tallow.*

STEAROPTENE. The name given by Herberger to the concrete portion or camphor of volatile oils. Bizio calls it *stereusin.* Stearopténe corresponds to the margarine of the fixed oils.

STEEL. According to M. Bréant, the steel of which the celebrated Damascus blades are made, differs from European cast steel, in being more highly charged with carbon, and in being slowly cooled in such a manner that a crystallization takes place of two distinct combinations of carbon and iron. The orbicular veins or knots found on the Oriental scimitars are the result of the peculiar method of forging them, as well as the method of twisting the bars.

Under Mr. Heath's patent, dated 1839, ½ to 1% of *carburet of manganese* is introduced into the crucible with the broken bars of *blistered steel* ordinarily used. The cast steel thus obtained is of very superior quality, and possesses the peculiar and valuable property of being weldable to itself, and to wrought iron.

There is no test of the value of steel beyond its elasticity and temper, and the fineness, equality, and smoothness of its grain.

STEREOTYPE METAL. See *Type Metal.*

STERLING. The truth of the old proverb, that "all is not gold which glitters," is often painfully experienced by the purchaser of modern jewelry. The following table in connexion with the remarks at pages 538, and 559, will, therefore, prove highly useful to the reader in *determining* the *value* of *articles* in *gold*, provided he ascertain the "fineness" of the metal either by *examination* or *written warranty :—*

Sterling value of Gold of different degrees of "Fineness."

Carats. Fine.	Value per oz. Troy. £	s.	d.
24 *carats*	4	4	11½
23 ,,	4	1	5
22 ,, (*British standard*)	3	17	10½
21 ,,	3	14	4
20 ,,	3	10	9½
19 ,,	3	7	3
18 ,, (*lowest Hall-mark*)	3	3	8½
17 ,,	3	0	2
16 ,,	2	16	7½
15 ,,	2	13	1
14 ,,	2	9	6½
13 ,,	2	6	0
12 ,,	2	2	5½
11 ,,	1	18	11
10 ,,	1	15	4½
9 ,,	1	11	10
8 ,,	1	8	3½
7 ,,	1	4	9
6 ,,	1	1	2½
5 ,,	0	17	8
4 ,,	0	14	2
3 ,,	0	10	7½
2 ,,	0	7	1
1 ,,	0	3	6½

STEWING is a method of cooking food, intermediate to frying and boiling, performed by simmering it in a saucepan or stewpan, with merely sufficient water to prevent burning, and to effect the object in view; the whole being served up to form the "dish." It is undoubtedly the most simple and economical, and, when skilfully conducted, one of those best calculated to develope the flavour and nutritious qualities of animal food.

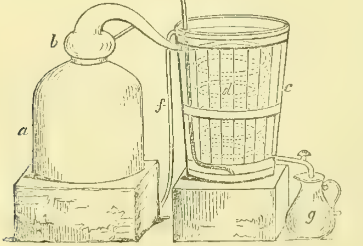
Irish Stew,—Soyer. Take about 2 *lb.* of *scrag* or *neck of mutton;* divide it into ten or twelve pieces, and lay them in the pan; add 8 *large potatoes* and 4 *onions* cut into slices, season with 1½ tea-spoonful of *pepper*, and 3 do. of *salt;* cover all with water, put it into a slow oven, or on a stove, for two hours, then stir it all up well, and serve it up in deep dishes. If a little more water is added at the commencement, you can take out, when half done, a *nice cup of broth.*

STIBETHYLE. A peculiar ethereal liquid obtained by MM. Löwig & Schweizer, by distilling *iodide of ethyle* along with an *alloy of antimony and potassium.* It is transparent, very mobile, very inflammable, smells strongly of onions, and boils at 317° Fahr.; exposed to the air it emits dense white fumes, and often inflames. *Bichloride*, *biniodide*, *binoxide*, *bisulphuret*, and some other *compounds of stybethyle*, have been formed.

STIBIC ACID. See *Antimonic Acid.*

STILBENE. A peculiar hydrocarbon, which crystallizes in scales of a pearly lustre. (Brande.)

STILL. A vessel or apparatus employed for the distillation of liquids on the large scale. The forms of stills, and the materials of which they are made, vary according to the purposes for which they are intended, some being exceedingly simple, whilst others are equally elaborate and complicated. The *Engraving* represents the most common and useful apparatus of this kind, and the one almost exclusively employed in the laboratory. It is *used* as follows:—After the *fluid* and *other matters* (if any) are put into the *still*, the *head* is placed on and connected with the *worm tub* or *refrigerator*, and the joints are all *securely luted.* For *ordinary liquids*, a *stiff paste* made with *linseed meal* and *water*, to which a little *chalk* may be added, answers well for this purpose. For *corrosive liquids* nothing is better than *elastic bands* or *rings* interposed between the joints, which are then "brought home," as it is called, with *screws* or *clamps.* Heat is next applied, and the *worm tub* is supplied with *cold water* in sufficient quantity to preserve its contents at a proper temperature; the application of the heat being so regulated that the liquid may drop from the end of the refrigerator *quite cold* and *unaccompanied with vapour.* For *highly volatile liquids* a closed receiver should be provided.



a. Body of still, which may be either placed in a steam jacket, or in a brick furnace.
b. Still head or capital.
c. Worm tub.
d. Pewter worm, or refrigerator.
e. Cold water pipe.
f. Waste pipe.
g. Receiver.

STIMMI. (Obs.) Antimony.

STIMULANTS. Syn. *Stimulantia.* Medicines or agents which possess the power of exciting vital action. They are divided into *general stimulants*, or those which affect the whole system, as mercury or bark; and *local* or *topical stimulants*, or those which affect a particular organ or part only, as mustard applied as a poultice. *Diffusible stimulants* are general stimulants, the effects of which are rapid but fugacious, as ether or alcohol. "Much discrimination and caution are required in the administration of articles of this class, because, if given when inflammation is present, they are liable to create more mischief than benefit; but they are called for when, on the decline of that condition of an organ or organs, a state of relaxation or torpidity exists. In this state of things, a gentle stimulation materially assists the functions, and is productive of much benefit."

STINGS. See *Bites and Stings.*

STIR-ABOUT. *Thick gruel* formed of *oatmeal* and *water* boiled together. When eaten with cold milk it forms the *porridge* of the Scotch; and when mixed with the liquor in which meat or vegetables have been boiled, it is called *beef brose*, *kale brose*, *&c.* See *Oats* and *Oatmeal.*

STOCK. Among *cooks*, is *condensed soup* or *jelly*, used to make *extemporaneous soup*, *broth*, *&c.*

STOKING. See *Steam.*

STOMACH AFFECTIONS. Those of a character to admit of being usefully noticed in a popular work, will be found so referred to under the heads, *Appetite*, *Dyspepsia*, *Sickness*, *&c.*

Dr. Budd, in a recent lecture, recommends *small doses* of *ipecacuanha* as a remedy for those cases of indigestion in which digestion is slow, and the food lies heavily on the stomach, and there is an inability for mental or bodily exertion for some time after meals. He says it should be given in the morning fasting, and in quantity barely sufficient to occasion a slight feeling of vermiculating motion in the stomach, but without causing any sensation of pain or nausea. The *dose* to produce this effect varies from $\frac{1}{4}$ to 2 gr. He thinks there is no other medicine which appears so effectual in removing the affections in question. *Small doses* of *rhubarb*, *ginger*, and *cayenne pepper*, have a similar kind of action, and may be given singly or together for the same purpose. "I generally prescribe from $\frac{1}{2}$ to 1 gr. of *ipecacuanha* in a pill with 3 or 4 gr. of *rhubarb.* With many, a favorite remedy for the discomfort resulting from slow digestion, is a grain of *cayenne pepper*, with 3 or 4 gr. of *rhubarb.* The best time for giving these medicines is shortly" (say ½ an hour) "before any meal after which a sense of oppression is usually felt."

STONES (Precious). See *Gems* and *Pastes.*

STONE-WARE. See *Pottery.*

STOPPERS, when obstinately immovable in bottles, are the most safely treated by patiently hitting them upwards alternately on opposite sides with a piece of wood. When this fails the part may be dipped into hot water.

STORAX. See *Styrax.*

STORM GLASS. A philosophical toy, consisting of a thin glass tube about 12 inches *long*, and ¾ inch in *diameter*, about three fourths filled with the following liquid, and covered with a brass cap having an almost capillary hole through it, or else tied over with bladder.

The Solution. Take of *camphor*, 2 dr.; *nitre*, 1½ dr.; *sal ammoniac*, 1 dr.; *proof spirit*, 2¼ fl. oz.; dissolve, and place it in the tube above referred to. *Used* to foretell changes of the weather.

STRABISMUS. Syn. *Squinting.* This need not be described. When *one eye* only *is affected*, an excellent plan is to blindfold the sound eye during several hours each day, until the affection be removed. When *both eyes are affected*, a projecting piece of pasteboard, in the line of the nose, may be worn as much as possible with the same object. In *bad cases* of *squinting inwards*, as it is called, the division of the internal rectus muscle of the eyeball, by a skilful surgeon, is said to often relieve the deformity.

STRAMONIUM. See *Thorn Apple.*

STRANGURY. See *Urine.*

STRAPPING. Spread adhesive-plaster. *Used* to dress wounds, &c.

STRASS. See *Enamels.*

STRAWBERRY. Syn. *Fragaria.* The *fruit* of *fragaria vesca* (Linn.), or *strawberry plant.* Strawberries are, perhaps, the mildest of all the cultivated fruits; they are cooling, and slightly laxative and diuretic; rubbed on the teeth they dissolve the tartar, and whiten them. They were formerly in repute in gout, stone, and consumption. The *root* of the plant is aperient.

STRAW PLAIT, and articles made of it, are *bleached* by exposing them to the *fumes* of *burning sulphur* in a close chest or box; or, by *immersing* them in a *weak solution of chloride of lime*, and afterwards well washing them in water. *Water acidulated with oil of vitriol* or *oxalic acid*, is also used for the same purpose. *Straw-plait* may be *dyed* with any of the simple liquid dyes.

STRINGS (Musical). See *Catgut.*

STRIPPING LIQUOR. A mixture of *nitre*, 1 part; with *sulphuric acid*, 8 parts. *Used* to recover the silver on old plated-goods.

STRONTIA. *Strontian*, *Protoxide of Strontium*, *Oxide of do.* The protoxide of the metal strontium.

Prep. Pure strontia is best obtained by igniting *nitrate of strontia.*

Prop., *&c.* Pure caustic strontia is a grayish-white powder, possessing an extremely pungent acrid taste; with water it forms a white hydrate (*hydrate of strontia*), which is soluble in about 50 parts of water at 60° Fahr., and in 3 or 4 parts of boiling water; the hot saturated solution deposits crystals as it cools. Hydrate of strontia closely resembles hydrate of baryta in its general appearance and properties. It readily unites with the acids forming salts; all of which may be most cheaply prepared by dissolving the native *carbonate of strontia* in the respective *acids.* The *nitrate* is the only one met with in commerce, and is employed to give a *red colour* to *fireworks.* This salt is soluble in proof spirit, and in 5 parts of cold, and less than an equal weight of boiling water.

Tests. The *solution* of *strontia* and its *hydrate* exhibit an alkaline reaction, and, like baryta, is precipitated white by sulphuric acid, and the alkaline sulphates and carbonates. It is *distinguished* from BARYTA,—1, by its inferior solubility;—2, by not being precipitated by hydrofluosilicic acid. It is *distinguished* from LIME,—1, by sulphuric acid and the soluble sulphates producing a precipitate in its solutions, either at once, or after a time, which is more soluble in water than that from lime, but quite insoluble in acids and alkalies;—2, by its strong solutions being precipitated yellow by neutral chromate of potassa. It is *distinguished* from MAGNESIA, besides other reactions, by the comparative insolubility of its sulphate. It is also *distinguished* from *each* of the *preceding earths* by its soluble salts giving a *deep carmine-red tinge* to flame; while the salts of BARYTA impart a yellow tinge, and those of LIME a yellowish-red one.

STRONTIUM. The metallic base of the earth *strontia.* It was discovered by Sir H. Davy, in 1808. It closely resembles barium, but is less lustrous. With *chlorine* it combines to form *chloride of strontium*, a somewhat deliquescent salt, soluble in 2 parts of cold, and in less of boiling water; and freely soluble in alcohol. With *oxygen* it forms a *protoxide* (strontia); and a *binoxide* or *peroxide*, which is prepared in the same manner as binoxide of barium.

STROPHULUS. A papular eruption peculiar to infants. There are several varieties:—In *strophulus intertinctus, red gum*, or *red gown*, the pimples rise sensibly above the level of the cuticle, possess a vivid red colour, and are usually distinct from each other; they commonly attack the cheeks, fore-arm, and back of the hand, and, occasionally, other parts of the body.—In *strophulus albidus* or *white gum* there are a number of minute whitish specks, which are, sometimes, surrounded by a slight redness. The two preceding varieties commonly occur during the first two or three months of lactation.—In *strophulus confertus, rank red gum*, or *tooth rash*, which usually appears about the fourth or fifth month, the pimples usually occur on the cheeks and sides of the nose, sometimes on the forehead and arms, and still less frequently, on the loins. They are smaller, set closer together, and less vivid, but more permanent than in the common red gum.—In *strophulus volaticus*, small circular patches or clusters of pimples, each containing from 6 to 12, appear successively on different parts of the body, accompanied with redness; and as one patch declines another springs up near it, by which the efflorescence often spreads gradually over the whole face and body.—In *strophulus candidus*, the pimples are larger than in the preceding, and are pale, smooth, and shining; it principally attacks the upper parts of the arms, the shoulders, and the loins. The last two varieties commonly appear between the third and ninth month.

The *treatment* of the *above affections* consists chiefly in removing *acidity* and *indigestion*, and duly regulating the bowels by an occasional dose of *magnesia* or *rhubarb*, or both combined. *Diarrhœa* may be met by the warm bath and the daily use of arrow-root (*genuine*), to which a teaspoonful or two of pure port wine has been added; and *itching* and *irritation* may be alleviated by the use of a lotion consisting of water, to which a little milk, lemon-juice, borax, or glycerine, has been added.

STRUTHEINE. An acrid bitter principle obtained from the *roots* of *gypsophila Struthium* (Linn.), a species of soap-wort. It appears to be identical with saponine.

STRYCHNINE. Syn. *Strychnina, Tetanine, Vanquelina; Strychnia*,—Ph. L. E. & D. *Prep.* 1. Dissolve *hydrochlorate* or *sulphate of strychnia* in *distilled water*, and throw down the alkaloid with *ammonia*, carefully avoiding excess; redissolve the precipitate in hot *rectified spirit*, and collect the crystals which form as the liquid cools.

2. (Ph. D.) *Nux vomica* (in powder), 1 *lb.*, is digested for 24 hours in ½ gall. of *water acidulated with* 2 fl. dr. *of sulphuric acid*, after which it is boiled for half an hour, and the decoction decanted; the residuum is boiled a *second*, and a *third* time with a fresh ½ gall. of *water acidulated with* 1 fl. dr. *of the acid*, and the undissolved matter is finally submitted to strong expression; the *decoctions* are next filtered and concentrated to the consistence of a syrup, which is boiled with *rectified spirit*, 3 pints, for about 20 minutes, *hydrate of lime*, 1 *oz.* or q. s., being added in successive portions during the ebullition, until the solution becomes distinctly alkaline; the liquid is then filtered, the spirit distilled off, and the residuum dissolved in *diluted sulphuric acid*, q. s.; *ammonia*, in *slight* excess, is added to the filtered solution, and the precipitate which falls is collected upon a paper filter, and dried; it is next re-dissolved in a minimum of *boiling rectified spirit*, and digested with ½ *oz.* of *animal charcoal* for 20 minutes; the filtered liquid, as it cools, deposits *strychnia*, in crystals.

Prop. A white, inodorous, infusible powder; or small, but exceedingly brilliant, transparent, colourless, octahedral crystals; soluble in about 7000 parts of water at 60°, and in 2500 parts at 212° Fahr.; freely soluble in hot rectified spirit; insoluble in absolute alcohol, ether, and solutions of the caustic alkalies; imparts a distinctly bitter taste to 600,000 times its weight of water, (1 part in 1,000,000 parts of water is still perceptible,—Fownes); exhibits an alkaline reaction; and forms salts with the acids, which are easily prepared, are crystallizable, and well defined.

Pur. "Crystals." "On the application of heat it liquefies (?), and if the heat be increased it is destroyed." (Ph. L.) "Nitric acid strongly reddens it" (*commercial*, not the pure); "a solution of 10 gr. in 4 fl. oz. of water and 1 fl. dr. of pyroligneous acid, when decomposed by 1 fl. oz. of concentrated solution of carbonate of soda, yields on brisk agitation a coherent mass, weighing, when dry, 10 gr., and entirely soluble in solution of oxalic acid." (Ph. E.)

Tests.—1. Potassa and its carbonate produce, in solutions of the salts of strychnia, white precipitates, which are insoluble in excess of the precipitant, and which, when viewed through a lens magnifying 100 times, appear as aggregates of small crystalline needles. In weak solutions the precipitate only separates after some time, in the form of crystalline needles, which are, however, in this case, perfectly visible to the naked eye.—2. Ammonia gives a similar precipitate, which is soluble in excess of the precipitant. —3. Bicarbonate of soda produces, in neutral solutions, a like white precipitate, which is insoluble in excess, but which re-dissolves on the addition of a *single* drop of acid; in acid solutions no precipitate occurs for some time, in the cold, but immediately on boiling the liquid.—4. Nitric acid dissolves pure strychnia and its salts to colourless fluids, which become yellow when heated. Commercial strychnia, from containing a little brucia, is reddened by this test.—5. A minute quantity of strychnia being mixed with a small drop of concentrated sulphuric acid, placed on a white capsule or slip of glass, forms a colourless solution, but yields, on the addition of a very small crystal of bichromate of potash, or a very minute portion of chromic acid, a rich violet colour, which gradually changes to red and yellow, and disappears after some time. The $\frac{1}{1000}$th of a grain yields very distinct indications. —6. Puce oxide or peroxide of lead produces a similar reaction to the last, provided the sulphuric acid contain about 1% of nitric acid.

Pois. The *characteristic symptom* is the special influence exerted upon the nervous system, which is manifested by a general contraction of all the muscles of the body, with rigidity of the spinal column. A profound calm soon succeeds, which is followed by a new tetanic seizure longer than the first, during which the respiration is suspended. These symptoms then cease, the breathing becomes easy, and there is stupor followed by another general contraction. In fatal cases, these attacks are renewed, at intervals, with increasing violence, until death ensues. One phenomenon which is only found in poisonings by substances containing strychnia, is, that touching any part of the body, or even threatening to do so, instantly produces the tetanic spasm.—*Treat.* The stomach should be immediately cleared by means of an *emetic*, tickling the fauces, &c. To *counteract* the *asphyxia* from tetanus, &c., *artificial respiration* should be practised with diligence and care. "If the *poison* has been *applied externally*, we ought immediately to *cauterize* the part, and apply a *ligature* tightly above the wound. If the *poison* has been *swallowed for some time*, we should give a *purgative clyster*, and administer *draughts* containing *sulphuric ether* or *oil of turpentine*, which in most cases produce a salutary effect. Lastly, *injections of chlorine* and *decoction of tannin* are of value."

According to M. Ch. Gunther, the greatest reliance may be placed on full doses of *opium*, assisted by venesection, in cases of poisoning by strychnia or nux vomica. His plan is to administer this drug in the form of solution or mixture, in combination with a saline aperient.

Uses, &c. It is a most *frightful poison*, producing tetanus and death in very small doses. Even $\frac{1}{24}$ gr. will *sometimes occasion* tetanic twitchings in persons of delicate temperament. $\frac{1}{4}$ gr. blown into the throat of a small dog produced death in 6 minutes. In very *minute doses* it acts as a useful tonic in various nervous diseases, chronic diarrhœa, leucorrhœa, &c.; in slightly larger ones, it has been advantageously employed in certain forms of paralysis, in tic douloureux, impotence, &c. *Dose.* $\frac{1}{24}$ to $\frac{1}{16}$ gr. (dissolved in water by means of a drop of acetic or hydrochloric acid), gradually and cautiously increased until it slightly affects the muscular system. *Externally*, $\frac{1}{8}$ to $\frac{1}{4}$ gr. at a time.

Concluding Remarks. The Edinburgh College orders the nux vomica to be exposed for two hours to steam, to soften it, then to chop or slice it, next to dry it by the heat of a vapour bath or hot air, and, lastly, to grind it in a coffee-mill. In the process of the Ph. L. 1836, *magnesia* is employed to effect the precipitation. In the present Ph. L., strychnia appears in the Materia Medica. Most of that of commerce is now obtained from *St. Ignatius' bean*, which, according to Geiseler, yields $1\frac{1}{4}$% of it; whereas 3 *lb.* of nux vomica produce little more than 1 dr. Commercial strychnia may be freed from brucia by digesting the powder in dilute alcohol.

The *salts* of *strychnia* which are occasionally asked for in trade, are the *acetate* (strychniæ acetas), *hydrochlorate* or *muriate* (s. murias,—Ph. D.), *hydriodate* (s. hydriodas), *iodate* (s. iodas), *nitrate* (s. nitras), *phosphate* (s. phosphas), and *sulphate* (s. sulphas). All of these may be easily formed by simply neutralizing the *acid* previously diluted with 2 or 3 parts of *water*, with the *alkaloid*, assisting the solution with heat; crystals are deposited as the liquid cools, and more may be obtained by evaporating the mother-liquor.

(The concluding sentence of 5, *a*, page 1029, is, unfortunately, misplaced. It should be at the end of 5, *b*.)

STUCCO. The name of several calcareous cements or mortars. *Fine stucco* is the third or last coat of three-coat plaster, and consists of a mixture of *fine lime* and *quartzose sand*, which in application is "twice hand-floated and well trowelled."

STUFFING. Seasoning placed in meat poultry, game, &c., before dressing them, in order to give them an increased relish. The same materials, formed into balls, are added to soups, gravies, &c., under the name of *forcemeat*.

Prep. 1. (For *Fowls, &c.*) Shred a little *ham* or *gammon*, some cold *veal* or *fowl*, some *beef suet*, a small quantity of *onion*, some *parsley*, a very little *lemon peel, salt, nutmeg*, or *pounded mace*, and either *white pepper* or *cayenne*, and *bread crumbs;* pound them in a mortar, and bind it with 1 or 2 *eggs*.

2. (For *Hare*, or *anything in imitation of it*,—Mrs. Rundell.) The *scalded liver*, an *anchovy*, some *fat bacon*, a little *suet*, some *parsley, thyme, knotted marjoram*, a little *shalot*, and either *onion* or *chives*, all chopped fine; with some *crumbs of bread, pepper*, and *nutmeg*, beaten in a mortar with an *egg*.

3. (For *Goose*.) From *sage, onion, suet*, and *crumb of bread*. Geese are now, however, more commonly stuffed with *veal stuffing*.

4. (For *Veal*,—Soyer.) Chop ½ *lb.* of *suet*, put it into a basin with ⅝ *lb.* of *bread crumbs*, a teaspoonful of *salt*, a ¼ do. of *pepper*, a little *thyme* or *lemon peel* chopped, and 3 *whole eggs;* mix well.—*Obs.* 1 *lb.* of *bread crumbs* and *one more egg* may be used; they will make it cut firmer. This, as well as No. 1, is now commonly employed for poultry and meat. Ude, a great authority in these matters, observes that "it would not be amiss to add a *piece of butter*, and to pound the whole in a mortar." "*Grated ham* or *tongue* may be added to this stuffing." (Rundell.) This is also used for *Turkeys*, and for "*forcemeat patties*."

STUFFING (Birds, &c.) The skins are commonly *dusted* over with a mixture of *camphor, alum*, and *sulphur*, in about equal quantities; or, they are smeared with *Bécöur's arsenical soap* noticed at *page* 1148. According to Prof. Crace Calvert, *carbolic acid*, which is worth only about 2*s.* per gall., is superior to all other substances for preserving the skins of birds and animals, as well as *corpses*.

STURGEON. Several species of *acipenser* pass under this name. The *common sturgeon* is the *acipenser sturio* (Linn.) The *roe* is made into "*caviare;*" the *swimming-bladder* into "*isinglass*."

STY. Syn. *Stye, Stian; Hordeolum*,—Lat. A small inflamed tumour, or boil, at the edge of the eyelid, somewhat resembling a barleycorn. It is usually recommended to promote its maturation by warm applications; since "the stye, like other furunculous inflammations, forms an exception to the general rule, that the best mode in which inflammatory swellings can end is resolution."

STYPHNIC ACID. Syn. *Nitrostyphnic Acid.* A compound obtained by the action of *nitric acid* (sp. gr. 1·2) upon *assafœtida, purree*, and several other *gum resins, extracts, &c.* It forms slender, yellowish-white prisms, which are sparingly soluble in water, but freely soluble in alcohol and ether. Its salts crystallize in orange-yellow needles, and detonate when heated.

STYPTICS. Syn. *Styptica.* Substances which arrest local bleeding. *Creasote, tannic acid, alcohol, alum*, and most of the *astringent salts* belong to this class.

Brocchieri's Styptic. A nostrum consisting of the *water distilled from pine tops*.

Eaton's Styptic. A *solution of sulphate* disguised by the addition of some unimportant substances. "Helvetius's styptic was for a long time employed under this title." (Paris.)

Helvetius's Styptic (stypticum Helvetii). *Iron filings* (fine) and *cream of tartar*, mixed to a proper consistence with *French brandy*. See *Helvetius's Styptic Powder* (p. 1059).

STYRACINE. A name given by Simon to a crystallizable substance extracted from storax by means of *alcohol*. It also exists under the liquid or oily form, when it is called *cinnaméine*. (See *p.* 262.)

STYRAX. Syn. *Storax, Storax Balsam; Styrax*,—Ph. L. & E. "The *liquid balsam* of an *uncertain plant*." (Ph. L.) The "*balsamic exudation* of *styrax officinale*, Linn." (Ph. E.), or *cane storax tree*. Two or three varieties are known in commerce:—*Liquid storax* (styrax liquida), *lump* or *red storax* (s. in massis), which is generally very impure; *storax in tears* (s. in lachrymis), and *storax in reeds* (s. calamita). The last are now seldom met with in trade. A fine variety of *liquid storax* (rasamala) is obtained from *liquidambar altingia* and *l. orientale*.

Prepared storax (*styrax colata; s. præparata*,—Ph. L.) is obtained by dissolving *storax*, 1 ℔, in *rectified spirit*, 4 pints, by a gentle heat, straining the solution through linen, distilling off greater part of the spirit, and evaporating what is left to a proper consistence by the heat of a water bath. It is less fragrant than the raw drug.

Storax is stimulant, expectorant, and nervine. It was formerly much used in menstrual obstructions, phthisis, coughs, asthmas, and other breath diseases. It is now chiefly used as a perfume. *Dose.* 6 to 20 or 30 gr.

A *factitious strained storax* is made as follows:—1. *Balsam of Peru*, 1 *lb.; balsam of tolu*, 4 *lb.;* mix.

2. *Gum benzoin*, 8 *lb.; liquid storax*, 6 *lb.; balsam of tolu*, and *socotrine aloes*, of each, 3 *lb.; balsam of Peru*, 2 *lb.; N. S. W. yellow gum*, 7 *lb.; rectified spirit*, 7 gall.; digest with frequent agitation for a fortnight, strain and distil off the spirit (about 5½ gall.) until the residuum has a proper consistence. *Prod.* 28 *lb.*

3. *Liquid storax*, 1 *oz.; socotrine aloes*, ¼ *lb.; balsam of tolu*, 2 *lb.; rectified spirit*, q. s.

STYROLE. An ethereal liquid, obtained by cautious distillation, from the *volatile oil of liquid storax.* It is thin; colourless; powerfully aromatic and fragrant; scarcely soluble in water; dissolves freely in alcohol and ether; boils at 293° and remains liquid at 0° Fahr. Sp. gr. 0·924. It may be also obtained from cinnamic acid. *Crude styrole* may be obtained by distilling a mixture of 3 parts of *storax*, 1 of *carbonate of soda*, and 5 of *water*. (See *pp.* 262, 785.)

STYRONE. A neutral, crystalline substance, obtained, along with *cinnamic acid*, when *styracine* is distilled with *hydrate of potassa.* It is the styrax analogue of *peruvine.*

SUB-. See *Nomenclature* and *Salts.*

SUBERIC ACID. Obtained by boiling *rasped cork* for some time in *nitric acid*, and then evaporating the liquid to one-half; the resulting crystalline powder may be purified by redissolving it in boiling water, and allowing it to neutralize. Margaric acid treated in the same way also yields *suberic acid.*

Prop., *&c.* It closely resembles mucic acid; it is colourless; sparingly soluble in cold water; fusible and volatilizable by heat; and forms salts called *suberates*, many of which are soluble and crystallizable.

SUBERINE. *Cork* deprived of all its soluble matter by the successive action of *water* and *alcohol.*

SUBLIMATE (Corrosive). See *page* 772.

SUBLIMATION. The process by which volatile substances are reduced to the state of vapour by heat, and again condensed in the solid form. It differs from ordinary distillation in being confined to dry solid substances, and in the heat employed being, in general, much greater. *Calomel, corrosive sublimate*, and *sal ammoniac*, are thus prepared.

SUBSTANTIVE COLOURS. In the *art of dyeing*, are such as impart their tints to cloth and yarns without the intervention of a mordant; in contradistinction to ADJECTIVE COLOURS, "which require to be fixed by certain *intermedes*, or substances which have a joint affinity for the colouring matter and the material to be dyed." (Brande.)

SUCCEDANEUM. See *Tooth-cements, &c.*

SUCCIN, *Succinum.* Amber.

SUCCINIC ACID. Syn. *Acid of Amber, Volatile Salt of do.; Sal Succini; Acidum Succinicum*,—Ph. D. 1826. *Prep.* From *amber*, in coarse powder, mixed with an equal weight of *sand*, and distilled by a gradually increased heat; or from the *impure acid* obtained during the distillation of oil of amber; the product in both cases being purified by wrapping it in bibulous paper and submitting it to strong pressure, to remove the oil, and then resubliming it. *It may also* be *prepared* from the *mother-liquor* of *suberic acid*, by evaporation and digesting the resulting crystals in *ether*, to remove suberic acid.

Prop., *&c.* Colourless, inodorous (when pure), crystalline scales or prisms; soluble in 5 parts of cold, and in 2½ parts of boiling water; fusible and volatile without decomposition. Its *salts* are called "*succinates*," most of which are soluble.—*Succinate of ammonia* is used as a test for iron.—*Succinamide* is a compound formed by the action of ammonia water on succinic ether;—*bisuccinamide*, by heating anhydrous succinic acid in dry gaseous ammonia.—*Succinone* is an oily liquid obtained by distilling succinic acid with lime.—*Succinic acid* has been recently formed by a process of fermentation from *malic acid.* It is *distinguished* from *benzoic acid* by its greater solubility, and by giving a brownish or pale red bulky precipitate with sesquichloride of iron in neutral solutions; whereas that with benzoic acid is paler and yellower.

Uses, *&c.* Succinic acid is antispasmodic, stimulant, and diuretic, but is now seldom used. *Dose.* 5 to 15 gr.

SUCCORY. Chicory or wild endive. (See *p.* 236.)

SUDORIFICS. See *Diaphoretics.*

SUET. Syn. *Sevum, Sebum*,—Lat. This is prepared from the *fat* of the loins of the *sheep* (or *bullock*), by melting it by a gentle heat, and straining the liquid fat. In this state it forms the *adeps ovillus* (Ph. D.), *sevum* (Ph. L. & E.), *sevum ovillum*, or *sevum præparatum*, employed in *medicine* and *perfumery*, as the basis of *ointments, cerates, plasters, pommades, &c.*

SUET (Melilot). Syn. *Sevum Meliloti*,

—Lat. *Prep.* From *suet*, 8 *lb.; melilot leaves*, 2 *lb.;* boil until the leaves are crisp, strain, and allow it to cool very slowly, so that it may "grain well." *Used* by farriers, and to make melilot plaster.

SUFFOCATION. The *treatment* varies with the cause. See *Animation* (Suspended), *Charcoal, Drowning, Hanging, Sulphuretted Hydrogen, &c.* Suffocation from *coal gas* may be treated like that from charcoal; and that resulting from the inhalation of the *gas* from *cess-pools, grave-yards, sewers, &c.*, in the manner noticed under *sulphuretted hydrogen.*

SUGAR. Syn. *Cane Sugar; Sucre*,—Fr. *Saccharum*,—Lat. This well-known and most useful substance is found in the juice of many of the canes or grasses, in the sap of several forest trees, and in the roots of various plants. In *tropical climates* it is extracted from the sugar-cane (*arundo saccharifera; saccharum officinarum*,—Linn.); in *North America* from the sugar maple (*acer saccharinum*,—Linn.); and in *France* from white beet-root (*beta vulgaris alba*,—Linn.). The ordinary sugar used in England is extracted from the sugar-cane which is raised so abundantly in our numerous colonies.

The *manufacture of sugar* is exclusively conducted on the *large scale.* The *recent canes* are crushed between rollers, and the *expressed juice* is suffered to flow into a suitable vessel, where it is slowly heated to nearly the boiling-point, to coagulate albuminous matter. A *small quantity* of *milk of lime* is then added, to remove mechanical impurities, and the *skimmed* and *clarified juice*, after being sufficiently concentrated by rapid evaporation in open pans, is transferred to *coolers*, and thence into upright casks perforated at the bottom, and so placed that the *syrup*, or uncrystallizable portion, may drain off into a tank or cistern from the *newly formed sugar.* During the period of crystallization it is frequently agitated in order to hasten the change, and to prevent the formation of large crystals. The *solid portion* of the product forms *moist, raw*, or *muscovado sugar;* the uncrystallizable syrup, *molasses* or *treacle.*

Raw sugar is *refined* by re-dissolving it in *water*, adding to the solution a *little albumen*, under the form of *serum of blood* or *white of egg*, and, sometimes, a little *lime-water*, and heating the whole to the boiling-point; the *impurities* are then removed by careful *skimming*, and the syrup is *decolored* by *filtration* through recently burnt *animal charcoal;* the clear decolorized syrup is next evaporated to the crystallizing-point *in vacuo*, and at once transferred into *conical earthen-moulds*, where it solidifies, after some time, to a confusedly-crystallized mass; this, when *drained, washed* with a *little clean syrup*, and *dried in a stove*, constitutes ordinary *loaf, lump*, or *refined sugar.* When the crystallization is allowed to take place quietly and slowly, the product is *sugar-candy.* The *production of molasses* in the rude colonial manufacture is chiefly the result of the high and long-continued heat applied to the cane-juice, an error avoided in the "sugar-refining."

Prop. Sugar requires for its solution only 1-3rd of its weight of cold, and still less of boiling water; it is slowly dissolved by cold rectified spirit; it dissolves in 4 parts of boiling rectified spirit, and in 80 parts of boiling absolute alcohol; it melts by heat and cools to a glassy amorphous mass (*barley sugar*); at about 400° Fahr. it suffers rapid decomposition, and fuses to a brown, uncrystallizable mass (*caramel*); long boiling with water increases its colour, and lessens its tendency to crystallize; its aqueous solution dissolve alkalies, earths, and many metallic oxides with facility; weak syrups take up about half as much *hydrate of lime* as they contain sugar; when slowly crystallized it assumes the form of oblique 4-sided prisms, terminated by 2-sided summits. Sp. gr. 1·60, (1·577, —Ure.)

Pur. Moist or muscovado sugar, and crushed lump sugar are *occasionally* adulterated with *chalk, plaster, sand, potato flour*, and other *fecula;* but *frequently*, and in certain neighbourhoods, CONSTANTLY, with *starch-sugar* or *potato-sugar.* These frauds may be detected as follows:—

Tests.—1. *Pure cane sugar* dissolves freely and entirely in both water and proof spirit forming transparent colourless solutions, which are unaffected by either sulphuretted hydrogen or dilute sulphuric acid.—2. Its solution bends the luminous rays in circumpolarization to the *right*, whereas grape and fecula sugars bend it to the *left.*—3. (Chevallier.) Boiled for a short time in water containing 2 or 3% of caustic potassa the liquid remains colourless; but it turns brown, which is more or less intense, according to the quantity, if starch sugar is present. Even 2 or 3% of starch sugar may be thus detected.—4. (E. Krantz.) A filtered solution of 33 gr. of cane or beet sugar in 1 fl. oz. of water, mixed with 3 gr. of pure caustic potassa, and then agitated with

1½ gr. of sulphate of copper in an air tight bottle, remains clear, even after the lapse of several days; but if starch sugar be present, a red precipitate is formed after some time; and if it is present in considerable quantity, the copper will be wholly converted into oxide within 24 hours, the solution turning first blue or green, and then entirely losing its colour.—5. (*Trommer's Test.*) A solution of cane sugar is mixed with a solution of sulphate of copper, and caustic potassa added in excess; a blue liquid is obtained, which, on being heated, is at first but little altered; a small quantity of red powder falls after a time, but the liquid long retains its blue tint. When *grape-sugar*, or *fecula sugar*, is thus treated, the first application of heat throws down a copious greenish precipitate, which rapidly changes to scarlet, and eventually to dark red, leaving a nearly colourless solution. This is an excellent test for distinguishing the two varieties of sugar, or discovering an admixture of grape-sugar with cane-sugar. The $\frac{1}{1000}$th part of *grape-sugar* may be thus detected. The *proportion of oxide of copper* produced, affords a good criterion, not only of the *purity of the sugar*, but also, of the *extent* of the adulteration.—6. (Ure.) Dissolve a little sulphate of copper (say 20 gr.) in a measured quantity of water, and add to it, in the cold, a solution of caustic potassa, until, by testing with turmeric paper, the liquid appears faintly alkaline, shown by the paper becoming *slightly* brown. If a small quantity of this test-liquor (previously well-shaken) be added to an aqueous solution of the sugar, and the whole boiled, the solution becomes at first green, and then olive-green, if *dextrine* is present; but if it contain *grape-sugar*, the salt of copper is immediately reduced into the state of orange and oxide; whilst a solution of *pure cane-sugar* undergoes *no change*, or is scarcely altered.—7. The presence of the inspissated sweet waste liquor (*crude glycerine*) of the stearine manufactories, now a common adulterant, may be detected by the inferior sweetness, and by the moist and "sickly" appearance of the sugar.—8. The specific gravities and crystalline forms offer other means of distinguishing the varieties of sugar.

Concluding Remarks.— Refined sugar (*saccharum*,—Ph. L.; *s. purum*,—Ph. E.; *s. purificatum*,—Ph. D.), raw sugar (*s. commune*,— Ph. E.), and molasses or treacle (*sacchari fæx*,—Ph. L. & E.) are officinal.

The *relative sweetening power* of *cane sugar* is estimated at 100; that of *pure grape sugar*, at 60; that of *fecula* or *starch sugar*, at 30 to 40.

According to Messrs. Oxland's method (patented 1849) of *defecating* and *bleaching* the juice of beet-root, cane, &c., *acetate of* alumina, formed by dissolving 4 *lb.* of that earth in acetic acid, is boiled with each ton of sugar, and as soon as the acetic acid is nearly all driven off, a solution of tannin, formed from 1 *lb.* of bruised valonia and 2 gall. of hot water, is added to the boiling syrup; the excess of alumina is afterwards separated by lime, and the usual method of further procedure adopted. By their *second patent* (1851), *superphosphate of alumina* or *of lime* is substituted for acetate of alumina, in the proportion of about 6 *lb.* of alumina, dissolved in phosphoric acid, for each ton of sugar.

Sugar may be *obtained* from nearly all *sweet vegetable substances*, by a process essentially similar to that described above.

SUGAR (Acid of). See *page* 918.

SUGAR (Alum). Syn. *Saccharum Aluminatum*, *Alumen Saccharinum*,—Lat. From *alum* and *white sugar*, in fine powder, equal parts, formed into minute sugar-loaf shaped lumps with *mucilage of gum arabic* made with rose water. *Used* to make astringent lotions and eye-waters.

SUGAR (Barley). Syn. *Saccharum Hordeatum*, *Penidium*, *Saccharum Penidium*,—Lat. *Prep.* Take of *saffron*, 12 gr.; *hot water*, q. s.; infuse for 20 minutes, strain, and add of *white sugar*, 1 *lb.;* boil to a full *candy height*, or that state called "*crack*," or "*crackled sugar*," when 2 or 3 drops of clear *lemon juice* or *white vinegar* must be added, and the pan removed from the fire and set for a single minute in *cold water* to prevent its burning; the sugar must be then at once poured out on an *oiled marble slab*, and either cut into pieces, or rolled into cylinders, and twisted in the usual manner. 1 drop of *oil of citron*, *orange*, or *lemon*, will flavour a considerable quantity. *White barley-sugar* is made with a *strained decoction of barley* instead of water, or starch is added to whiten it.

SUGAR (Beet-root). Syn. *Saccharum Betæ*,—Lat. See *page* 1192.

SUGAR-BOILING. The art or business of the confectioner or sugar-baker; the candying of sugar. The stages are as follow:—*Well clarified* and *perfectly transparent syrup*, is boiled until a "skimmer" dipped into it, and a portion "touched" between the forefinger and thumb, on opening them, is drawn into a small thread, which crystallizes and breaks. This is called a "*weak candy height.*" If *boiled* *again*, it will draw into a larger string, and if bladders may be blown through the "drippings" from the ladle, with the mouth, it has acquired the second degree, and is now called "*bloom sugar.*" After *still further boiling* it arrives at the state called "*feathered sugar.*" To determine this, re-dip the skimmer, and shake it over the pan, then give it a sudden flirt behind, and the sugar will fly off like feathers. The *next degree* is that of "*crackled sugar;*" in which state the sugar that hangs to a stick dipped into it, and put directly into a pan of *cold water*, is not dissolved off but turns hard and snaps. The *last stage* of refining this article reduces it to what is called "*carmel sugar;*" proved by dipping a stick first into the sugar, and then into cold water, when, on the moment it touches the latter, it will, if matured, snap like glass. It has now arrived at a "*full candy height.*" Care must be taken throughout that the fire is not too fierce, as by flaming up against the sides of the pan, it will burn and discolour the sugar; hence, the boiling is best conducted by steam heat.

Any *flavour* or *colour* may be given to the candy by adding the colouring matter to the syrup before boiling it, or the flavouring essences when the process is nearly complete. See *Stains, &c.*

SUGAR CANDY. Syn. *Saccharum Candidum, S. Crystallinum, S. Crystallizatum,*—Lat. *Sugar* crystallized by leaving the *saturated syrup* in a warm place (90 to 100° Fahr.), the shooting being promoted by placing *sticks*, or *threads*, at small distances from each other in the liquor; it is also deposited from *compound syrups*, and does not seem to retain much of the foreign substances with which they are loaded. *Brown sugar-candy* is prepared in this way from raw sugar; *white do.*, from refined sugar; and *red do.*, from a syrup of refined sugar which has been coloured red by means of *cochineal.*

Sugar candy is chiefly *used* as a sweetmeat; and, being longer in dissolving than sugar, in coughs, to keep the throat moist; reduced to powder, it is also blown into the eyes, as a mild escharotic in films or dimness of that organ.

SUGAR (Diabetic). Grape sugar found in the urine of persons labouring under *diabetes.*

SUGAR (Gelatine). See *Glycocine.*

SUGAR (Grape). Syn. *Glucose, Fruit Sugar; Saccharum Uvæ, S. Fructûs,*—Lat. This substance is found in the juice of grapes and other fruit, in the urine of diabetic patients, and in the liquid formed by acting on starch and woody fibre with dilute sulphuric acid.

Prep. From the *juice of ripe grapes* or an *infusion* of the *ripe fruit* (raisins), by saturating the acid with *chalk*, decanting the clear liquid, evaporating to a syrup, clarifying with *white of egg*, or *bullock's blood*, and then carefully evaporating to dryness; it may be purified for chemical purposes by solution and crystallization in either *water* or *boiling alcohol.* Like other sugar, it may be decoloured by animal charcoal.

In the ordinary process of refining, crude grape sugar yields 75% of a *white granular sugar*, and 24% of *treacle.*

Prop. It is less sweet and less soluble than cane sugar, requiring 1½ parts of cold water for its solution; instead of bold crystals it forms granular warty masses, without distinct crystalline faces; it does not easily combine with either lime, or oxide of lead; with heat, caustic alkaline solutions turn it brown or black, but it dissolves in oil of vitriol without blackening, the reverse being the case with cane sugar; with chloride of sodium it forms a soluble salt which yields large, regular, and beautiful crystals. Sp. gr. 1·400.

Obs. Cane sugar is converted into grape sugar during the process of fermentation, and by the action of acids. See *Sugar* (*p.* 1192.) and *Starch Sugar* (below).

SUGAR (Lemon). Syn. *Saccharum Limoniatum,*—Lat. See *Lemonade Powders.*

SUGAR (Maple). Syn. *Saccharum Acerinum,*—Lat. From the *juice* of the *sugar maple.* The *average product* from each tree is about 6 *lb.* per season. (See *p.* 1192.

SUGAR OF LEAD. See *page* 679.

SUGAR OF MILK. Syn. *Lactine; Saccharum Lactis,*—Ph. D. *Prep.* Gently evaporate *clarified whey* until it crystallizes on cooling, and purify the crystals by digestion with *animal charcoal,* and repeated crystallizations.

Prop., &c. White, translucent, very hard, cylindrical masses or four-sided prisms; soluble in about 6 parts of cold, and in 2 parts of boiling water; it is unsusceptible of the vinous fermentation, except under the action of dilute acids, which convert it into grape sugar; in solution, it is converted into lactic or butyric acid by the action of caseine and albuminous matter. Milk contains about 5% of it. (Boussingault.)

Obs. Sugar of milk is chiefly imported from Switzerland. In this country it is chiefly used as a vehicle for more active medicines; especially among the homœopathists.

SUGAR (Starch). Syn. *Potato Sugar, Fœcula do.* This is grape sugar obtained by the action of diastase on starch in the manner noticed under *Dextrine* and *British gum;* or by the action of dilute sulphuric acid on starch, or of the strong acid on lignine, or on substances containing it.

Prep. 1. *Potato fecula,* 100 parts; *water,* 400 parts; *sulphuric acid,* 6 parts; mix, boil for 35 or 40 hours, adding *water,* to make up for evaporation; then saturate the acid with lime or chalk, decant or filter, and evaporate the clear liquor. Under pressure, the conversion is more rapid. *Prod.* 105%.

2. *Shreds of linen* or *paper,* 12 parts; *strong sulphuric acid,* 17 parts, (Braconnot;—5 of acid, and 1 of water,—Vogel;) mix in the cold; in 24 hours dilute with *water,* and boil it for 10 hours; then neutralize with chalk, filter, evaporate to a syrup, and set the vessel aside to crystallize. *Prod.* 114%. Sawdust, glue, &c., also yield grape sugar by like treatment. See *p.* 691.

SUGARS (Medicated). Syn. *Saccharides; Sacchara Medicata; Saccharolés, Saccharures.* Some of these are prepared by moistening *white sugar* with the *medicinal substance,* then gently drying it, and rubbing it to powder; in other cases they are obtained in the manner noticed under *Pulverulent Extracts* (*p.* 446), or *Oleosaccharum.* The most valuable preparation of this class in British pharmacy is the *saccharated carbonate of iron,* (ferri carbonas cum saccharo,—Ph. L.)

SUGAR PLUMS. Syn. *Bon-bons, Dragées.* These are made by various methods, among which are those noticed under *Confectionery Drops, Lozenges,* and *Pastils,* to which may be added the following:—Take a quantity of *sugar-syrup* in the proportion to their size, in that state called a "blow," (which may be known by dipping the skimmer into the sugar, shaking it, and blowing through the holes, when parts of light may be seen;) and add a drop or two of any esteemed *flavouring essence.* If the *bon-bons* are preferred white, when the sugar has cooled a little, stir it round the pan till it grains, and shines on the surface. When all is ready pour it through a funnel into little *clean, bright, leaden moulds,* which must be of *various shapes,* and be previously slightly moistened with *oil of sweet almonds;* it will then take a proper form and harden. As soon as the plums are cold take them from the moulds; dry them for two or three days in the air, and put them upon paper. If the *bon-bons* are required to be *coloured,* add the *colour* just as the sugar is ready to be taken off the fire.

Crystallized bon-bons are *prepared* by dusting them with powdered *double-refined lump sugar* before drying them.

Liqueur bon-bons, now so beautifully "got up" by the Parisian confectioners, are obtained by pressing pieces of *polished bone* or *metal* into *finely powdered sugar,* filling the hollow spaces so formed with *saturated solutions of sugar* in the respective *liqueurs,* and then spreading over the whole an ample layer of *powdered sugar.* In the course of three or four days the bon-bons may be removed, and *tinted* by the artist at will. Instead of white powdered sugar ordered above, *coloured sugar* may be used. These bon-bons are found to be hollow spheres, containing a small quantity of the spirit or liqueur employed; and will bear keeping for many months. See *Sweetmeats, &c.*

SUGAR RESIN. See *Sugar Xyloidine.*

SULFAMIDE. A remarkable crystallized compound formed by the action of *anhydrous sulphuric acid* on *anhydrous ammonia.*

SULFIMIDE. From *anhydrous sulphurous acid* and *ammonia,* as the last.

SULPHAMYLIC ACID. A new acid formed by the action of equal parts of *potato-oil* and *oil of vitriol* on each other. After the mixture has become blackened, it is diluted with *water,* saturated with *carbonate of baryta,* filtered and crystallized by gentle evaporation; the crystals (*sulphamylate of baryta*) are purified by re-solution and re-crystallization, and are ultimately decomposed by *dilute sulphuric acid;* from the resulting clear liquid *sulphamylic acid* may be obtained in a crystalline form by cautious evaporation. The *sulphamylates of baryta, lead, lime,* and *potassa,* are soluble and crystallizable.

SULPHARSENIOUS ACID. See *page* 86.

SULPHATED BONES. See *Coprolite, Superphosphate of Lime,* and *Manures.*

SULPHATE. Syn. *Sulphas,*—Lat. A salt of sulphuric acid.

The *soluble sulphates* may be *recognised* by—1. Yielding a heavy, white, pulverulent precipitate with chloride of barium or nitrate of baryta, which is insoluble in either hydrochloric or nitric acid.—2. Acetate or nitrate of lead gives a heavy white precipitate, which is only sparingly soluble in dilute nitric acid, but completely soluble in hot strong hydrochloric acid.

An *insoluble sulphate* may be tested by mixing it with 3 times its weight of carbonate of potash or soda (both in fine powder), exposing the mixture in a platinum crucible to a red heat for ½ an hour, dissolving the mass in water, filtering, neutralizing the free alkali with acetic or hydrochloric acid, and then applying the reagents as before.

The *sulphates* of *baryta*, *tin*, *antimony*, *bismuth*, *lead*, and *mercury* are INSOLUBLE; those of *strontia*, *lime*, *zirconia*, *yttria*, and *silver*, very SPARINGLY SOLUBLE; the *other sulphates* are, for the most part, FREELY SOLUBLE in water.

The *sulphates* of the *alkalies*, *earths*, and *common metals*, when mixed with charcoal and heated to redness, suffer decomposition, a *sulphuret* of the base being formed.

SULPHIDES. See *Sulphuret.*

SULPHINDYLIC ACID. Syn. *Sulphindigotic Acid.* An intensely blue pasty mass, formed by dissolving 1 part of *indigo* in about 15 parts of *concentrated sulphuric acid.*

Prop. &c. It forms blue *salts* with the bases which are freely soluble in *pure* water, but quite insoluble in saline solutions. The purple powder left undissolved on diluting the acid product, when the acid used has been too small in quantity, or the digestion too brief, is soluble in a large quantity of pure water. (See *p.* 597.)

SULPHISATHYDE, *bisulphisathyde*, *sulfasathyde*, *sulfesathyde*, *&c.* See *Isathyde.*

SULPHITE. See *Sulphurous Acid.*

SULPHOBENZIDE. A crystalline substance which separates when a mixture of *benzole* and *anhydrous sulphuric acid* is largely diluted with *water.* It is purified by washing it with water, dissolving it in ether, and crystallizing by spontaneous evaporation. It fuses at 212° Fahr., and is volatile.

SULPHOBENZOIC ACID. A bibasic, crystallizable acid, formed by the direct union of *benzoic acid* and *anhydrous sulphuric acid;* the viscid mass is dissolved in water, the solution saturated with *carbonate of baryta*, and *hydrochloric acid* added to the filtered liquid; *sulphobenzoate of baryta* crystallizes out, from which the *sulphobenzoic acid* may be obtained by decomposing it with *dilute sulphuric acid.*

SULPHOCYANIC ACID. See *page* 587.

SULPHOCYANIDES. See *below.*

SULPHOCYANOGEN. Syn. *Bisulphuret of Cyanogen.* A light, insoluble, deep yellow powder, discovered by Liebig, and obtained by saturating a *concentrated solution of a metallic sulphocyanide* with *chlorine;* or by heating it with *nitric acid.* Its compounds are the *sulphocyanides* or *hydrosulphocyanates.* Most of these may be formed by directly saturating *hydrosulphocyanic acid* with the *oxide*, or *hydrate of the base;* or, from the *sulphocyanide of potassium*, and a soluble salt of the base, by double decomposition. (See *page* 587.)

SULPHOFORM. Syn. *Sulphoformum*, —Lat. An oily liquid obtained by distilling a *mixture* of *iodoform*, 1 part; with *sulphuret of mercury*, 3 parts. Its properties are undetermined.

SULPHOGLYCERIC ACID. See *below.*

SULPHOHYDRIC ACID. See *p.* 583.

SULPHOLEIC ACID. When *olive oil* is slowly and cautiously mixed with half its volume of *concentrated sulphuric acid*, all rise of temperature being avoided, a homogeneous liquid is obtained, which, when mixed with a little water, separates into two layers, the undermost consisting of *sulphoglyceric acid* and free sulphuric acid, and the upper and syrupy portion, of two compound acids, the *sulphomargaric* and *sulpholeic.* These latter dissolve in a large quantity of water, but after some time undergo decomposition into sulphuric acid and several new fatty acids, to which the names *metamargaric*, *hydromargaric*, *hydromargaritic*, *metoleic*, and *hydroleic* are given. (See *p.* 585.)

SULPHOMARGARIC ACID. See *Sulpholeic Acid.*

SULPHOMETHYLIC ACID. A peculiar acid substance formed from *sulphate of methyle* by the action of *water.* The action is slow in the cold, but more rapid with heat, and is accompanied with violence at the boiling temperature. Its salts are called *sulphomethylates.*

SULPHONAPHTHALIC ACID. A crystallizable acid compound, formed along with another acid, by dissolving naphthaline in *warm oil of vitriol*, diluting the solution with *water*, and saturating it with *carbonate of baryta;* the resulting baryta salt (the most soluble of the two) crystallizes from a hot solution, and *sulphonaphthalic acid* is afterwards obtained from it by the addition of *dilute sulphuric acid.*

SULPHOPHENIC ACID. A syrupy liquid, formed by the union of *sulphuric acid* with *hydrated oxide of phenyle.*

SULPHOSACCHARIC ACID. *Prep.* Melted *grape-sugar* is cautiously mixed with *concentrated sulphuric acid;* the *product* is dissolved in *water*, and neutralized with carbonate of baryta; sulphate of baryta is formed together with a soluble sulphosaccharate of that earth, from which the acid itself may be afterwards eliminated. It is a sweetish liquid, forming a variety of soluble salts (*sulpho-saccharates*), and is very prone to decompose into sugar and sulphuric acid.

SULPHOSELS or *sulphosalts.* See *Salt* (p. 1119).

SULPHOSINAPISINE. A crystallizable compound obtained from *mustard seed.*

SULPHOTULUOLIC ACID. A fluid acid compound resulting from the combination of *tuluole* with *fuming sulphuric acid.*

SULPHOVINIC ACID. Syn. *Œnothionic Acid, Ethereo-Sulphuric do., Bisulphate of Oxide of Ethyle; Acidum Sulphovinicum,*—Lat. *Prep.* 1. Mix equal weights of *sulphuric acid* and *alcohol,* and, in half an hour, add as much *carbonate of lead* as acid employed, or q. s. to remove all the free sulphuric acid present; filter, when a *solution* of *sulphovinic acid* will be obtained.

2. Strong *rectified spirit* is mixed with twice its weight of *concentrated sulphuric acid;* the mixture is heated to its boiling point, and then left to cool; when cold, it is diluted with a large quantity of *water,* and neutralized with *carbonate of baryta;* (much sulphate of baryta is produced;) the mass is placed upon a cloth filter, drained, and pressed; the *clear solution* is evaporated to a small bulk by the heat of a *water bath,* filtered from a little sulphate, and left to crystallize; the product is *sulphovinate of baryta,* in very beautiful colourless, transparent crystals. These crystals dissolve in about an equal weight of cold water, and the *hydrated acid* may be procured by exactly precipitating the base by *dilute sulphuric acid,* and evaporating the filtered solution, *in vacuo,* at the temperature of the air.

Prop., &c. A sour syrupy liquid, very easily decomposed by heat, and even by long exposure in the vacuum of the air-pump. Combined with the bases, it forms salts called *sulphovinates,* which may be purified by re-solution and re-crystallization. *All* the *sulphovinates* are soluble; the solutions are decomposed by ebullition; and most of them crystallize well. Heated with hydrate of lime or baryta, the *sulphovinates* yield a *sulphate of the base* and *alcohol.*

SULPHUR. Syn. *Brimstone; Soufre,*—Fr. *Sulphur,*—Lat. An undecompounded substance, or chemical element, the general properties of which are well known. That of commerce is chiefly imported from Sicily and Italy, and is a volcanic production.

Var. The principal of these are—

Amorphous Sulphur, Brown do.; Sulphur amorphum, S. fuscum, S. informe, S. rubrum,—Lat. Prepared from *sublimed sulphur,* by melting it, increasing the heat to from 320° to 350° Fahr., and continuing it at that temperature for about half an hour, or until it becomes brown and viscid, and then pouring it into water. In this state it is ductile like wax, may be easily moulded in any form, is much heavier than usual, and when it has cooled does not again become fluid until heated to above 600° Fahr. The same effect is produced more rapidly by at once raising the temperature of the melted mass to from 430° to 480° Fahr.

Precipitated Sulphur, Hydrate of sulphur, Milk of do.; Sulphuris hydras, Lac sulphuris; Sulphur precipitatum,—Ph. L. *Prep.* From *sublimed sulphur,* 1 part; *dry* and recently *slaked lime,* 2 parts; *water,* 25 parts, or q. s.; boil for 2 or 3 hours, dilute with 25 parts more of *water,* filter, and precipitate with *dilute hydrochloric acid;* drain, and well wash the precipitate, and dry it by a gentle heat. Resembles sublimed sulphur in its general properties, but is much paler, and in a finer state of division. "Pale yellow" (not white),—Ph. L.

Roll Sulphur, Cane do., Stick do.; Sulphur in bacculis, S. in rotulis, S. rotundum,—Lat. This is *crude sulphur,* purified by melting and skimming it, and then pouring it into moulds. That obtained during the roasting of copper pyrites, and which forms the common roll sulphur of England, frequently contains from 3 to 7% of yellow arsenic.

Sublimed Sulphur, Flowers of sulphur; Flores sulphuris; Sulphur,—Ph. L. *Sulphur sublimatum,*—Ph. E. & D., & Ph. L. 1836. Prepared by subliming sulphur in iron vessels. For *medical purposes* it is ordered to be well washed with water, and dried by a gentle heat. In this state it forms the *washed sulphur* (*sulphur lotum,*—Ph. L. 1824) of old pharmacy. In this state it is "of a lemon colour; is sublimed at the heat of 600° Fahr., and is entirely soluble in oil of turpentine aided by heat." (Ph. L.) "When washed with water, it (the liquid) does not alter the colour of litmus." (Ph. L. 1836.)

Sulphur Vivum, Black sulphur, Crude do., Horse brimstone; Sulphur nigrum, S. caballinum, S. griseum,—Lat. This is crude native sulphur. It is a gray or mouse-coloured powder. The residuum in the subliming pots from the preparation of *flowers of sulphur* is now commonly substituted for it. It generally contains much arsenic, and is consequently *very poisonous.*

Pur. The *sublimed sulphur* of the shops is now, in general, of respectable quality, but the *precipitated sulphur* frequently contains about ⅔rds of its weight of sulphate of lime (*plaster of Paris*), owing to the substitution of *sulphuric acid* for hydrochloric acid in its manufacture. *This fraud* is readily *detected* by strongly heating a little of the suspected sample in an iron spoon or shovel, when the sulphur is burnt or volatilized, and leaves behind the sulphate of lime as a white ash; this, when mixed with water, and gently dried, gives the amount of the adulteration. *A still simpler plan* is to dissolve out the sulphur in the sample with a little hot oil of turpentine or liquor of potassa; the undissolved portion is foreign matter.

Prop. Sulphur melts to a clear thin fluid, and volatilizes at about 232° Fahr., and in open vessels rapidly takes fire, burning with a bluish flame. It is insoluble in both water and alcohol; it is soluble in oil of turpentine and the fatty oils, and freely so in bisulphuret of carbon and hot liquor of potassa. With oxygen it unites to form *oil of vitriol* and *sulphurous acid*, and with the metals to form *sulphurets.* Sp. gr. 1·982 to 2·045.

Estim. The determination of the quantity of *sulphur*, *phosphorus*, and *chlorine*, in a state of combination, especially in organic mixtures, is often rather troublesome. The proportion of SULPHUR is best determined by oxidizing a *known weight of the substance* by *strong nitric acid*, or by *fusing* it in a silver vessel with 10 or 12 times its weight of *pure hydrate of potassa* and about half as much *nitre.* The sulphur is thus converted into sulphuric acid, the quantity of which can be determined by *dissolving the fused mass in water*, acidulating the solution with *nitric acid*, adding a salt of *baryta*, and weighing the resulting *sulphate.* PHOSPHORUS is, in like manner, oxidized to *phosphoric acid*, the quantity of which is determined by precipitation in combination with *sesquioxide of iron*, or otherwise. The CHLORINE is correctly determined by placing a small weighed portion in a *combustion-tube*, which is afterwards filled with fragments of *pure quicklime.* The lime is then brought to a red-heat, and the vapour of the liquid driven over it, when *chloride of calcium* is formed. The *contents of the tube*, when cold, are dissolved in *dilute nitric acid*, filtered, the chlorine precipitated by *nitrate of silver*, and the chlorine weighed under the form of *chloride of silver.* See *Organic Bodies.*

Uses, &c. Sulphur is extensively used in the manufacture of gunpowder, in bleaching, &c., &c. When swallowed it acts as a mild laxative and stimulating diaphoretic; and has hence been long taken in various chronic skin diseases, in pulmonary, rheumatic, and gouty affections, and as a mild purgative in piles, prolapsus ani, &c. *Externally*, it is extensively used in skin diseases, especially the itch, for which it appears a specific. *Dose.* 12 or 15 gr. to 2 dr., in sugar, honey, treacle, or milk.

Obs. According to Dr. J. Hannon, amorphous sulphur possesses properties of a very energetic kind, and approaches in activity to the alkaline sulphurets, without possessing any of their inconveniences. "Yellow sulphur very rarely succeeds against gout and rheumatism; but brown (amorphous) sulphur succeeds invariably; and in much smaller doses." He says it is obtained in the most active state by decomposing sulphuret of copper by aqua regiæ; observing to add the latter, until all the newly-formed sulphate has been dissolved, and changed into chloride of copper. The viscous sulphur floats on the surface of the fluid in the form of globules of different sizes, which are to be collected and washed. *Another plan* is to mix 2 parts of *nitrate of potassa* with 2 parts of *chloride of sodium*, and to add to the mixture 1 part of *sulphuret of copper*, obtained either directly or by precipitation; from this mixture there will result a viscous sulphur by adding *dilute sulphuric acid*, until no further effervescence takes place. The *dose* is 5 to 15 or 20 gr., made into pills with *balsam of tolu.*

SULPHUR (Bromide of). A reddish, oily-looking liquid, prepared by dissolving *sulphur* in *bromine.* It is easily decomposed, particularly by water.

SULPHUR (Chlorides of). 1. *Dichloride* or *Subchloride.* Prepared by passing *dry chlorine gas* over the surface of *sulphur* melted in a bulbed-tube or small retort connected with a well-cooled receiver. The *product* is a deep orange-yellow and very mobile liquid, which possesses a disagreeable odour, and boils at 280° Fahr.

2. *Chloride* or *Protochloride.* A red liquid, formed by exposing the *dichloride* for some time to the action of *chlorine*, and then distilling it in a stream of that gas. It sinks in water, and boils at 147° Fahr. (See *below.*)

3. *Chloride*, *Hypochloride*, or *Hypochlorite* of the shops; *Sulphuris Chloridum*, *S. Hypochloridum*, *S. Hypochloritis*,—Lat. This is prepared by spreading *washed sulphur* thinly on the bottom of a wooden box, or other chamber, and passing *chlorine gas*

slowly over it until it ceases to be absorbed.

Obs. This compound is of variable and undetermined constitution. It has been recommended for *internal use*, by Derksengi, in old gouty affections combined with pains in the stomach, and in severe nervous fever. *Dose.* ½ to 2 gr., dissolved in ether, and taken with old Hungary wine. It is also used *externally* in *psoriasis inveterata*, and other skin diseases.

SULPHUR (Hypochlorite of). See *above.*

SULPHUR (Iodide of). Syn. *Biniodide of Sulphur; Sulphuris Iodidum,*—Ph. L. *Sulphur Iodatum,*—Ph. D. *Prep.* Into a glass flask put 1 part of *sublimed sulphur*, and over it place 4 parts of *iodine;* insert the cork loosely, and place the flask in a *water bath;* as soon as its contents melt, stir them with a glass rod, replace the cork, remove the bath from the fire, and let the whole cool together. When cold, break the iodide into pieces, and place it in a wide-mouthed stoppered bottle. In this way a beautiful semi-crystalline, dark grey mass, resembling antimony, is obtained. The formulæ of the Ph. L. E. & D., Ph. U. S. & P. Cod., are essentially similar. The Ph. D. orders the two substances to be powdered and mixed before heating them.

Uses, &c. It is stimulant and alterative. An ointment made of it has been recommended by Biett and others in tuberculous affections of the skin, in lepra, psoriasis, lupus, porrigo, &c.

Iodide of sulphur stains the skin like iodine, and is readily decomposed by contact with organic substances. "From 100 gr. diligently boiled in water, a residue of about 20 gr. of sulphur is obtained." (Ph. L.)

SULPHURATION. The process by which silk, cotton, and woollen goods, straw plait, &c., are subjected to the fumes of burning sulphur, or sulphurous acid, for the purpose of bleaching or decolouring them. On the *large scale*, this is effected in closed apartments, called "*sulphuring rooms,*" to which sufficient air only is admitted to keep up the slow combustion of the sulphur. On the *small scale*, as for straw hats, bonnets, &c., a large wooden chest is frequently employed in the same way.

SULPHURET. Syn. *Sulphide; Sulphuretum, Sulphidum,*—Lat. Sulphurets are compounds of sulphur with the electro-positive or inflammable bodies.

The *sulphurets* are *prepared* by—heating a *mixture* of the *metal* and *sulphur*, in equivalent proportions, in a covered crucible,—by igniting a mixture of the *metallic oxide* and *sulphur,*—by depriving a *sulphate of the base* of its oxygen, by igniting it in contact with *charcoal,*—or by precipitating a *salt of the base* by *sulphuretted hydrogen* or a *soluble metallic sulphuret.*

The *sulphurets* are mostly opaque, brittle fusible, semi-metallic bodies; those of *mercury* and *arsenic* are volatile, and those of the *alkalies* and the *earths* soluble in water.

The *sulphurets* often unite among themselves, forming crystallizable compounds analogous to salts, and, hence, termed *sulphosalts* by chemical writers.

The insoluble *sulphurets* may be either tested directly, by treating them with dilute sulphuric acid when they evolve sulphuretted hydrogen, or by converting their sulphur into sulphuric acid, in the manner noticed under *Sulphur.*

Nitroprusside of sodium has recently been proposed by Dr. Playfair as a most delicate test for the *alkaline sulphurets*, with which it strikes a most beautiful violet colour. This salt is prepared by treating 2 parts of *powdered ferrocyanide of potassium* with 5 parts of *common nitric acid*, previously diluted with its own volume of *water;* the solution, after effervesence has ceased, is digested by a gentle heat, until salts of protoxide of iron no longer yield with it a blue, but a slate-coloured precipitate; it is now allowed to cool, after which it is filtered, neutralized with *carbonate of soda*, and again filtered; the *filtrate*, on evaporation, gives a crystallization of nitrate of potassa and soda, together with the *new salt;* the *crystals of the latter* are then selected and purified by crystallization. They are rhombic, and of a splendid ruby colour. (The other *nitroprussides* are formed in a similar manner.)

SULPHURETTED HYDROGEN. See *page* 583.

SULPHURIC ACID. Syn. *Oil of Vitriol, Vitriolic Acid, Monohydrated Sulphuric Acid; Acidum Sulphuricum,*—Ph. L. & E. *Acidum Sulphuricum Venale,*——Ph. D. *Acidum Vitriolicum,*—Ph. L. 1788. This acid, in a concentrated form, was discovered by Basil Valentine towards the end of the 15th century. At first it was obtained by the distillation of green vitriol; but is now made by bringing the *fumes* arising from the slow combustion of *sulphur* into contact with those evolved from a *mixture* of *nitre* and *oil of vitriol*, so that the former becomes oxidized at the expense of the latter. The process is conducted in a series of leaden chambers, having a *little water* on the floor, to absorb the acid, and so arranged as to prevent the loss of gas. As soon as the water, or rather liquid acid, has acquired the sp. gr. of 1·350 to 1·450, it is drawn off, and concentrated in *leaden boilers* to the density of 1·659 to 1·700; after which it is further concentrated in *green-glass* or *platinum retorts*, until the sp. gr. reaches 1·842 to 1·844. When cold, the clear acid is put into large globular bottles of green glass (*carboys*), surrounded with straw and basket work, and is sent into the market under the name of *oil of vitriol.*

Purif. Commercial sulphuric acid frequently contains *nitrous acid, arsenic*, and *saline matter.* The *first* of these may be removed by adding about 1½ gr. of *sugar* to each fluid ounce of the *acid*, heated to nearly its boiling point, and continuing the heat until the dark colour at first produced shall have disappeared, when it should be distilled; or ⅛ to ½ of 1% of *sulphate of ammonia* may be substituted for the sugar, and the acid heated to ebullition for a few minutes, by which the most impure acid may be rendered absolutely free from nitric acid and nitrous oxide. The ARSENIC may be got rid of by adding a little *sulphuret of barium*, or *copper-foil* to the acid, agitating the mixture well, and after repose decanting, and distilling it. SALINE MATTER may be removed by simple rectification. "The *distillation* is most conveniently conducted, on the *small scale*, in a *glass retort*, containing a few *platinum chips*, and heated by a *sand bath* or *gas flame*, rejecting the first ½ fl. oz. that comes over." (Ph. E.) In the new Ph. D., the *first tenth* of the *distillate* is ordered to be rejected, and the process to be stopped when no more than about 1 fl. oz. is left in the retort. According to Dr. Ure, the capacity of the retort should be from 4 to 8 times as great as the volume of the acid, and connected with a large tubular receiver, by a loosely fitting glass tube, 4 feet long and 1 to 2 inches in diameter. "The receiver should not be surrounded with cold water." We find that *fragments of glass*, or of *rock crystal*, may be advantageously substituted for platinum foil to lessen the explosive violence of the ebullition. Sulphuric acid, which has become *brown* by exposure, may be decolorized by heating it gently, the carbon of the organic substances being thus converted into carbonic acid.

Prop. Commercial sulphuric acid (*oil of vitriol*) is a colourless, odourless, acrid, and highly corrosive liquid, the general properties of which are well known. Its sp. gr. at 60° should never be *greater* than 1·8450, or *less* than 1·840. 1 fl. oz. *weighs* 14 dr. It is immediately coloured by contact with organic matter. It attracts water so rapidly from the atmosphere when freely exposed to it, as to absorb 1-3rd of its weight in 24 hours, and 6 times its weight in a few months. When 4 parts are suddenly mixed with 1 part of water, the temperature of the mixture rises to about 300° Fahr.; whilst 4 parts of pounded ice mixed with 1 part of acid sinks the thermometer to some degrees below zero. It freezes at about — 20°, and boils and distils over at 620° Fahr. It exhibits all the properties of the acids in an exalted degree. Its salts are called *sulphates.*

Pur. "Free from colour and odour. Sp. gr. 1·843. 100 gr. are saturated by 285 gr. of crystallized carbonate of soda." (Ph. L.) "What remains after the acid is distilled to dryness, does not exceed $\frac{1}{400}$th part of its weight. Diluted sulphuric acid is not discoloured by sulphuretted hydrogen." (Ph. L. 1836.) "Diluted with its own volume of water, only a scanty muddiness arises, and no orange fumes escape. Sp. gr. 1·840." (Ph. E.) The RECTIFIED ACID (*acidum sulphuricum purum*,—Ph. E. & D.) is "colourless; dilution causes no muddiness; solution of sulphate of iron shows no reddening at the line of contact when poured over it. Sp. gr. 1·845." (Ph. E.) Sp. gr. 1·846,—Ph. D.; 1·842,—Ure.

Tests.—See *Sulphate.*

Uses.—Sulphuric acid is much employed in the arts, and, from its superior affinity, to disengage most of the other acids from their saline combinations, in chemical processes. In the diluted state it is used in medicine. When swallowed, it acts as a violent corrosive poison. The antidotes are *chalk, whiting, magnesia, carbonate of soda*, or *carbonate of potash*, mixed with water, or any bland diluent, and taken freely, an emetic being also administered.

Estim. The *strength* of *sulphuric acid* is most correctly ascertained by its power of saturating bases. In *commerce* it is usually determined from its sp. gr. The *quantity* of *sulphuric acid present in a compound* may be determined by weighing it under the form of sulphate, as explained in a former part of this volume. See *Acidimetry* (and *below*).

TABLE *of the quantity of Oil of Vitriol and Dry Sulphuric Acid in* 100 *parts of the Dilute Acid at different Densities.* By Dr. URE.

Liquid Acid.	Sp. Gr.	Dry Acid.	Liquid Acid.	Sp. Gr.	Dry Acid.	Liquid Acid.	Sp. Gr.	Dry Acid.	Liquid Acid.	Sp. Gr.	Dry Acid.
100	1·8485	81·54	75	1·6520	61·15	50	1·3884	40·77	25	1·1792	20·38
99	1·8475	80·72	74	1·6415	60·34	49	1·3788	39·95	24	1·1706	19·57
98	1·8460	79·90	73	1·6321	59·52	48	1·3697	39·14	23	1·1626	18·75
97	1·8439	79·09	72	1·6204	58·71	47	1·3612	38·32	22	1·1549	17·94
96	1·8410	78·28	71	1·6090	57·89	46	1·3530	37·51	21	1·1480	17·12
95	1·8376	77·46	70	1·5975	57·08	45	1·3440	36·69	20	1·1410	16·31
94	1·8336	76·65	69	1·5868	56·26	44	1·3345	35·88	19	1·1330	15·49
93	1·8290	75·83	68	1·5760	55·45	43	1·3255	35·06	18	1·1246	14·68
92	1·8233	75·02	67	1·5648	54·63	42	1·3165	34·25	17	1·1165	13·86
91	1·8179	74·20	66	1·5503	53·82	41	1·3080	33·43	16	1·1090	13·05
90	1·8115	73·39	65	1·5390	53·00	40	1·2999	32·61	15	1·1019	12·23
89	1·8043	72·57	64	1·5280	52·18	39	1·2913	31·80	14	1·0953	11·60
88	1·7962	71·75	63	1·5170	51·37	38	1·2826	30·98	13	1·0887	10·41
87	1·7870	70·94	62	1·5066	50·55	37	1·2740	30·17	12	1·0809	9·78
86	1·7774	70·12	61	1·4960	49·74	36	1·2654	29·35	11	1·0743	8·97
85	1·7673	69·31	60	1·4860	48·92	35	1·2572	28·54	10	1·0682	8·15
84	1·7570	68·49	59	1·4760	48·11	34	1·2490	27·72	9	1·0614	7·34
83	1·7465	67·68	58	1·4660	47·29	33	1·2409	26·91	8	1·0544	6·52
82	1·7360	66·86	57	1·4560	46·48	32	1·2334	26·09	7	1·0477	5·71
81	1·7245	66·05	56	1·4460	45·66	31	1·2260	25·28	6	1·0405	4·89
80	1·7120	65·23	55	1·4360	44·85	30	1·2184	24·46	5	1·0336	4·08
79	1·6993	64·42	54	1·4265	44·03	29	1·2108	23·65	4	1·0268	3·26
78	1·6870	63·60	53	1·4170	43·22	28	1·2032	22·83	3	1·0206	2·446
77	1·6750	62·78	52	1·4073	42·40	27	1·1956	22·01	2	1·0140	1·63
76	1·6630	61·97	51	1·3977	41·58	26	1·1876	21·20	1	1·0074	·8154

SULPHURIC ACID (Alcoholized). Syn. *Eau de Rabel,*—Fr. *Acidum Sulphuricum Alcoholisatum,*—Lat. *Prep.* (P. Cod.) To *rectified spirit,* 3 parts; add, very gradually, *sulphuric acid,* 1 part. It is generally coloured by letting it stand over a little *cochineal.* Refrigerant, and, externally, escharotic. *Dose.* ½ fl. dr. to water, 1 pint; as a cooling drink in fevers, &c.

SULPHURIC ACID (Anhydrous). Syn. *Dry Sulphuric Acid; Acidum Sulphuricum sine Aquâ,*—Lat. *Prep.* 1. By heating *Nordhausen acid* in a glass retort connected with a well-cooled receiver.

2. (Barreswill.) 2 parts of the *strongest oil of vitriol* are *gradually* added to 3 parts of *anhydrous phosphoric acid,* contained in a retort surrounded by a *freezing mixture;* when the compound has assumed a brown colour, the retort is removed from the bath, and connected with a receiver which is set there in its place; a gentle heat is now applied to it, when white vapours pass over into the receiver and condense there under the form of beautiful silky crystals. The *product* equals in weight that of the phosphorus originally employed. "If a few drops of water be added, a *dangerous explosion* ensues."

Prop. White, silky, asbestos-like crystals; deliquesces rapidly and fumes in the air; put into water it hisses like a red-hot iron; it melts at 66°, and boils at about 105° Fahr.; it does not redden dry litmus paper; sp. gr. 1·97 at 78° Fahr.

SULPHURIC ACID (Aromatic). Syn. *Elixir of Vitriol, Acid do. do.; Acidum sulphuricum aromaticum,*—Ph. E. & D. *Prep.* 1. (Ph. E. & D.) *Oil of vitriol,* 3½ fl. oz.; *rectified spirit,* 1½ pint; mix, add of *powdered cinnamon,* 1½ oz.; *powdered ginger,* 1 oz.; digest for 6 days (7 days,—Ph. D.), and filter. Sp. gr. 0·974,—Ph. D.

2. (*Wholesale.*) From *compound tincture of cinnamon,* 1 gall.; *oil of vitriol,* 1 *lb.;* mix, and in a week filter. *Dose.* 10 to 30 drops, in the same cases as the dilute acid.

SULPHURIC ACID (Dilute). Syn. *Spirit of Vitriol; Acidum Sulphuricum Dilutum,*—Ph. L. E. & D. *A. Vitriolicum D.,*—Ph. L. 1788. *Spiritus Vitrioli Tenuis,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) Take of *sulphuric acid,* 15 fl. dr.; and dilute it gradually with *distilled water,* q. s. to make the whole exactly measure a pint. Sp. gr. 1·103. "1 fl. oz. of this acid is exactly saturated by 216 gr. of crystallized carbonate of soda."

2. (Ph. E.) *Sulphuric acid,* 1 fl. oz.; *water,* 13 fl. oz. Sp. gr. 1·090.

3. (Ph. D.) *Pure sulphuric acid,* 1 fl. oz.; *distilled water,* 13 *oz.* Sp. gr. 1·084.

4. (*Henry's.*) Sp. gr. 1·135. Has the same saturating power as his hydrochloric, and nitric acid. *Used* for assays.

Prop., *&c.* Antiseptic, tonic, and refrigerant. *Dose.* 10 to 30 drops, largely diluted with water, several times daily; in low typhoid fevers, passive hæmorrhages, profuse perspiration, in various skin diseases to relieve the itching, in dyspepsia, &c. It is also used *externally.*

SULPHURIC ACID (Nordhausen). Syn. *Fuming Sulphuric Acid; Acidum Sulphuricum Fumans,*—Lat. *Prep.* By distilling *calcined sulphate of iron* in an earthen retort. The *product* is a brown, oily liquid, which fumes in the air, is intensely corrosive, and has a sp. gr. about 1·900. It is chiefly *used* for dissolving indigo.

SULPHURIC ACID (Oxygenized). Formed by adding *sulphate of silver* to the *oxygenized hydrochloric acid* of Thénard, and afterwards precipitating a part of the sulphuric acid with *solution of baryta.* (See *p.* 17.)

SULPHURIC ETHER. See *page* 398.

SULPHUROUS ACID. Syn. *Acidum Sulphurosum,*—Lat. This acid is freely evolved in the gaseous form when *sulphur* is burnt in *air* or *dry oxygen;* and when the *metals* are digested in *hot sulphuric acid;* and, mixed with carbonic acid, when *charcoal, chips of wood, cork,* and *sawdust,* are treated in the same way.

Prep. 1. By the action of *sulphuric acid* on *clippings of copper* or *mercury* at a gentle heat. Pure.

2. (Berthier.) By heating, in a glass retort, a *mixture* of *black oxide of manganese,* 100 parts; and *sulphur,* 12 or 14 parts. Pure. The gas evolved should be collected over mercury, or received into water, when it forms *liquid sulphurous acid.*

3. (Redwood.) *Pounded charcoal,* ½ *oz.; oil of vitriol,* 4 fl. oz.; mix in a retort, apply the heat of a spirit lamp, and conduct the evolved gases by means of a bent tube into a bottle containing *water.* The *sulphurous acid* is absorbed, whilst the *carbonic acid gas* passes off.

Prop., *&c.* Water absorbs 30 times its volume of this gas. *Pure liquid sulphurous acid* can only be obtained by passing the *pure dry gas* through a glass tube surrounded by a powerful freezing mixture. Its sp. gr. is 1·45; boiling point 14° Fahr.; it causes intense cold by its evaporation. *Sulphurous acid* forms salts called *sulphites.*

Uses. To bleach silks, woollens, straw, &c., and to remove vegetable stains and iron-moulds from linen. For these purposes it is prepared from saw-dust or any other refuse carbonaceous matter.

SUMACH. This dye stuff is chiefly used as a substitute for galls. With a *mordant* of *acetate of iron,* it gives GRAY or BLACK; with *tin* or *acetate of alumina,* YELLOW; and with *sulphate of zinc,* a YELLOWISH BROWN; alone it gives a GREENISH FAWN-COLOUR.

SUMBUL. Syn. *Musk Root; Jatamansi.* A substance introduced to British medicine by Dr. A. B. Granville, in 1850. It occurs in circular pieces, varying from 1 to 3 or 4 inches in diameter; has a musk-like-odour, and a sweet balsamic taste. It acts as a powerful stimulant, especially of the nervous system. In India and Persia it has long been used as a medicine, a perfume, and as incense. *Dose.* 15 gr. to 1 dr., either masticated, or made into an infusion, electuary, or tincture; in cholera, hysteria, neuralgia, epilepsy, low fevers, and various other spasmodic and nervous disorders.

SUMMER DRINKS. See *Lemonade, Sherbet, &c.*

SUN PAINTING. Syn. *Heliography, Heliotype, Photography, Phototype, &c.* Names which apply to the production of pictures upon any medium by means of light; but principally to those on paper. Those on metal are distinguished by the name of their inventor, Daguerre. The methods of obtaining pictures in this way essentially consist in coating or saturating any surface with a material the chemical constitution of which is easily affected by the rays of light, exposing it in this state in the camera obscura; then "fixing" or developing the picture so formed by appropriate reagents; and, lastly, when necessary, removing or dissolving off the undecomposed sensitive medium from the surface of the paper or plate. The minutiæ of the different processes vary much from each other, but in all, considerable experience and tact in manipulating is essential to *great* success in their application. No real difficulty, however, exists in any of them.

The limits of this work will not permit us to describe the *processes* of the *Daguerreotype* and the numerous *methods* of *photography* now practised, as we first intended. Mere names and quantities, without very full and explicit directions, would prove useless to the reader. We must, therefore, refer him to the various little treatises published on the subject by Messrs. Knight & Son, and others, in which the details are minutely explained. The same remarks apply to the *solutions* and *other preparations* used in *photography*, the strength of which are regulated by the *particular process* which they are intended for, and the immediate effect to be produced.

SUPER-. See *Nomenclature.*

SUPPER. The evening meal; the last meal of the day. *Supper* is generally an unnecessary meal, and when either heavy, or taken at a period not long before that of retiring to rest, proves nearly always injurious, preventing sound and refreshing sleep, and occasioning unpleasant dreams, night-mare, biliousness, and all the worst symptoms of imperfect digestion. Cases of sudden death during sleep, arising from the stomach being overloaded with undigested food, are far from rare. The *last meal* of the day should be taken at least *three hours* before bedtime. Even when it consists of some "trifle," as a sandwich or biscuit, an interval of at least *an hour* should elapse before retiring to rest. In this way restlessness and unpleasant dreams will become rare. See *Meals, Watchfulness, &c.*

SUPPOSITORY. Syn. *Suppositorium*, —Lat. A medicine placed in the rectum for the purpose of remaining there, and dissolving gradually. The mode of proportioning the doses has been noticed in the article *Enema.*

SUPPOSITORY (for Piles). Syn. *Suppositorium Hæmorrhoidale, S. Sedativum*, —Lat. *Prep.* 1. *Powdered opium*, 2 gr.; *finely-powdered galls*, 10 gr.; *spermaceti cerate*, 1 dr.

2. (Ellis.) *Powdered opium*, 2 gr.; *soap*, 10 gr ; mix.

3. (Richard.) *Extracts of opium* and *stramonium*, of each, 1 gr.; *cocoa nut butter*, 2 dr. *Used* when the piles are very painful.

SUPPOSITORY (Purgative). Syn. *Suppositorium Catharticum*,—Lat. *Prep.* 1. *Soap*, 1 dr.; *elaterium*, 1 to 2 gr.; mix. As a strong purge.

2. (Niemann.) *Soap*, 2 dr.; *common salt*, 1 dr.; *honey*, q. s.; mix. As a mild cathartic.

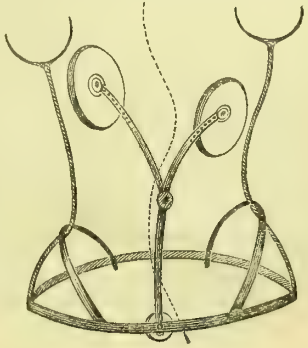
SUPPOSITORY (Resolvent). Syn. *Suppositorium Resolvens*,—Lat. *Prep.* (Stafford.) *Iodide of potassium*, 3 to 4 gr.; *extracts of henbane* and *hemlock*, of each, 6 gr. In enlargement or induration of the prostate gland.

SUPPOSITORY (Sedative). See *above.*

SUPPOSITORY (Vermifuge). Syn. *Suppositorium Anthelminticum, S. Vermifugum*, —Lat. *Prep.* (Swediaur.) *Aloes*, 4 dr.; *common salt*, 3 dr.; *flour*, 2 dr.; *honey*, q. s., to make a stiff mass; divide into proper-shaped pieces weighing about 15 gr. each. One to be used after each motion.

SURGERY (Popular). Under this head we proposed, in a collective form, briefly to refer to certain matters which commonly fall under the care of mothers, nurses, &c.; or, which it may be useful to emigrants, and to persons residing in "out of the way" localities to be able to attend to. Much that we had prepared on this subject (as in the case of *sun painting*, and various other heads), we are compelled to omit, in order to bring our book within the limits which our publisher, no doubt judiciously, deems desirable for the work. We must, therefore, content ourselves with referring the reader to the various useful remarks connected with the subject which lie scattered through this volume, as well as to those below.

Deformities arise from various causes. Sometimes the parties are born with them; at other times they arise from violence; but, more frequently, perhaps, from debility or disease, either natural, or the result of mismanagement in infancy and childhood. Of these, deformities of the spine are usually the most difficult of cure, and the most distressing in their consequences. The only useful mode of *treatment*, in these cases, appears to consist in the *judicious application* of *mechanical means*, assisted by the usual *medical efforts* to restore or improve the general health. Among "*spinal appliances*" no apparatus is better calculated to effect the object in view, than that which has for its action the *gradual* reduction of the several prominences (*arcs of curve*), and the consequent rectification of the vertebral column. The mechanical principle known as the "rack and pinion" appears more particularly adapted to this purpose, by admitting of a *gradual* increase of the rectifying power, entirely at the will of the medical attendant and the patient. A greatly improved apparatus of this discription is shown in the *Engraving.*



It *consists* of *two metal uprights* upon which the arms rest: a *band* that passes around the pelvis, and is secured to the hips by semicircular pieces of light metal: from the back of this band is affixed a *steel stem* with a *pad* at the upper end, and having its point of motion at the pelvic band, but, unlike the ordinary apparatus, it is in *one piece*, and *curved rather sharply* in its centre, from which another point of motion is established by means of a *second stem* and *plate* resting against the opposite side. The *conjoined motion* of the two resembles the *closing of a pair of scissors*, and acting in opposite directions, *gradually*, but *surely*, depresses the arc of each curve, as required, and produces a straightened or normal condition of the spine.

Rupture or *hernia*, as commonly met with, is the protrusion of some of the viscera of the abdomen out of that cavity into a kind of sac, composed of the portion of the peritonæum which is pushed before them. When the protrusion may be returned by pressure into the abdomen, it is called a *reducible hernia;* and when the contrary is the case, *irreducible hernia.* Where the protrusion is not only irreducible, but the contents of the sac suffer constriction, so that their passage towards the anus is arrested, a train of the most alarming and often fatal symptoms ensue, and the affection is called *strangulated hernia.* For the *relief* of *ordinary cases* of *rupture* the patient has recourse to a *truss*, which is an apparatus which, perhaps, more than any other, it is highly important to have so constructed as not only to avoid unnecessary pressure upon the abdominal surface, but likewise to guard against the dilation of the hernial aperture in the attempt to apply a remedy. This *desideratum* is remarkably well secured by a *truss* which we have recently examined, wherein a *layer of sand* acts as a support, in lieu of that usually given by much more solid substances. The *advantages* of this plan are, that the *particles composing the pad* create a *surface always in perfect apposition with the abdominal parietes*, whilst the *hernial opening cannot be enlarged*, as it may be by the continued pressure of a hard substance against it, and, as frequently happens, actually within it.

Delay in *applying a truss*, and the *use* of an *improper one*, is a common cause of a simple rupture becoming an irreducible or dangerous one; and, in many, very many cases, strangulated, and fatal.

In conclusion, we may remark, that persons labouring under deformity are not generally aware of the large number of ingenious contrivances of a mechanical character which have been produced of late years for removing or alleviating their misfortunes. The profession, and their patients who are thus afflicted, would do well to inspect for themselves the various manufactures of Mr. Heather Bigg, of 29, Leicester Square, the inventor of the *spinal appliance* and *truss* above refered to, who has recently visited the orthopædic establishments of Germany and France, for the express purpose of rendering himself acquainted with the most recent inventions employed in *mechanical surgery.*

SURINAMINE. A crystallizable substance obtained from the *bark* of *Geoffroya Surinamensis*, or *Surinam bark.*

SWALLOW. Three or four species of *hirundo* (Linn.) pass under this name. It was once held in great repute in medicine. Even the *excrement* was included among the simples of the Ph. L. 1618. The swallow is an insectivorous bird, but, like the sparrow and rook, is much persecuted for its good services. It has been calculated, that directly and indirectly, a single swallow is the humble means of lessening the race of one kind of insect alone to the extent of 560,970,489,000,000,000 of its race in one year.

SWEET BALLS. *Prep.* Take of *Florentine orris root*, 3 *oz.; cassia*, 1 *oz.; cloves, rhodium-wood*, and *lavender flowers*, of each, ½ *oz.; ambergris* and *musk*, of each, 6 gr.; *oil of verbena*, 10 or 12 drops; beat them to a paste, form this into balls with *mucilage of gum tragacanth* made with *rose-water*, pierce them whilst soft with a needle, and when they are quite dry and hard, polish them. *Worn in the pocket* as a *perfume.* Some persons varnish them, but that keeps in the smell. See *Scent Balls, Scented Cassolettes, &c.*

SWEET BAY. Syn. *Laurel; Laurus Nobilis*,—Linn. The *fruit* (*lauri baccæ; laurus*,—Ph. L.) as well as the *leaves* (*lauri folia*) are reputed aromatic, stimulant, and narcotic. They were formerly very popular in coughs, colic, hysteria, suppressions, &c.; and, *externally*, in sprains, bruises, &c.

SWEETS. Home-made wines; British wines.

SWEETBREAD. The thymus gland of the calf. When boiled it is light and digestible; but when highly dressed and seasoned, it is improper both for dyspeptics and invalids. (Pereira.)

SWEETMEATS. Under this head are properly included confections, candies, and preserves, in sugar; but, as generally employed, the word embraces all the sweet compounds of the confectioner.

Sweetmeats, as well as *cakes*, *blancmange*, and *jellies*, are not unfrequently coloured with deleterious substances, the consequences of which are always pernicious, and, in many instances, have proved fatal. *Gamboge*, a drastic cathartic; *chrome yellow*, *red lead*, *orpiment*, *emerald green*, and various other pigments containing lead, arsenic, copper, or other poisons, have been thus employed. The whole of these may be readily detected by the *tests* and *characteristics* appended to their respective names. The *colours* and *stains* which may be safely employed to increase the beauty of these articles, are noticed under *Stains* and *Liqueurs*.

SWINE POX. See *page* 1067.

SYCOSIS. An obstinate tubercular eruption, which chiefly attacks the scalp and part of the face covered by the beard, more especially the chin. The *treatment* is the same as for *acne*, of which it is a variety.

SYDENHAM'S LENITIVE. *Prep.* Take of *rhubarb* (recently grated or powdered), 3 dr.; *tamarinds*, 2 oz.; *senna*, ½ oz.; *coriander seeds* (bruised), 2 dr.; *boiling water*, 1 pint; macerate for 3 hours in a covered vessel, and strain. An excellent stomachic and laxative. *Dose.* ½ to 1 wine-glassful.

SYLVIC ACID. Syn. *Silvic Acid.* The portion of *common resin* or *colophony* which is the most readily soluble in cold alcohol. It is extracted by *weak alcohol*, and purified by solution in *strong* alcohol. It crystallizes in small, colourless, rhombic prisms; is freely soluble in hot strong alcohol, volatile oils, and ether; and is *distinguished* from *pinic acid* by its insolubility in cold alcohol of the sp. gr. 0·883. With alkalies it forms salts called *sylvates*, which are soluble in both alcohol and ether.

SYMBOLS. In *chemistry*, are representations of one atom or equivalent of each of the elementary, or pseudo-elementary bodies, by the capital initial letter or letters of their Latin names. As C, for *carbon*; Fe. (ferrum), *iron*; O, *oxygen*, &c. *Chemical formulæ* are combinations and arrangements of these symbols, to show the composition of bodies, and the changes which they undergo in their various combinations and decompositions. The *symbols* and *formulæ* of *bodies*, both simple and compound, are inserted in all complete "*tables of equivalents.*"

SYMPATHETIC INK. See *page* 627.

SYNAPTASE. Syn. *Emulsine.* The name given by Robiquet to the *emulsine*, or *vegetable caseine*, which forms a large proportion of the white pulp of both the bitter and sweet *almond.* It possesses the remarkable property of converting *amygdaline*, in the presence of water, into *hydrocyanic acid* and the *essential oil of bitter almonds.* 100 gr. of *amygdaline* yield, under the influence of *synaptase* and *water*, 47 gr. of *raw oil*, and 5·9 gr. of *anhydrous hydrocyanic acid.* (Liebig.)

SYNCOPE. See *Fainting.*

SYNOCHA. See *Fever.*

SYRINGINE. See *Lilacine.*

SYPHILIS. A well-known contagious disease, characterised by symptoms too numerous and delicate to be usefully described here. In all cases in this, as well as in other kindred affections, the assistance of a skillful surgeon should be promptly sought.

SYRUP. Syn. *Sirup*, *Sirop*; *Syrupus*, —Lat. A saturated, or nearly saturated solution of sugar in water, either simple, flavoured, or medicated.

In the *preparation* of *syrups* care should be taken to employ the *best refined sugar*, and either *distilled water* or *filtered rain water*; by which they will be rendered much less liable to spontaneous decomposition, and will be perfectly transparent, without the trouble of clarification. When *inferior sugar* is employed, *clarification* is always necessary. This is best done by dissolving the sugar in the water, or other aqueous menstruum, *in the cold*, and then beating up a *little* of the *cold syrup* with some *white* of *egg*, and an ounce or two of *cold water*, until the mixture *froths well;* this must be added to the *syrup in the boiler*, and the whole "whisked up" to a good froth; heat should now be applied, and the *scum* which forms, removed from time to time with a clean "skimmer." As soon as the syrup begins to slightly simmer it must be removed from the fire, and allowed to stand until it has cooled a little, when it should be again skimmed, if necessary, and then passed through *clean flannel.* When *vegetable infusions* or *solutions* enter into the *composition* of *syrups*, they should be rendered perfectly transparent by filtration or clarification, before being added to the sugar.

The *proper quantity* of *sugar* for *syrups* will, in general, be found to be 2 *lb.* (avoir.) to every imperial pint of *water* or *thin aqueous fluid.* These proportions, allowing for the water that is lost by evaporation during the process, are those best calculated to produce a syrup of the proper consistence, and possessing good "keeping qualities." They closely correspond to those recommended by Guibourt for the production of a *perfect syrup*, which, he says, consists of 30 parts of *sugar* to 16 parts of *water.*

In the *preparation* of *syrups* it is of great importance to employ as little heat as possible, as a solution of sugar, even when kept at the temperature of boiling water, undergoes slow decomposition. The *plan* which we adopt, is to pour the *water* (cold) over the *sugar*, and to allow the two to lie together for a few hours, in a covered vessel, occasionally stirring, and then to apply a *gentle heat* (preferably that of steam or a water-bath) to finish the solution. Some persons (falsely) deem a syrup ill prepared unless it has been allowed to boil well; but if this method be adopted, the ebullition should be only of the gentlest kind (*simmering*), and should be checked after the lapse of 1 or 2 minutes.

When it is necessary to *thicken* a *syrup* by *boiling*, a few *fragments of glass* should be introduced, in order to lower the boiling point.

To make *highly transparent syrups*, the *sugar* should be in a single lump, and by preference taken from the *bottom* or *broad end* of the loaf; as, when taken from the smaller end, or if it be powdered or bruised, the syrup will be more or less cloudy.

Syrups are *judged*, by the laboratory man, to be *sufficiently boiled*, when some taken up in a spoon pours out like oil; or, a drop cooled on the thumb-nail gives a proper "*thread*" when touched. When a thin skim appears on blowing upon the syrup, it is judged, by the same party, to be completely saturated. These rude tests often lead to errors, which might be easily prevented by employing the proper proportions, or determining the sp. gr.

A *fluid ounce* of *saturated syrup* weighs 577½ gr.; a *gallon* weighs 13⅕ *lb.* (avoir.); its sp. gr. is 1·319 to 1·321, or 35° of Baumé's aerometer; its *boiling point* is 221° Fahr., and its density at the temperature of 212° is 1·260 to 1·261, or 30° Baumé. The *syrups* prepared with the *juices of fruits*, or which contain much *extractive matter*, as those of sarsaparilla, poppies, &c., mark about 2° or 3° more on Baumé's scale than the other syrups.

In most pharmaceutical works directions are given to *completely* saturate the water with sugar. Our own experience, which is extensive, leads us to disapprove of such a practice, since we find, that, under all ordinary circumstances, a syrup with a *very slight excess* of water keeps better than one fully saturated. In the latter case, a portion of sugar generally crystallizes out on standing, and thus, by abstracting sugar from the remainder of the syrup, so weakens it, that it *rapidly ferments* and *spoils.* This change proceeds at a rapidity proportionate to the temperature. *Saturated syrup* kept in a vessel that is frequently *uncorked* or exposed to the air soon loses sufficient water, by evaporation from its surface, to cause the formation of minute crystals of sugar, which falling to the bottom of the vessel, continue to increase in size at the expense of the sugar in the solution. We have seen a single 6-gallon stone bottle, in which syrup has been kept for some time, the inside of which, when broken, has been found to be entirely cased with sugar-candy, amounting in weight to 16 or 18 *lb.* *On the other hand, syrups* containing *too much water* also rapidly ferment, and become acescent; but of the two, this is the less evil, and may be more easily prevented. The proportions of sugar and water given above will form an excellent syrup, provided care be taken that an undue quantity be not *lost by evaporation.*

The *decimal part* of the *number denoting the sp. gr. of a syrup*, multiplied by 26, gives the *number of pounds of sugar* it contains per gallon, very nearly. (Ure.)

In *boiling syrups*, if they appear likely to *boil over*, a little *oil*, or rubbing the edges of the pan with *soap*, will prevent it.

Syrups may be *decoloured* by *agitation* with, or *filtration* through, *recently burnt animal charcoal.* (See *p.* 321.) *Medicated syrups*, should not, however, be treated in this way.

The *preservation* of *syrups*, as well as of all other saccharine solutions, is best promoted by keeping them in a *moderately cool*, but *not* a *very cold* place. "Let syrups be kept in vessels well closed, and in a situation where the temperature never rises above 55° Fahr." (Ph. L.) They are better kept in *small*, rather than in *large* bottles, as the longer a bottle lasts, the more frequently it will be opened, and, consequently, the more it will be exposed to the air. By *bottling syrups* whilst *boiling hot*, and immediately corking down and tying the bottles over with bladder perfectly air-tight, they may be preserved, even at a summer heat, for years without fermenting, or losing their transparency.

The "*candying*," or *crystallization* of *syrup*, unless it be oversaturated with sugar, may be prevented by the addition of a little *acetic* or *citric acid* (2 or 3 dr. per gall.)

The *fermentation* of *syrups* may be effectually *prevented* by the addition of a little *sulphite of potassa* or of *lime*. *Chlorate of potassa* has been proposed for this purpose by Dr. Macculloch, on theoretical grounds. M. Chereau recommends the addition of some (about 3 to 4%) *sugar of milk*, with the same intention. Mr. Durand asserts that by adding about 1 fl. dr. of *Hoffmann's anodyne* to each pint of *syrup*, the accession of fermentation may not only be prevented, but arrested when it occurs. *Fermenting syrups* may be immediately restored by exposing the vessel containing them to the temperature of *boiling water*. The addition of a little *spirit* is ordered in the new London Pharmacopœia.

In making the above additions to syrup, care must be had not to mix incompatible substances. Thus, in general, the two methods referred to, cannot be practised together.

Syrup is, perhaps, the worst possible form of medicine, owing to the difficulty of accurately saturating it with active medicinals, and its liability to change. Few persons think that "sweetness renders a nauseous drug more palatable."

The *following formulæ* embrace all the *syrups* (syrupi) which are *officinal* in these countries. Those not included in the list may be easily made by adding to *simple syrup* a *concentrated infusion* or *solution of the particular substance*, or of its *extract* dissolved in, or rubbed down with a little *water* or *spirit*, in such proportion that the dose of the compound may range from 1 to 3 fl. dr.

SYRUP (Acetate of Morphia). Syn. *Syrupus Morphiæ Acetatis*, — Lat. *Prep.* (Ph. D.) *Solution of acetate of morphia*, 1 fl. oz.; *simple syrup*, 15 fl. oz.; mix. Each fl. oz. contains ¼ gr. of acetate. *Dose.* ½ to 2 teaspoonfuls.

SYRUP (Almond). Syn. *Barley Syrup, Orgeat; Sirop d'Orgeat; Syrupus Amygdalæ*, —Lat. *Prep.* 1. *Sweet almonds*, 1 *lb.; bitter almonds*, 1 *oz.;* blanch, beat them to a smooth paste, and make an emulsion with *barley water*, 1 quart; strain, to each pint add of *sugar*, 2 *lb.*, and a table-spoonful or two of *orange-flower water;* put the mixture into small bottles, and preserve it in a cool place. Some persons add a little brandy.

2. (Ph. Bor.) *Sweet almonds*, 8 oz.; *bitter almonds*, 2 oz.; blanch them, after cold maceration, then beat them in a marble mortar, with a wooden pestle to a paste, adding, gradually, of *water*, 16 fl. oz.; *orange-flower water*, 3 fl. oz.; after straining through flannel, dissolve 3℔ of *sugar* in each pint of the emulsion. An agreeable pectoral and demulcent.

SYRUP (Buckthorn). Syn. *Syrupus Rhamni*,— Ph. L. & E., & Ph. D. 1826. *Syr. Rhamni Cathartici*, — Ph. E. 1817. *Syr. Spinæ Cervinæ*,—Ph. L. 1788. *Syr. de Spinâ Cervinâ*,—Ph. L. 1720. *Prep.* 1. (Ph. L.) *Juice of buckthorn*, defecated by 3 days' repose, 2 quarts; *ginger* and *allspice* of each (bruised), 6 dr.; macerate the spice in 1 pint of the juice at a gentle heat for 4 hours, and filter; boil the remainder of the juice to 1½ pint, mix the liquors, dissolve therein of *white sugar*, 6℔; and add to (the nearly cold) syrup 6 fl. oz. of *rectified spirit*. In the Ph. E. the spirit is omitted.

2. (*Wholesale.*) *a.* Take of *buckthorn juice*, 3 gall.; *bruised pimento* and *ginger* (sifted from the dust), of each, ½ *lb.;* simmer for 15 minutes, strain, and add of *sugar*, 44*lb.*

b. Take of *buckthorn juice*, 3 gall.; boil to 2 gall., add of *bruised pimento* and *ginger gruffs* (free from dust), of each, ¾ *lb.;* boil to 1 gall., strain, add *molasses*, 72 *lb.;* and finish the boiling.

Obs. Syrup of buckthorn is a brisk but unpleasant cathartic. It is now chiefly used in veterinary practice. *Dose.* ½ fl. oz. to 1 fl. oz. Should the *colour* be *dull*, the addition of a few gr. of *citric* or *tartaric acid* will brighten it.

SYRUP (Capillaire) Syn. *Syrup of Maiden-hair; Syrupus Adianthi, Syrupus Capillorum Veneris*,—Lat. *Capillaire, Sirop de Capillaire*,—Fr. *Prep.* (P. Cod.) *Canadian maiden-hair* (adiantum pedatum,—*Linn.*), 4 oz.; *boiling water*, 2½ pints; infuse, strain, add of *white sugar*, 5 ℔; and pour the boiling clarified syrup over 2 oz. more of maiden-hair; re-infuse for 2 hours, and again strain. (See *Capillaire.*)

Obs. Demulcent. Clarified syrup flavoured with *orange-flower water* or *curaçoa* is now commonly sold for *capillaire*. It is usually "put up" in small bottles of a peculiar shape, known in the trade as "*Capillaires.*" It is now chiefly used to sweeten and flavour grog. (See *p.* 199.)

SYRUP (Citric Acid). Syn. *Syrupus Acidi Citrici*, — Ph. D. *Prep.* (Ph. D.) Take of *citric acid* (in powder), and *distilled water*, of each, 2½ *oz.;* dissolve, add the solution together with *tincture of lemon-peel*, 5 fl. dr., to *simple syrup*, 3 pints; and mix with agitation. An agreeable refrigerant. *Used* for sweetening barley-water, &c., and for flavouring water to be used as a beverage in fevers and other inflammatory diseases.

SYRUP (Cochineal). Syn. *Syrupus Coc-*

cinellæ; Syrupus Cocci, — Ph. L. *Prep.* (Ph. L.) Take of *cochineal* (bruised), 80 gr.; *boiling distilled water,* 1 pint; boil for 15 minutes in a closed vessel, strain, and add of *sugar,* 3 ℔, or twice that of the strained liquor; lastly, when the syrup has cooled, add of *rectified spirit,* 2½ fl. oz, or ½ *fl. dr.* to *each fl. oz.* of *syrup. Used* as a colouring syrup, and often sold for syrup of clove-pinks.

SYRUP (Coltsfoot). Syn. *Syrupus Tussilaginis,* — Lat. *Prep.* (P. Cod.) *Flowers of coltsfoot,* 1 ℔; (or *dried flowers,* 2 oz.;) *boiling water,* 2 ℔; macerate for 12 hours; strain, press, filter, and add of *white sugar,* 4 ℔. A popular remedy in coughs, cold, &c. *Dose.* 1 to 2 table-spoonfuls, ad libitum.

SYRUP (Cream). *Finely powdered lump sugar* mixed with an equal weight of *fresh cream.* It will keep for a long time if put into bottles, and closely corked and sealed over. It is commonly placed in 2 *oz.* wide-mouthed phials, and taken on long voyages, a fresh phial being opened at every meal.

SYRUP (Empyreumatic). Treacle.

SYRUP (Ether). Syn. *Sirop d'Æther,* — Fr. *Syrupus Ætheris, Syr. Æth. Sulphurici,*—Lat. *Prep.* (P. Cod.) *Sulphuric ether,* 1 part; *white* (simple) *syrup,* 16 parts; place them in a glass vessel having a tap at the bottom, shake them frequently for 5 or 6 days, and then draw off the clear syrup into small bottles. *Dose.* ½ to 3 fl. dr.

SYRUP (Ginger). Syn. *Syrupus Zingiberis,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Bruised ginger,* 2½ oz.; *boiling water,* 1 pint; macerate for 4 hours, strain, and add of *white sugar,* 2½ ℔, or q. s.; and *rectified spirit,* as directed for *syrup of cochineal.* The Ph. E. omits the spirit.

2. (Ph. D.) *Tincture of ginger,* 1 fl. oz.; *simple syrup,* 7 fl. oz.; mix. Stimulant and carminative. Chiefly used as an adjuvant, in mixtures.

SYRUP (Gum). Syn. *Syrupus Acaciæ,* —Lat. *Sirop de Gomme,* — Fr. *Prep.* (P. Cod.) Dissolve *pale* and *picked gum arabic* in an equal weight of *water,* by a gentle heat, add the *solution* to *four times* its weight of *simple syrup,* simmer for 2 or 3 minutes, remove the scum, and cool. A pleasant demulcent. The addition of 1 or 2 fl. oz. of *orange-flower water* to each pint, greatly improves it.

SYRUP (Hive). See *page* 1211.

SYRUP (Horehound). Syn. *Sirop de Prassio; Syrupus Marubii,*— Lat. *Prep.* 1. (P. Cod.) *Dried horehound,* 1 oz.; *horehound water,* 2 ℔; digest in a water bath for 2 hours, strain, and add of *white sugar,* 4 ℔.

2. *White horehound* (fresh), 1 *lb.; boiling water,* 1 gall.; infuse for 2 hours, press out the liquor, filter, and add of *sugar,* q. s.

Obs. A popular remedy in coughs and diseases of the lungs. *Dose.* A table-spoonful, ad libitum. "It is sold for any syrup of herbs that is demanded, and which is not in the shop." (Gray.)

SYRUP (Hydrochlorate of Morphia). See *page* 1209.

SYRUP (Indian Sarsaparilla). Syn. *Syrupus Hemidesmi,*—Ph. D. *Prep.* (Ph. D.) *Indian sarsaparilla* (hemidesmus Indicus,—Brown), bruised, 4 *oz.; boiling water,* 1 pint; infuse for 4 hours, and to the strained and defecated infusion, add twice its weight of *sugar.* Tonic, diuretic, &c. *Dose.* 2 to 4 fl. dr.; in nephritic complaints, and in some others, instead of sarsaparilla.

SYRUP (Iodide of Iron). Syn. *Syrupus Ferri Iodidi,* — Ph. L. E. & D. *Prep.* (Ph. L.) Mix *iodine,* 1 oz.; and *iron wine,* 3 dr.; with *distilled water,* 8 fl. oz.; and heat the solution until it assumes a greenish colour, then strain it, evaporate it to about 4 fl. oz.; and add to it of *white sugar,* 10 oz.; lastly, when the syrup has cooled, add as much *water* as may be necessary, that it may measure exactly 15 fl. oz., and keep it in a well-stoppered black glass bottle. The formulæ of the Ph. E. & D. are nearly similar, a fl. dr. of each containing about 5 gr. of the pure dry iodide.

Obs. This syrup is tonic and resolvent, and hæmatinic. *Dose.* 15 or 20 drops to 1 fl. dr.; in anæmia, debility, scrofula, &c. It should be perfectly transparent and colourless, or at most only of a very pale green tint, and should be without sediment even when exposed to the air. (Ph. E.) Before the publication of the new Ph. L. a syrup containing only 3 gr. of *dry iodide* per fl. dr. was usually employed in this country, and is still sent out by many houses.

SYRUP (Ipecacuanha). Syn. *Syrupus Ipecacuanhæ,*—Lat. *Prep.* (Ph. E.) *Ipecacuanha* (in coarse powder), 4 oz.; *rectified spirit,* 15 fl. oz.; digest for 24 hours at a gentle heat, and strain; add of *proof spirit,* 14 fl. oz., and again digest and strain; and *repeat* the *process* with *water,* 14 fl. oz.; distil off the spirit from the mixed liquors, evaporate to 12 fl. oz., and filter; next add to the residuum, *rectified spirit,* 5 fl. oz., and *simple syrup,* 7 pints; and mix well. *Dose.* As an emetic for *infants,* ¼ tea-spoonful; for *adults,* 1 to 1½ fl. oz.; as an *expectorant,* 1 to 3 tea-spoonfuls.

SYRUP (Lemon). Syn. *Syrupus Li-*

monum,—Ph. L. & E. *Syrupus Citri Medicæ*,—Ph. E. 1839. *Syrupus Limonis*,—Ph. D. 1826. *Prep.* (Ph. L.) *Lemon juice* (strained or defecated), 1 pint; *white sugar*, 2½ ℔; dissolve by a gentle heat, and set it aside; in 24 hours remove the scum, decant the clear portion, and add of *rectified spirit*, 2½ fl. oz. The Edinburgh College omits the spirit.

Obs. A pleasant refrigerant syrup in fevers, &c. *Dose.* 1 to 4 fl. dr. in any diluent. With water it forms an excellent extemporaneous lemonade.

SYRUP (Marshmallow). Syn. *Syrupus Althææ*,—Ph. L. & E., & Ph. D. 1826. *Prep.* 1. (Ph. L.) *Marshmallow root*, fresh and sliced, 1½ oz.; *distilled water* (cold), 1 pint; macerate for 12 hours, press out the liquor, strain it through linen, and add to the strained liquor twice its weight of *white sugar* (about 3 ℔); dissolve by a gentle heat, and when cold add of *rectified spirit*, 2½ fl. oz., or q. s. (See *Syrup of Cochineal.*)

2. (Ph. L. 1836.) Take of *fresh marshmallow root*, bruised, 8 oz.; *water*, 4 pints; boil down to one half, and express the liquor when it is cold; set it aside for 24 hours, that the fæces may subside, then decant off the clear liquid, and, having added to it of *sugar*, 2½ ℔, boil the whole to a proper consistence. The formulæ of the Ph. E. is similar.

Obs. This is a popular demulcent and pectoral. *Dose.* 1 to 4 fl. dr.; in coughs, &c., either alone or added to mixtures.

SYRUP (Mulberries). Syn. *Syrupus Mori*,—Ph. L. *Prep.* (Ph. L.) *Juice of mulberries*, strained, 1 pint; *sugar*, 2½ ℔; dissolve by a gentle heat, and set the solution by for 24 hours; then remove the scum, decant the clear liquid, and add of *rectified spirit*, 2½ fl. oz. *Used* as a colouring and flavouring, when alkalies and earths are not present. Syrup of red poppies (*rhœados*) slightly acidulated with *tartaric* or *dilute sulphuric acid*, is very generally sold for it.

SYRUP (Muriate of Morphia). Syn. *Syrup of Hydrochlorate of Morphia; Syrupus Morphiæ Muriatis*,—Ph. D. *Prep.* (Ph. D.) *Solution of muriate of morphia*, 1 fl. oz.; *simple syrup*, 17 fl. oz.; mix. Each fl. oz. contains ¼ gr. of the muriate. *Dose.* ½ to 2 tea-spoonfuls.

SYRUP (Orange-peel). Syn. *Syrupus Aurantii*,—Ph. L. E. & D. *Syr. Citri Aurantii*,—Ph. E. 1817. *Syr. è Corticibus Aurantiorum*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Dried orange-peel*, 2½ oz.; *boiling distilled water*, 1 pint; macerate for 12 hours in a covered vessel, press out the liquor, simmer it for 10 minutes, and then complete the process as directed for *syrup of cochineal.* In the Ph. E. & D., & Ph. L. 1836, no spirit is ordered.

2. (*Wholesale.*)—*a.* From *fresh orange-peel*, 18 *oz.* (or dried, ¾ *lb.*); *sugar*, 18 *lb.*; *water*, q. s.

b. From *tincture of orange-peel*, 1 fl. oz.; *simple syrup*, 19 fl. oz.; mix. An agreeable flavouring and stomachic. *Dose.* 1 to 4 fl. dr.

SYRUP (Poppies). Syn. *Syrup of White Poppies; Syrupus Papaveris*,—Ph. L. & E., & Ph. D. 1826. *Syr. P. Albi*,—Ph. D. 1807, & Ph. L. 1788. *Syr. P. Somniferi*,—Ph. E. 1817. *Syr. de Meconio*, or *Diacodium*,—Ph. L. 1721. *Prep.* 1. (Ph. L.) *Poppy-heads*, dried, bruised, and without the seeds, 3 ℔; *boiling water*, 5 gall.; boil down to 2 gall., press out the liquor, evaporate the expressed liquid to 2 quarts, strain it whilst hot, and set it aside for 12 hours; next decant the clear portion from the fæces, boil this down to 1 quart, and dissolve in it, *sugar*, 5 ℔; lastly, when cold, add of *rectified spirit*, 5 fl. oz. "Each *fl. oz.* is equivalent to 1 gr. of dry extract." In the Ph. E. & Ph. D. 1826, no spirit is ordered.

2. (*Wholesale.*) *Extract of poppies*, 1½ *lb.*; *boiling water*, 2½ gall.; dissolve, clarify or filter, so that it may be *perfectly transparent when cold*, then add of *white sugar*, 44 *lb.*, and dissolve.

Obs. Syrup of poppies is anodyne and soporific. *Dose.* For an *infant*, ¼ to ½ tea-spoonful; for an adult, 2 to 4 fl. dr. According to M. Chereau its *tendency* to *fermentation* is *prevented* by the addition of 32 parts of *sugar of milk* to every 1000 parts of the syrup.

SYRUP (Red Poppies). Syn. *Syrupus Rhœados*,—Ph. L. & E. *Syr. Papaveris Rhœados*,—Ph. D. 1826. *Syr. P. Erratici*,—Ph. L. 1788, & Ph. D. 1807. *Prep.* 1. (Ph. L.) *Petals of the red poppy*, 1 ℔; *boiling water*, 1 pint; mix in a water bath, remove the vessel, macerate for 12 hours, press out the liquor, and after defecation or filtering, complete the process as directed for *syrup of cochineal.*

2. (*Wholesale.*) From *dried red-poppy petals*, 3 *lb.*; *boiling water*, q. s.; *white sugar*, 44 *lb.*; as the last.

Obs. Syrup of red poppies is chiefly employed for its fine red colour. A *little* acid brightens it. The *colour* is *injured* by contact with iron, copper, and all the common metals.

SYRUP (Rhubarb). Syn. *Syrupus Rhei*,—Lat. *Prep.* 1. (P. Cod.) *Bruised rhubarb*, 3 oz.; *cold water*, 16 fl. oz.; macerate for 12 hours, filter, and add of *white sugar*, 32 oz.

2. (Ph. U. S.) Take of *rectified spirit*,

8 fl. oz.; *water*, 24 fl. oz.; *rhubarb* (coarsely powdered), 2 oz.; (mixed with) *sand*, an equal bulk, or q. s.; make a tincture by percolation, evaporate this, over a water-bath, to 13 fl. oz., and dissolve in it 2 *lb.* of *white sugar.* An excellent formula.

3. (*Wholesale.*) *Rhubarb* (bruised), 1¾ *lb.; cold water*, q. s.; *sugar*, 20 *lb.;* as No. 1. Stomachic and purgative. *Dose.* For an infant, ½ to 1 teaspoonful; for an *adult*, ½ to ¾ fl. oz., or more.

SYRUP (Rhubarb,—Spiced). Syn. *Syrups Rhei Aromaticus,*—Lat. *Prep.* (Ph. U. S.) *Rhubarb*, 2½ oz.; *cloves* and *cinnamon*, of each, ½ oz.; *nutmeg*, ¼ oz.; (all bruised;) *proof spirit*, 32 fl. oz.; macerate for 14 days (or percolate), strain, gently evaporate to 16 fl. oz., filter whilst hot, and mix the liquid with *simple syrup* (gently warmed), 4¾ pints. A cordial laxative. *Dose.* ½ to 1 tea-spoonful; in infantile constipation, diarrhœa, &c.

SYRUP (Roses). Syn. *Syrupus Rosæ,*—Ph. L., & Ph. D. 1826. *Syrupus Rosæ Centifoliæ,*—Ph. E. *Syr. Rosarum Solutivus,*—Ph. L. 1746. *Syr. è Rosis Siccis,*—Ph. L. 1721. *Prep.* 1. (Ph. L.) *Dried petals of damask roses* (rosa centifolia), 7 oz.; *boiling water*, 3 pints; macerate for 12 hours, filter, evaporate in a water bath to 1 quart, and add of *white sugar*, 6 ℔; and when cold, *rectified spirit*, 5½ fl. oz.

2. (*Wholesale.*) From *rose leaves*, 1 *lb.; sugar*, 19 *lb.; water*, q. s.; as the last. Gently laxative. *Dose.* ¼ to 1 fl. oz. It is usual to add a few drops of dilute sulphuric acid to brighten the colour. Alkalies turn it green.

SYRUP (Red Roses). Syn. *Syrupus Rosæ Gallicæ,*—Ph. E. & D. *Prep.* 1. (Ph. E.) *Dried petals of the red rose*, 2 oz.; *boiling water*, 1 pint; *pure sugar*, 20 oz.; as the last.

2. (Ph. D.) *Dried petals of the gallic rose*, 2 oz.; *boiling water*, 1 pint; boil in a glass or porcelain vessel until the colour is extracted, strain with expression, and, after defecation, add to the clear decanted liquor twice its weight of *white sugar.* Astringent and stomachic; chiefly used as an adjunct in mixtures, &c.

SYRUP (Rue). Syn. *Syrupus Rutæ,*—Lat. *Prep.* Take of *oil of rue*, 12 to 15 drops; *rectified spirit*, ½ fl. oz.; dissolve, and add it to *simple syrup*, 1 pint. *Dose.* ½ to 1 teaspoonful; in the flatulent colic of children. An *infusion* of ½ oz. of the *herb* is sometimes substituted for the solution of the essential oil.

SYRUP (Saffron). Syn. *Syrupus Croci,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Hay saffron*, 5 dr. (10 dr.,—Ph. E; ½ *oz.,*—Ph. D.); *boiling water*, 1 pint; macerate in a covered vessel for 12 hours, then strain the liquor, and add of *white sugar*, 3 ℔, or q. s.; and *rectified spirit*, 2½ fl. oz., or q. s.; in the manner directed under *syrup of cochineal.* The Ph. E. & D. omit the spirit.

2. (*Wholesale.*) *Hay saffron*, 6 *oz.; boiling water*, 6 quarts; *white sugar*, 24 *lb.;* as the last. *Used* for its colour and flavour; the first is very beautiful.

SYRUP (Sarsaparilla). Syn. *Syrupus Sarzæ,*—Ph. L. & E. *Syrupus Sarsaparillæ,*—Ph. D. 1826. *Prep.* 1. (Ph. L.) Take of *sarsaparilla* (sliced), 3½ ℔; boil it in *water*, 2 gall., down to one half; pour off the liquor and strain it whilst hot; again boil the *sarsaparilla* in another gall. of *water* down to one half, and strain; evaporate the *mixed liquors* to 1 quart, and in these dissolve of *white sugar*, 8 oz.; lastly, when the syrup has cooled, add to it of *rectified spirit*, 2 fl. oz.

2. (Ph. E., & Ph. L. 1836.) *Sarsaparilla*, sliced, 15 oz.; *boiling water*, 1 gall.; macerate for 24 hours, boil to 2 quarts, strain, add of *sugar*, 15 oz.; and boil to a syrup.

3. (*Wholesale.*) Take of *extract of sarsaparilla*, 3 *lb.; boiling water*, 3 quarts; dissolve, strain, and add of *white sugar*, 12 *lb.* Alterative and tonic. *Dose.* 2 to 4 dr. See *Sarsaparilla.*

SYRUP (Sarsaparilla,—Compound). Syn. *Syrupus Sarzæ Compositus; Syrop de Cusinier,*—Fr. *Prep.* (Ph. U. S.) *Sarsaparilla*, bruised, 2 ℔; *guaiacum wood*, rasped, 3 oz.; *damask roses*, *senna*, and *liquorice-root*, bruised, of each, 2 oz.; *diluted alcohol* (proof spirit), 10 wine pints (1 gall. imperial); macerate for 14 days, express, filter through paper, and evaporate in a water bath to 4 wine pints (3¼ pints, imperial); then add of *white sugar*, 8 ℔, and, when cold, further add of *oils of sassafras* and *aniseed*, of each, 5 drops; and *oil of partridge berry* (gualtheria procumbens), 3 drops; previously triturated with a little of the syrup.

Obs. This is an excellent preparation; but the rose leaves might be well omitted. *Dose.* ½ fl. oz., 3 or 4 times a day, as an alterative, tonic, and restorative. The syrup of the P. Cod. is made with water instead of spirit, and is inferior as a remedy to the preceding.

SYRUP (Senna). Syn. *Syrupus Sennæ,*—Ph. L. & E. *Prep.* 1. (Ph. L.) Take of *senna*, 3½ oz.; *fennel seed* (bruised), 10 dr.; *boiling water*, 1 pint; macerate for 6 hours, with a gentle heat; then strongly press out the liquid through linen, and dissolve in it of *manna*, 3 oz.; next add this solution to *treacle*, 3 ℔, previously evaporated over a water bath until a little of it on being cooled almost concretes, and stir them well together.

2. (Ph. E.) *Senna*, 4 oz.; *boiling water*, 24 fl. oz.; infuse, strain, add of *treacle*, 48 oz.; and evaporate to a proper consistence. Aperient. *Dose.* 1 to 4 dr.

SYRUP (Simple). Syn. *Syrupus*,—Ph. L. *Syrupus Simplex.*—Ph. E. & D. *Prep.* 1. (Ph. L.) *White sugar*, 3 ℔; *distilled water*, 1 pint; dissolve by a gentle heat.

2. (Ph. E., & Ph. L. 1836.) *Pure sugar*, 10 ℔; *boiling water*, 3 pints.

3. (Ph. D.) *Refined sugar* (in power,—? crushed), 5 *lb.*; *distilled water*, 1 quart.

4. (*Wholesale.*) Finest *double refined sugar*, 44 *lb.; distilled water*, 2¾ gall.; make a syrup.

Obs. This preparation should be as white and transparent as water. *Used* as *capillaire*, *&c.*, and to give cohesiveness and consistence to pulverulent substances in the preparation of electuaries, pills, &c.

SYRUP (Squills). Syn. *Syrupus Scillæ*, —Ph. E. & D. *Prep.* 1. (Ph. E.) *Vinegar of squills*, 3 pints; *white sugar* (in powder), 7 ℔; dissolve by a gentle heat.

2. (Ph. D.) *Vinegar of squills*, 8 fl. oz.; *refined sugar* (in powder), 1 *lb.;* dissolve.

3. (*Wholesale*) Take of *vinegar of squills* (*perfectly transparent*), 14 *lb.; double refined sugar*, 28 *lb.;* dissolve in a *stoneware vessel*, in the *cold*, or at most by a very gentle heat.

Obs. This syrup, like the last, should be as clear as water, and nearly colourless. *Dose.* 1 to 2 fl. dr., as an expectorant; in chronic coughs and asthma. In large doses it proves emetic.

SYRUP (Squills,—Compound.) Syn. *Hive Syrup; Syrupus Scillæ Compositus*,—Lat. *Prep.* (Ph. U. S.) *Squills* and *senega*, of each, bruised, 5 oz.; *water*, ½ gall.; boil to a quart, add of *sugar*, 4½ ℔; evaporate to 3 pints, or a proper consistence, and dissolve in it, whilst hot, of *potassio-tartrate of antimony* (in powder), 1 dr.

Obs. This syrup is a popular expectorant in the U. S., where it is known as *hive syrup. Dose.* As an expectorant, 20 to 30 drops, for *adults;* for *children*, 5 to 10 drops; in *croup*, 10 drops to ½ fl. dr., repeated until it vomits.

SYRUP (Tolu). Syn. *Balsamic Syrup; Syrupus Tolutanus*,—Ph. L. E. & D. *Syr. Toluiferi Balsami*,—Ph. E. 1839. *Syr. Balsami Tolutani*,—Ph. D. 1826. *Syr. Balsamicus*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Balsam of Tolu*, 10 dr. (1 *oz.*,—Ph. D.); *boiling distilled water*, 1 pint; boil in a covered vessel for ½ an hour, frequently stirring, then cool, strain, and dissolve in the liquor, *sugar*, 2½ ℔.

2. (Ph. E.) *Simple syrup* (warm), 2 ℔; *tincture of Tolu*, 1 oz.; mix by degrees, and agitate them briskly together in a closed vessel.

3. (*Wholesale.*) To *warm water*, 23 *lb.*; add *tincture of Tolu*, gradually, until it will bear no more without becoming opaque; then cork down the bottle, and occasionally agitate until cold; when quite cold filter it through paper, and add of the *finest double-refined sugar*, 44 *lb.*; lastly, promote the solution, in a closed vessel, by a gentle heat in a water bath.

Obs. This syrup should be clear and colourless as water; but as met with in the shops it is usually milky. It is strange that the London College should have omitted from their formula the usual addition of *rectified spirit*, although this syrup, perhaps more than any other, would be benefited by it.

Syrup of Tolu is pectoral and balsamic.

SYRUP (Velno's Vegetable). According to Dr. Paris and Sir B. Brodie, this celebrated nostrum is prepared as follows:—*Young* and *fresh burdock root*, sliced, 2 oz.; *dandelion root*, 1 oz.; *fresh spearmint*, *senna*, *coriander seed*, and *bruised liquorice root*, of each, 1½ dr.; *water*, 1½ pint; boil down gently to a pint, strain, add of *lump sugar*, 1 *lb.*, boil to a syrup, and, lastly, add a *small* quantity of *corrosive sublimate*, previously dissolved in a little spirit. *Used* as an alterative and purifier of the blood.

SYRUP (Vinegar). Syn. *Syrupus Aceti*, —Lat. *Prep.* (Ph. E.) Take of *vinegar* (French in preference), 11 fl. oz.; *white sugar*, 14 oz.; and make a syrup. *Dose.* 1 dr. to 1 fl. oz.; as an expectorant in coughs and colds, or diffused through any mild diluent, as a drink in fevers. A more agreeable preparation is that of the P. Cod., made by dissolving 30 parts of *sugar* in 16 parts of *raspberry vinegar.*

SYRUP (Violets). Syn. *Syrupus Violarum; Syrupus Violæ*,—Ph. L. & E., & Ph. D. 1826. *Syr. Violæ Odoratæ*,—Ph. E. 1817. *Prep.* 1. (Ph. L.) Macerate *violet flowers*, 9 oz.; in *boiling water*, 1 pint; for twelve hours, then press, strain, and set aside the liquid that the fæces may subside; afterwards complete the process with *sugar*, 3 ℔, and *rectified spirit*, 2½ fl. oz., (or as much of *each* as may be necessary,) in the way which has been ordered concerning *syrup of cochineal.*

2. (Ph. E.) *Fresh violets*, 1 *lb.; boiling water*, 2½ pints; infuse for 24 hours in a covered vessel of glass or earthenware, strain

off the liquor (with gentle pressure), filter, and dissolve in the liquid, *white sugar*, 7½ ℔.

3. (*Wholesale.*) From *double-refined white sugar*, 66 *lb.*; *anthokyan*,[*] 11 *lb.*; *water*, 22 *lb.*, or q. s.; dissolve in earthenware.

Uses. Syrup of violets is gently laxative. *Dose.* For an *infant*, a teaspoonful.

Obs. Genuine syrup of violets has a lively violet-blue colour, is *reddened* by acids, turned *green* by alkalies, and both smells and tastes of the flowers. It is frequently used as a *test.* A *spurious sort* is met with in the shops, which is coloured with litmus, and slightly scented with orris root. The *purest sugar*, perfectly free from either acid or alkaline contamination, should alone be used in the manufacture of this syrup. The Ph. E. orders the infusion to be strained *without pressure;* and the P. Cod., and some other Ph., direct the flowers to be first washed in cold water.

SYRUP (Wormwood). Syn. *Syrupus Absinthii*,—Lat. *Sirop d'Absinthe*,—Fr. *Prep.* (P. Cod.) *Tops of wormwood* (dried), 1 part; *boiling water*, 8 parts; infuse for 12 hours, strain, with expression, and dissolve in the liquor twice its weight of *sugar.* Bitter, tonic, and stomachic. *Dose.* 1 to 3 fl. dr.

TABES. The medical name for a wasting of the body, *characterised* by emaciation, and weakness, without coughing or pulmonary expectoration. It is *distinguished* from *atrophy* in being accompanied by symptoms of fever, more or less extreme; which are absent in that disease. The *common causes* are said to be acrimony in the blood, owing to the absorption of pus from an abscess (*tabes purulenta*); or the presence of some poisonous substance, as arsenic or mercury (*tabes venenata*); or a scrofulous taint (*tabes scrofulosa, t. mesenterica*); or an excesive indulgence of the veneral appetite (*tabes dorsalis*). To the second variety may be assigned the case of Mrs. Wooler, which has acquired so much notoriety by a recent trial. The *treatment* consists mainly in the avoidance of exciting causes or practices, change of residence to a more salubrious atmosphere (where necessary), and the adoption of the usual tonic treatment recommended under *atrophy.*

TABLETTES. See *Lozenges* and *Savonettes.*

TÆNIA. See *Worms.*

TAFFETAS. Plasters on silk are occasionally so called. For *taffetas Anglicum*, see *Court plaster;* for *taffetas vesicans*, see *Vesicants.*

TALC. Syn. *Foliated Talc; Ubruc.* A transparent, foliated, silicious magnesian mineral, flexible but not elastic, found in Scotland, the Tyrol, and elsewhere. It is used as a cosmetic to impart a silky whiteness to the skin; also in the composition of *rouge végétal*, and to give a flesh-like polish to alabaster figures. A *second* and harder species of this mineral (*French chalk, soapstone, steatite; creta Gallica*) is employed as a *crayon* by carpenters, glaziers, and tailors, and forms the *boot-powder* of the boot-makers. *Writing* executed with it on *glass*, even after being apparently removed by friction, becomes again visible when breathed upon.

TALLOW and *other fats* are commonly *purified* by melting them along with water, passing the *mixed fluids* through a sieve, and letting the whole cool slowly, when a cake of cleansed fat is obtained.—*Another plan* is to keep the tallow melted for some time, along with about 2% of *oil of vitriol* largely diluted with water, employing constant agitation, and allowing the whole to cool slowly; then to *re-melt* the cake with a large quantity of *hot water*, and to wash it well.—*Another method* is to blow *steam* for some time through the melted fat. By either this or the preceding process a *white hard tallow* may be obtained.—*Some persons* add a *little nitre* to the melted fat, and afterwards, a *little dilute nitric* or *sulphuric acid*, or a *solution of bisulphate of potash.* *Others* boil the fat along with *water* and a *little dilute nitric* or *chromic acid*, or a *mixture of bichromate of potash* and *sulphuric acid;* and afterwards wash it thoroughly with *water.* These methods answer well for the tallow or mixed fats of which ordinary candles are made.

Tallow converted into *stearic acid* by *saponification* (see *p.* 1184-5) is readily *hardened* and *bleached*, if moderately pure. A *mixture* composed of 1 part of *oxalic acid* and 2000 parts of *water* is sufficient to bleach 1000 parts of *stearic acid.* The mode of operating is as follows:—Throw the *stearic acid*, cut into small pieces, into a vessel of *cold water*, and turn on steam; as soon as it has melted and assumed a turbid appearance, add the *solution of oxalic acid*, and boil the mixture. After boiling for ¾ hour, long threads appear in the liquid; the liquid itself, which previously was of a greyish colour, becomes black, and the threads unite together. The boiling must now be discontinued, and the contents of the vessel having been allowed to settle for three or four hours, must be drawn off into the coolers.

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[*] The *expressed juice of violets*, defecated, gently heated in earthenware to 192° Fahr., then skimmed, cooled, and filtered; a *little spirit* is next added, and the next day the compound is again filtered.

As *commercial stearic acid* frequently contains undecomposed tallow, as well as albuminous matter, this process is occasionally unsuccessful. To obviate these inconveniences, the candle may be run at two operations, as follows:—The *stearic acid*, treated as above, is exposed for a month to the sun, by which means the foreign matters are oxidized, and the *bleached stearic acid* acquires a dirty yellow colour; the *oxidized blocks* are then melted in *water* containing a little *sulphuric acid*, at about 150° Fahr.; an addition of about 10 per cent. of good *white wax* (or *spermaceti*) is next made, and the whole boiled for half an hour; the white of an egg, previously beaten up in a quart of *water*, is then added to each 1 cwt. of *stearic acid*, the temperature of the mass having been reduced to 100° or at most 120° Fahr., after which the mixture is again well stirred and boiled, when the *liquid soon becomes clear*, which is seen by the dark colour it assumes.

This mixture of stearic acid and wax or spermaceti is very suitable for forming the *exterior coating* of the candle; it is transparent and of perfect whiteness, and, as it is devoid of oxalic acid, it does not injure the moulds; whilst at the same time, as it is less fusible than pure stearic acid, candles made with it do not run. This first coating may be run hot without crystallizing; the interior of the candle, being protected from without against too sudden a cooling, may also be run somewhat hot; by this means the candle acquires a whiteness and a transparency which cannot be realized by other processes. (*Le Moniteur Industriel.*)

The *sulphuric saponification* of *inferior tallow* and other *solid* or *semi-solid fatty bodies* is now carried out on a very large scale for producing the *cheaper varieties* of "*stearine candles.*" For this purpose, the *tallow* or *fat* is mixed with 5 or 6% of *concentrated sulphuric acid*, and exposed to a steam-heat of 350° to 360° Fahr. After cooling, the black mass thus obtained crystallizes to a tolerably solid fat, which is well washed once or twice with *water*, or *high pressure steam*, and is then submitted to distillation by the aid of steam, heated to about 560° Fahr. The *product* of the *distillation*, is beautifully white, and may be at once used for making candles. It is better, however, to first submit it to the processes of *cold* and *hot pressing*, whereby a much more solid fat is obtained.

According to M. Pohl, *palm oil* or *palm tallow* is most easily purified by simple exposure to a high temperature, provided it has been first well defecated. When *quickly* heated to about 465° Fahr., and kept at that temperature for from 5 to 15 minutes, it is completely decoloured. The *product* has a slight empyreumatic odour, but this disappears by age, exposure, or saponification, and the natural violet odour of the oil returns. Cast-iron pans should be employed in this process, and should be only 2-3rds filled, and well-covered during the operation.

By the *distillation* of *sulphurated palm-oil* in *closed vessels*, at a heat ranging from 570° to 600° Fahr., from 68% to 75% of a *mixture* of *palmitic* and *palm-oleic acid* passes over; of which 25% to 30% is colourless, hard, and crystalline; and the rest darker and softer. (Pohl.) The *residuum* in the still is a *fine hard pitch.*

Most of the methods of *bleaching* and *refining* the *fatty oils* noticed at *pages* 841-3, also apply to the *crude tallows* and *fats* of *commerce.*

TAMARA. A mixed spice used in Italian cookery, consisting of *cinnamon*, *cloves*, and *corianders*, of each, 2 parts; *aniseed* and *fennel seed*, of each 1 part.

TAMARIND. Syn. *Tamarindus*,—Ph. L. E. & D. The *pulp* or *preserved fruit* or *pod* of the *tamarindus Indica* (Linn.), or *tamarind tree.* In the Ph. L., *tamarind pulp* (tamarindus præparatus) is ordered to be obtained by macerating *tamarinds*, 1 lb., with *water*, q. s. to cover them, by a gentle heat, for 4 hours, and completing the process as directed for *prepared prunes.*

Tamarind pulp is refrigerant and gently laxative. Mixed with water, it forms a grateful acidulous drink in fevers, &c.

TAN BALLS. Syn. *Tanner's Turf.* The muddy sediment of *tan-pits*, and the *exhausted bark*, pressed into balls or cakes. *Used* for summer fuel; but chiefly to "recover fires when nearly out," or "to keep them in" for a long time.

TANGHICINE. A crystallizable substance extracted by *ether* from the *seeds* of *tanghinia venenifera* or *Madagascariensis*, after the fixed oil has been removed by pressure. It is soluble in water, alcohol, and ether; and is bitter, acrid, and very poisonous.

TANGHININE. The ethereal extract of the seeds last referred to.

TANNATE. Syn. *Tannas*,—Lat. See *below*.

TANNER'S BARK. The best of this is *oak bark;* but the *bark* of the *chestnut, willow, larch,* and other trees which abound in tannin, are also used for preparing leather.

TANNIC ACID. Syn. *Tan, Tannin; Gallo-tannic Acid, Quercitannic do.; Scytodephic do.; Tanninum; Acidum Tannicum,* —Ph. L. D. & U. S. A peculiar vegetable principle, remarkable for its astringency, and its power of converting the skins of animals into leather.

Prep. 1. Precipitate an *infusion of galls* with a *concentrated solution of carbonate of potash,* avoiding excess; wash the precipitate with ice-cold *water,* dissolve it in *dilute acetic acid,* filter the solution, precipitate it with *acetate of lead,* wash the precipitate with *water,* suspend it in *water,* and decompose it by means of a *stream* of *sulphuretted hydrogen*; lastly, evaporate the *filtered liquid* in vacuo, or over sulphuric acid.

2. (Berzelius.) To a *hot infusion of galls* add a few drops of *sulphuric acid;* agitate, filter, and add, gradually, to the filtered liquor *sulphuric acid* diluted with its own weight of *water,* until the precipitate, after standing for an hour, is found to form a semi-fluid glutinous mass; then decant the liquid, and mix it carefully with *concentrated sulphuric acid* as long as a precipitate forms; wash this precipitate with *water* strongly *acidulated with sulphuric acid,* press it between the folds of bibulous paper, and dissolve it in *pure water;* to this solution gradually add *carbonate of lead* in very fine powder, and after agitation, and maceration for some time, until the sulpho-tannate is all decomposed, filter, and gently evaporate; lastly, powder the dry residuum, digest it in *ether,* allow the ether to evaporate spontaneously, and preserve the dry powder from the air.

3. (M. Pelouze.) From *galls,* in moderately fine powder, by percolation, in a closed vessel, with *sulphuric ether* that has been previously agitated with *water.* After some time the percolated liquid will be found divided into two distinct portions; the *lower* and *heavier* one being a watery solution of *tannic acid,* and the *upper* one, an *ethereal solution* of gallic acid and colouring matter. Fresh ether must be passed through the powder as long as the lower stratum of liquid continues to augment. The two fluids are now carefully separated, and after the heavier one has been well washed with ether, it is gently evaporated to dryness; preferably under the receiver of an air-pump, or over sulphuric acid. The *ether* may be recovered unaltered from the ethereal solution, by cautious distillation in a retort connected with a Liebig's condenser supplied with ice-cold water. *Prod.* About 40$\frac{0}{0}$.

4. (Ph. D.) From *galls,* in tolerably fine powder, 8 *oz.;* and a mixture of *sulphuric ether,* 3 pints; with *water,* 5 fl. oz.; by percolation, in successive portions, like the last; the aqueous solution of tannic acid being evaporated, and finally dried at a heat not exceeding 212° Fahr.

Prop., &c. Pure tannic acid is perfectly white, but as ordinarily met with it has a slight yellowish colour, owing to the action of the air; it is uncrystallizable; possesses a powerful and purely astringent taste, without bitterness; is freely soluble in water, less so in alcohol, and only very slightly soluble in ether; it reddens vegetable blues; in solution, it is gradually converted by the action of heat into *ellagic, gallic,* and *carbonic acids;* when heated in the dry state it suffers decomposition, *metagallic* and *pyrogallic acids* being formed; it unites with the bases forming salts called *tannates,* which are characterised by striking a deep black with the persalts of iron (*ink*); with gelatine it unites to form *leather.*

Pur. "Almost colourless. Dissolved in water, it is powerfully astringent. From a solution of isinglass it throws down a certain white precipitate. In other respects its properties correspond with those of gallic acid, before named." (Ph. L.)

Uses, &c. The value of substances containing tannin in the preparation of leather is well known. In its *pure form* it is used as an astringent in medicine; *internally,* in diarrhœa, hæmorrhages, as a tonic in dyspepsia, &c.; *externally,* made into a gargle, injection, or ointment. *Dose.* 1 to 10 gr., under the form of pills or solution.

Tannic acid and gelatine are mutually used as tests for each other; a thick flocculent precipitate is formed whenever these substances meet in solution. When a solution of tannin is dropped into another of gelatine, thick flocks are precipitated, which re-dissolve when heated with the supernatant fluid. The following is a useful and simple form for preparing this test: —Infuse *pounded galls,* 1 *oz.,* in *hot water,* ½ pint, for several hours; strain with pressure, add to the turbid fluid, *common salt,* 2 *oz.;* and the next day filter it. The *filtrate* will retain its transparency and power of precipitating gelatine for years. (*Chem. Gaz.*)

By digesting *powdered charcoal* in *nitric acid,* and carefully evaporating the solution so obtained, Mr. Hatchett succeeded in procuring an astringent subject, possessing many of the properties of tannic acid, and which has been called *artificial tannin* and *tannin resin.*

It is said that *tannin* may be *decolorized* by sulphuret of mercury.

TANNIN. See *Tannic Acid.*

TANNING. When the skin of an animal, carefully deprived of hair, fat, and other impurities, is immersed in a dilute solution of tannic acid, the animal matter gradually combines with that substance as it penetrates inwards, forming a perfectly insoluble compound, which resists putrefaction completely; this is *tanned leather.* In practice, *lime water* is used for *cleansing* and *preparing* the skin, *water acidulated with oil of vitriol* for "raising" or opening the pores, and an *infusion of oak-bark*, or, sometimes, of *catechu,* or other *astringent matter*, for the source of tannic acid. The process itself is necessarily a slow one, as dilute solutions only can be safely used. *Skins* intended for the curriers, to be dressed for "*uppers,*" commonly require about 3 weeks; and *thick hides,* from 12 to 18 months.

Of late years various ingenious contrivances have been adopted, with more or less success, to hasten the process of tanning skins and hides. Among these may be mentioned, the employment of *stronger tan-solutions*, the application of a *gentle heat*, *puncturing the skins* to afford more ready access for the liquid to their interior parts, and *maceration* in the tan-liquor *under pressure*, either at once, or after the vessel containing them has been exhausted of air by means of an air-pump. On the merit of these several methods it has been remarked, "that the *saturated* infusions of astringent barks contain much less extractive matter, in proportion to their tannin, than the *weak* infusions; and when the skins are *quickly* tanned in the former, common experience shows that it produces leather which is less durable than leather *slowly* formed." (Sir H. Davy.) "100 *lb.* of skin, *quickly* tanned in a strong infusion of bark, produce 137 *lb.* of leather; while 100 *lb. slowly* tanned in a weak infusion, produce only 117½ *lb.*" "Leather thus highly (and hastily) charged with tannin is, moreover, so spongy as to allow moisture to pass readily through its pores, to the great discomfort and danger of persons wearing shoes made of it." (Ure.)

According to Mr. G. Lee, much of the original gelatine of the skins is wasted in the preliminary processes to which they are subjected, more especially, the "*liming*" and "*bating.*" He says, that 100 *lb.* of perfectly dry hide, cleaned from extraneous matter, should, on chemical principles, afford at least 180 *lb.* of leather.

Morocco leather is prepared from *goat* or *sheep skins,* which after the action of *lime water* and a *dung bath,* are slightly tanned in a *bath of sumach.* They are subsequently grained, polished, &c.

Russia leather is generally tanned with a *decoction of willow bark,* after which it is dyed, and curried with the *empyreumatic oil of the birch tree.* It is the last substance which imparts to this leather its peculiar odour and power of resisting mould and damp. See *Leather*, *Tannic Acid*, *Tawing*, *&c.*

TANTALIC ACID. Syn. *Columbic Acid.* This compound exists in the ores of columbium in combination with iron, manganese, or yttria.

Prep. The *ore* is fused along with 3 or 4 times its weight of *carbonate of potassa;* the resulting *columbate* or *tantalate of potassa* is dissolved out of the *fused mass* with *water*, and the *solution* thus obtained is precipitated with a *mineral acid;* the white powder which falls is *hydrated columbic* or *tantalic acid.*

Prop., &c. It is insoluble in water, but readily unites with the alkalies forming salts termed *columbates* or *tantalates,* which are crystallizable. It is soluble in hydrofluoric acid, and the solution, by evaporation at 76° Fahr., deposits crystals of *terfluoride of columbium.* The *double fluoride of columbium* and *potassium* may also be readily formed. Sp. gr. 7·25 to 8·25.

TANTALUM. Syn. *Columbium.* A rare metal discovered by Mr. Hatchett, in 1801, in a mineral from Massachusets; and by M. Ekeberg, in 1803, in tantalite. It exists in most of its ores in combination with oxygen.

Prep. From the *double fluoride of potassium and columbium,* by heating it with *potassium,* in the way described under *Silicium.*

Prop., &c. A grey metal, little acted on by acids, burning to tantalic acid when heated in the air, or when fused with potassa. With oxygen it forms two compounds—an *oxide* or *protoxide,* which is insoluble, obtained by exposing columbic or tantalic acid, for 4 or 5 hours, to an intense heat, in a crucible lined with charcoal, and luted; and a *binoxide* or *peroxide,* which is tantalic acid. (See *above.*) It also forms corresponding compounds with chlorine.

Obs. It has been lately discovered, by H. Rose, that the supposed *tantalic acid* obtained from the *tantalite* of Bavaria and of America, is in reality a compound of *tantalum*, and two new metals (*niobium* and *pelopium*), with *oxygen.* When this supposed *tantalic acid* is mixed with *powdered charcoal,* and heated to redness in a *stream* of *chlorine gas,* a mixed sublimate is obtained, consisting of a yellow, readily fusible, and very volatile substance, which is *chloride of pelopium;* and a white, infusible, less volatile body, which is *chloride of niobium.* When these substances are separated and thrown into water, they suffer immediate decomposition, a solution of hydrochloric acid, and an insoluble precipitate of *niobic acid* or *pelopic acid* being formed. The properties of these bodies closely resemble each other. From their respective chlorides metallic *niobium, pelopium,* and *tantalum* may be obtained, by the action of *ammonia,* at a high temperature. So prepared, they are black, pulverulent, unaffected by water, and burn, when heated in the air, with the production of the respective acids.

TAPE-WORM. See *Worms.*

TAPIOCA. Syn. *Tapioca,*—Ph. E. & D. The *fecula* of the *root* of *janipha manihot* (jatropha manihot,—*Linn.*), which has been well washed in *water,* and dried on *hot plates,* by which it assumes the appearance of warty-looking granules.

Pure tapioca is insipid, inodorous, only slightly soluble in cold water, but *entirely* soluble in boiling water, forming a translucent, and highly nutritious jelly. Its granules are muller-shaped, about $\frac{1}{2000}$th of an inch in diameter, and display very marked hilums. It is *used* in a similar manner to sago and arrowroot. See *Cassava.*

TAR. Syn. *Pix Liquida,*—Ph. L. E. & D. "A liquid bitumen prepared from (the) wood" of "*pinus sylvestris,* and other species, by heat." (Ph. L.) The chemical constitution of tar is very complicated. Its *uses* in the arts are well known. As a *medicine,* it is stimulant, diuretic, sudorific, and vermifuge. *Dose.* 5 to 20 gr., made into pills; in ichthyosis, &c. *Externally,* in lepra, psoriasis, foul ulcers, &c. See *Ointments* and *Infusions.*

TAR (Barbadoes). Syn. *Pix Liquida Barbadensis, Petroleum Barbadense; Petroleum,*—Ph. L. & E. "Black liquid bitumen exuding spontaneously from the earth." (Ph. L.) Its properties for the most part resemble those of the last. *Dose.* 10 to 30 drops; in asthma, chronic coughs, tapeworm, &c. *Externally,* in chilblains, chronic and rheumatic pains, &c.

TAR (Coal). Produced during the distillation of *bituminous coal* for gas.

TAR (Oil of). See *page* 839.

TARAXACUM (Ph. L. E. & D.). See *page* 307.

TARES. See *Vetch.*

TARPAULIN. Syn. *Tarpawling. Canvas* covered with *tar* or any composition to render it waterproof.

TARRAS. Syn. *Terras.* A volcanic product resembling *puzzolene,* that imparts to mortar the property of hardening under water. Several other *argillo-ferruginous minerals* possess the same power, and are *used* under this term.

TARTAR. Syn. *Argal, Argol; Tartarum, Tartarus,*—Lat. *Crude tartar* is the concrete deposit formed upon the sides of the casks and vats during the fermentation of grape juice. That obtained from white wine is *white argol;* that from red wine, *red argol.* After purification it forms *cream of tartar.*

TARTAR (Ammoniated). Syn. *Ammonio-tartrate of Potassa, Soluble Tartar* (Ammoniated); *Tartarus Ammoniatus, Tartarum Solubile Ammoniatum,*—Lat. *Prep.* Neutralize a *solution of cream of tartar* with *ammonia* in slight excess, then evaporate, and crystallize. Very soluble in water. A favorite laxative on the Continent.

TARTAR (Boraxated). Syn. *Soluble Cream of Tartar, Boro-tartrate of Potassa and Soda; Tartarum Boraxatum, Cremor Tartari Solubilis, Potassæ et Sodæ Tartras Boraxata,*—Lat. *Prep.* From *borax,* 2 *lb.; cream of tartar,* 5 *lb.;* both in powder; dissolved in water, evaporated, and crystallized. See *Borotartrate of Potassa.*

TARTAR (Chalybeated). See *page* 646.

TARTAR (Cream of). See *page* 1043.

TARTAR (Emetic). See *page* 76.

TARTAR (Oil of). See *page* 1035.

TARTAR (Reduced). Syn. *Cremor Tartari Reductus,*—Lat. An article is sold under the name of *British cream of tartar,* which contains $\frac{1}{4}$th its weight or more of *bisulphate of potash.*

TARTAR (Salt of). See *page* 1033.

TARTAR (Soluble). See *page* 1043.

TARTAR (Spirit of). Pyrotartaric acid.

TARTAR (Tartarized). Tartrate of potassa.

TARTAR (Vitriolated). Sulphate of potash.

TARTARIC ACID. Syn. *Acidum Tartaricum,*—Ph. L. E. & D. *Acid of Tartar, Essential Salt of do., Tartareous Acid, Sal Essentiale Tartari, Acidum Tartari Essentiale,*—Obs. var. *Prep.* 1. (Ph. L. 1836.)

Take of *cream of tartar*, 4 ℔; *boiling water*, 2 gall.; dissolve by boiling, add, gradually, of *prepared chalk*, 12 oz. 7 dr. (made into a milk with water), and when the effervescence ceases, add another like portion of *prepared chalk*, dissolved in *hydrochloric acid*, 26½ fl. oz., or q. s., diluted with *water*, 4 pints; collect the precipitated *tartrate of lime*, and after well washing it with *water*, boil it for 15 minutes in *dilute sulphuric acid*, 7 pints and 17 fl. oz.; next filter, evaporate the filtrate (to the density of 1·38), and set it aside to crystallize; re-dissolve the crystals in *water*, concentrate the solution by evaporation, and re-crystallize a *second*, and a *third* time. The Edinburgh formula is nearly similar. In the present Ph. L. & D. tartaric acid is placed in the Materia Medica.

2. (Mr. Gatty.) The solution of *argol* or *tartar* is first neutralized with *carbonate of potash*, and to every 300 gall. of the *clear liquid*, at the density of 5° Twaddell, 34 gall. of *milk of lime* (1 *lb.* of *lime* per gall.) are added; *carbonic acid gas* is then forced in, with agitation; decomposition ensues, with the formation of *bicarbonate of potassa* and *tartrate of lime;* the *last* is converted into *tartaric acid* in the usual manner, and the *former* is evaporated in iron pans, and roasted in a reverberatory furnace for its *potash.*

3. (Dr. Price.) This is a mere modification of his process for obtaining *citric acid*, described at *page* 263.

Prop. Tartaric acid forms inodorous, scarcely transparent, oblique rhombic prisms, more or less modified, which are permanent in the air; it possesses a purely sour taste, dissolves in about 2 parts of water at 60° Fahr., and in about its own weight of boiling water; it is slightly soluble in alcohol; the aqueous solution exhibits right-handed polarization, and suffers gradual decomposition by age; it contains 9% of water; fuses at 220°, boils at 260°, and when heated to about 400° Fahr., after losing 1-4th of its water, is converted into *tartralic acid;* by continuing the heat until another 1-4th of its water is driven off, it is converted into *tartrelic acid;* at a still higher degree of heat it loses all its water, and assumes the form of an insoluble white powder, which is *anhydrous tartaric acid.* By distillation it yields *pyrotartaric* and *pyruvic acids*, with other products; when strongly heated, it is wholly dissipated. With the bases it forms salts called *tartrates.*

Pur. It is "free from colour; is entirely, or almost entirely dissipated by fire; and is entirely soluble in water. This solution throws down bitartrate of potash from any neutral salt of potassa. Nothing is precipitated from the same solution by chloride of barium, and what is thrown down by acetate of lead is dissolved by nitric acid. 100 gr. of this acid, dissolved in water, are saturated by 192 gr. of crystallized carbonate of soda." (Ph. L.) If it contain *tartrate of lime*, or *cream of tartar*, it is not wholly soluble in alcohol, nor wholly destroyed by fire. If it contain *sulphuric acid*, or a *sulphate*, chloride of barium gives a white precipitate.

Tests. 1. Tartaric acid is known to be such by its solution giving white precipitates with solutions of caustic lime, baryta, and strontia, which dissolves in excess of the acid.—2. A solution of potassa causes a white granular precipitate of cream of tartar, soluble by agitation in excess of the precipitant.—3. Nitrate of silver and acetate of lead give white precipitates, which, when heated, fume, and yield the pure metal.—4. If to a solution of tartaric acid, or a tartrate, solution of sesquioxide of iron, or of alumina, be added, and subsequently ammonia or potassa, no precipitate is formed.—5. At about 570° Fahr., all the tartrates are blackened, and yield a peculiar and characteristic odour.

Uses, &c. Tartaric acid is chiefly employed in *calico printing*, and in *medicine*, as a substitute for citric acid and lemon juice in the preparation of cooling drinks and saline draughts. For the latter purpose, bicarbonate of soda is the alkaline salt commonly employed.

20 gr. of *crystallized tartaric acid*

are saturated by

27 gr. of *crystallized bicarbonate of potassa;*
22 gr. of *commercial carbonate of do.;*
22 gr. of *crystallized bicarbonate of soda;*
38 gr. *of crystallized carbonate of soda;* and
15½ gr. of *sesquicarbonate of ammonia.*

Concluding Remarks. On the *large scale*, the decomposition of the tartar is usually effected in a copper boiler, and that of the tartrate of lime in a leaden cistern. This part of the process is often performed by mere digestion for a few days, without the application of heat. Leaden or stoneware vessels are used as crystallizers. *Good cream of tartar* requires 26% of *chalk*, and 28·5% of *dry chloride of calcium* for its perfect decomposition. *Dry tartrate of lime* requires 75% of *oil of vitriol* to liberate the whole of its tartaric acid. A *very slight excess* of sulphuric acid may be safely, nay, advantageously employed. Some manufacturers *bleach* the *coloured solution* of the first crystals, by treating it with *animal charcoal;* but for this purpose the latter substance should be first purified by digesting it in hydrochloric acid, and afterwards by edulcorating it with water, and exposing it to a *dull* red heat in a covered vessel. The general management of this manufacture resembles that of *citric acid.* To obtain a *large product*, care must be taken that the *whole* of the tartrate of lime be thoroughly decomposed, a matter not always effected by clumsy manipulators, who do not adapt their quantities or practice to the circumstances before them.

TARTARINE. The name given by Kirwin to potash.

TARTRALIC ACID. This acid is *distinguished* from *tartaric acid* by saturating 1-4th less base, and by forming soluble salts with lime and baryta. By heat it is converted into *tartrelic* acid. This *new acid* possesses only *half* the neutralizing power of tartaric acid. In contact with water the tartralic and tartrelic acids, and their salts, are slowly reconverted into tartaric acid and tartrates. *Dry tartralic, tartrelic,* and *tartaric acids* are isomeric compounds. *Tartaric acid* is *bibasic.*

TARTRATE. Syn. *Tartras,*—Lat. The *tartrates* are noticed under the names of the *respective bases* and *tartaric acid.* The *tartrates* of *baryta, lime, magnesia, strontia,* and most of the *ordinary metals* are INSOLUBLE; the *others*, are SOLUBLE.

TARTRELIC ACID. See *Tartaric* and *Tartralic Acids.*

TARTROVINIC ACID. A compound, formed of *tartaric acid* in combination with the *elements of ether,* analogous to *oxalvinic acid.*

TARTS. These may be regarded as miniature pies, consisting of *fruit*, either *fresh* or *preserved,* baked or spread on *puff-paste.*

TAURINE. Obtained, along with *choloidic acid* and *ammonia,* when *purified bile* is boiled for some hours with an excess of *hydrochloric acid.* By filtration, evaporation, and dissolving the dry residuum in about 6 parts of *boiling alcohol*, nearly *pure taurine* crystallizes out as the solution cools. It forms white crystalline needles, which are soluble in water, and sparingly soluble in alcohol. It is remarkable for containing fully 25% of sulphur.

TAUROCHOLALIC ACID. See *Choleic Acid.*

TAURO-HYOCHOLALIC ACID. A peculiar sulphuretted acid, found by Strecker, in *pig's bile,* corresponding to the *taurocholalic acid* of ox-bile.

TAWING. In the *preparation* of the *tawed leather* used for *gloves, housings, &c.*, the *skins* are first *soaked, scraped,* and *hung* in a *warm room* until they begin to exhale an ammoniacal odour, and the wool readily comes off; they are then *de-haired,* and soaked in *water* with some *quick-lime* for several weeks, the water being changed two or three times during that period; they are then again *beamed, smoothed,* and *trimmed,* after which they are *rinsed,* and *re-soaked* in a *vat* of *bran-and-water,* where they are kept in a state of gentle fermentation for some weeks; (in this state they are called "*pelts;*") the *skins* are next well worked about in a *warm solution of alum* and *salt,* again *fermented* in *bran-and-water* for a short time, and are then stretched on hooks, and dried in a stove-room; they are lastly, again *soaked* in *water*, and *trodden* or *worked* in a pail or tub containing some *yelks* of *eggs* beaten to a froth with *water*, after which they are *stretched* and *dried* in a loft, and are smoothed with a warm *smoothing-iron.* Sometimes the process is shortened by soaking the skins in the following mixture after the first steep with bran:—*Common salt,* 3½ *lb.; alum,* 8 *lb.; boiling water*, q. s.; dissolve, add of *wheaten flour*, 21 *lb.; yelks* of 9 dozen *eggs;* make a paste. For *use*, a portion is to be *largely diluted* with *water.*

Chamois or *shammy leather* is generally *prepared* from either *sheep* or *doe-skins,* which, after *dressing, liming, &c.*, are *well oiled* on the grain side, then rolled into balls, and thrown into the trough of the *fulling mill,* where they are beaten for 2, 3, or 4 hours. They are next *aired*, and again *oiled* and *fulled*, and this is repeated a *third* time, or oftener, as circumstances may direct. The *oiled skins* are then exposed to a *fermenting process*, or *heating* in a close chamber, and are afterwards freed from redundant oil by being scoured in a *weak alkaline lye.* They are, lastly, rinsed in clean water, wrung at the peg, dried, and "finished" at the *stretcher-iron.*

Tawed leather differs from *tanned leather* in yielding *size* or *glue* under the influence of heat and moisture, in nearly the same way as the raw skins.

TEA. Syn. *Thea,*—Lat. The *dried leaves* of *thea bohea* (Linn.), and *thea viridis* (Linn.) The first yields *black tea;* the second, *green tea.*

Pur. The only *adulteration* of *tea* which is extensively practised at the present day, is mixing it with a certain portion of *exhausted tea-leaves* which have been re-dried and curled. The *collection* and *preparation* of these occupy several hundred persons, chiefly women and children, in and about London. The *leaves* which have been found in the possession of the manufacturers of *imitation tea* are those of the *sloe tree*, *ash tree*, *elder bush*, and *white thorn*. According to Mr. Warrington, a most extensive system of adulterating tea is practised in China. Many samples directly imported from that country, examined by him, *did not* contain a *single grain of tea*, being made up entirely of other leaves. The *ordinary green teas* he found, for the most part, spurious, being manufactured out of the cheaper black teas. These are "*faced up*" or "*painted*" with various *colouring substances, powdered porcelain clay, &c.*, which are readily perceived under the microscope, and even admit of being separated, and chemically examined.

It is a *general practice* among the grocers in this country to impart what they call a "*bloom*" to their GREEN TEAS by "*rouncing*" them up with a little *calcined magnesia*, or *finely powdered talc* or *French chalk*. The quantity that adheres to the tea is very trifling, but it greatly improves its appearance. BLACK TEAS are "*faced*," in a similar manner, with *finely powdered plumbago* or *black lead*.

Pure China tea is not *turned black* by being put into water impregnated with sulphuretted hydrogen gas, nor does it tinge spirit of hartshorn *blue*. The *infusion* is *amber-coloured*, and is *not reddened* by the addition of an acid. The *ashes* left from the combustion of genuine tea are white, and do not exceed 5 to 5½%. If they exceed this they may be chemically examined with the usual tests for *alumina*, *chromate of lead*, *copper*, *cyanide of potassium*, *gypsum*, *lime*, *magnesia*, *&c.* Many of these substances may be detected by simply agitating the tea with a little *cold water*, when they will be detached from its surface, and render the water turbid, or, by their gravity, sink to the bottom.

Among *domestic substitutes* for tea are—the *leaves* of *speedwell*, *wild germander*, *black currant*, *syringa* or *mock orange*, *purple-spiked willow herb*, *gaultheria procumbens* or *winter green*, *sweetbriar*, *cherry tree*, *sloe*, *&c.*, all of which are used for tea, either singly or mixed. The addition of a *single bud* of the *black currant* to the infusion of *ordinary black tea* imparts to it a flavour closely resembling that of *green tea*.

The brownish-coloured powder vended under the name of "*la veno beno*," is a mixture of 2 parts of *tea-dust* with 5 parts of *powdered catechu* or *terra japonica*. A few grains of this substance thrown into the tea-pot, are described in the advertisements as being capable of more than doubling the strength of the beverage.

The once notorious "*paraguay plant*," sold in packets, was simply *new meadow-hay* that had been wetted with a *strong infusion of catechu*, then dried, chopped small, and strongly compressed. See *Theine* and *Caffeine*.

TEA. "The tea is not a meal; when it is properly used, it should not be a meal; but it has a special purpose to fulfil which I will now explain. Tea, and under the generic term tea I include coffee—tea is usually taken three hours after dinner. This is the moment which corresponds with the completion of digestion, when the food having been conveyed away from the stomach, nothing remains behind but the excess of the acid juices employed in digestion; these acid juices create an uneasy sensation at the stomach, and a call is made for something to relieve the uneasiness; tea fulfils that object." "On the same principle, after the business of the dining-room, the antacid and refreshing beverage, either in the shape of tea or coffee, is prepared in the drawing-room. In taking either, the nearer they approach to the simple infusion the better, little milk or cream, and less sugar, should be the principle. But seeing the purpose of tea; how unreasonable to make it the excuse for a meal, to conjoin with it, toast, muffins, bread and butter, and *id genus omne*." "Three meals a day may be taken as the standard of habit and custom; tea and coffee having a specific place and purpose as a beverage, but none as a meal." (Eras. Wilson.) See *Meals, &c.*

TEA (Beef.) Syn. *Infusum Carnis Bubulæ*, *Jusculum cum Carne Bovis*,—Lat. This is merely a very concentrated soup formed of lean beef. According to the common plan, *lean beef*, 1 *lb.* is gently simmered in *water*, 1 quart, for about ½ an hour, when *spice*, *salt*, *&c.*, is added, and in a few minutes the whole is strained for use. The following are other formulæ:—

1. (Dr. A. T. Thomson.) Take of good *rump steak*, ½ *lb.*; cut it into *thin slices*, spread these over a hollow dish, sprinkle a *little salt* on them, add a pint of *boiling water*, and place the dish (covered) near the fire for half an hour; then remove the whole to a saucepan, and boil it gently for 15 minutes; lastly, strain through a hair sieve.

2. (Prof. Liebig.) *Beef*, free from fat, 1 *lb.*, is to be minced very small, mixed with an equal weight of *cold water*, and, after

digestion and agitation in the cold for about ½ an hour, heated slowly to boiling; when it has boiled for a minute or two, strain it through a cloth. It may be coloured with *roasted onion* or *burnt sugar*, and *spiced* and *salted* to taste.

Obs. Similar preparations are ordered in some foreign pharmacopœias from *calves' lights, crayfish. frogs, mutton, pullets, snails, tortoise, veal, &c.* In the Ph. L. 1746, a form was given for *viper broth* (jusculum viperinum).

TEA (Bran). See *page* 152.

TEETH (The). Syn. *Dentes*,—Lat. An object very subservient to health, and which merits due attention, is the *preservation of the teeth;* the care of which, considering their importance in preparing the food for digestion, is, in general, far from being sufficiently appreciated. Comparatively very few persons *wash their mouths* and *clean their teeth* even once a day; a feat which ought always to be practised at the conclusion of a meal, when either animal food or vegetables are eaten; for the first is apt to leave behind it a rancid acrimony, and the other, an acidity, both of them hurtful to the teeth. Those who abhor a fœtid breath, rotten teeth, and the toothache, would do well to invariably clean their teeth before retiring to rest. With *smokers* this practice is almost obligatory. *Washing* the *mouth* frequently with *cold water* is not only serviceable in keeping the teeth clean, but in *strengthening* the *gums*, the firm adhesion of which to the teeth, is of the greatest importance in preserving them sound and secure. Some parties think it serviceable to add a few drops of *spirit* or *essence of camphor* to the *water* thus employed, a plan we certainly approve of. See *Breath, Dentifrices, Pastes, Powders, Tooth Cements, Washes, &c.*

TEETHING. Syn. *Dentition.* Children are sometimes born with one or more teeth; but in general, the teeth, at birth, consist of mere pulpy rudiments buried in the gum. Their *development* is gradual. About the *third* or *fourth month* they begin to assume shape and hardness. At this period children become fretful, the saliva flows copiously, the gums grow turgid, and there is a fondness of biting hard cold objects. In nearly all cases there is more or less fever, frequently a cough or diarrhœa, and a rash commonly appears, which is called by nurses the "*red gum.*" These symptoms generally abate after a fortnight or three weeks, and the child remains undisturbed until the *seventh* or *eighth month.* About this period the gums again become red, tender, and swollen, and often extremely sensitive and painful. The upper part of the gum gradually becomes attenuated and pale, and, just before the tooth appears, even covered with a blister. These changes are usually attended by an increased flow of saliva, or "drivelling," and a lax state of the bowels; both of which are regarded as favorable symptoms. Sometimes, however, the *diarrhœa* is excessive, when it may be cautiously restrained by a dose or two of *rhubarb-and-magnesia*, with a little *dill* or *peppermint water;* or better, by the daily use of a little *arrow-root*, to which a few drops of *pure port wine* may be added. Sometimes the *local irritation* is considerable, or there are *spasms* or *convulsions*, in which case the practice is to *lance* the gums. When there is *drowsiness, stupor*, or *oppressed respiration*, one or two *leeches* may be applied to the temples, and a *small blister* to the back of the neck, or behind the ear. *Sluggishness of the bowels* may be removed by a little *castor oil;* or, when there is actual *constipation*, by a little *calomel* or *mercurial powder* and *rhubarb. Excessive irritability*, without other marked symptoms, is best combated by a drop or two of *tincture of hops* in sweetened water. *Throughout* the *whole period* of *dentition*, the *use* of *warm dry clothing*, freedom from *tight bandages*, with *thorough ventilation*, good *nursing exercise, fresh air* without undue exposure, abundance of "*crawling on the carpet*," and frequent *warm baths*, will be found most advantageous. Indeed the *last*, without other treatment, is often sufficient to subdue the most distressing convulsions, and the most obstinate diarrhœa; and in no case can they do harm. See *Nursing, Strophulus, &c.*

TEKORETINE. A crystalline resinous principle obtained from *turf.*

TELA VESICATORIA. See *Vesicants.*

TELESCOPE. See *Glass, Speculum Metal, &c.* The *metal* used for the *specula* of Lord Ross's great 53-feet reflecting telescope is an alloy of *copper* and *tin* in atomic proportions. One of these specula weighs 3½ tons; the other, 4 tons; they are each of them 6 feet in diameter.

TELLURETTED HYDROGEN. See *page* 584.

TELLURIC ACID. Syn. *Teroxide of Tellurium. Prep.* Equal parts of *tellurous acid* and *carbonate of soda* are fused together, the product dissolved in *water*, a little *hydrate of soda* added, and a *stream of chlorine* passed through the solution; the liquid is next saturated with *ammonia*, and mixed with *solution of chloride of* *barium*, by which a white insoluble precipitate of *tellurate of baryta* is thrown down; this is washed and digested with 1-4th of its weight of *sulphuric acid* diluted with *water;* the filtered solution gives, on evaporation in the air, large crystals of *telluric acid.*

Prop., &c. Soluble in water; a strong heat renders it anhydrous, and insoluble, even in boiling liquor of potassa; a red heat converts it into *tellurous acid;* its salts (*tellurates*) are uncrystallizable; those of the earths, insoluble.

TELLURIUM. A rare grayish white metal, found only in small quantities, in the metallic state, in the gold mines of Transylvania.

Prep. The native *sulpho-telluret of bismuth,* of Chemnitz, in Hungary, reduced to fine powder, is mixed with an equal weight of *dry carbonate of soda,* the mixture made into a *paste* with *oil,* and heated to whiteness in a closely covered crucible; *telluret* and *sulphuret of sodium* are produced, and *metallic bismuth* set free; the fused mass is dissolved in water and the solution freely exposed to the air, when the sodium and sulphur oxidize to *caustic soda* and *hyposulphite of soda,* whilst the *tellurium* separates in the metallic state.

Prop., &c. It possesses a colour and lustre closely approaching those of silver; is brittle; fuses below redness; burns in the air when heated; and is volatilized at a red heat; sp. gr. 6·2578. With *oxygen* it forms two compounds, both of which exhibit acid properties. It also forms two compounds with *chlorine.*

TELLUROUS ACID. *Prep.* By burning *tellurium* in the air; or, by heating it, in fine powder, with *nitric acid* of the sp. gr. 1·25; the solution, thus obtained, deposits white anhydrous octahedral crystals of *tellurous acid* on standing. *Hydrated tellurous acid* is also thrown down when *tellurite of potassa* is mixed with *nitric acid* in slight excess. In this state it is a white powder, soluble to a certain extent in water, and reddens litmus. Under both forms it is easily soluble in alkaline solutions. Its salts are called *tellurites.*

TEMPERANCE. See *Abstinence, Intemperance, Summer Beverages, &c.*

TEMPERATURE. "We measure the degree of heat by Fahrenheit's thermometer. When we direct a *boiling heat,* we mean that of 212°. We call a *gentle heat* that which is denoted by any degree between 90° and 100° Fahr."

"Whenever specific gravity is mentioned, we suppose the substance spoken of to be of the temperature of 62° Fahr." (Ph. L.)

In the Ph. E. & D., and in chemical works in this country generally, the specific gravities of bodies are taken at, or referred to the temperature of 60° Fahr.

TENCH. The *cyprinus tinca* (Linn.), a soft-finned abdominal fish (*malacopterigii abdominales*), formerly employed in medicine, but now only known as an easily digestible, and nice-flavoured fresh-water fish.

TENT. A piece of *lint,* or *compressed sponge,* used to dilate openings, wounds, &c.

TER-, See *Nomenclature.*

TERBIUM. A new metal found by Prof. Mosander, associated with *erbium* and *yttrium* in ordinary *yttria.* See *Erbium* and *Yttria.*

TEREBENE. A hypothetical principle supposed to exist in the *liquid hydrochlorate of oil of turpentine.*

TEREBYLENE. A volatile, oily liquid, obtained by distilling the *liquid hydrochlorate of oil of turpentine* with *quicklime.*

TERRA, (Lat.) Earth. *Terra Japonica,* catechu; *terra ponderosa,* sulphate of baryta; &c.

TERRA COTTA. Literally, *baked clay;* a term applied to statues, architectural ornaments, &c., made of pure white clay fine sand, and powdered potsherds, slowly dried, and baked to a strong hardness.

TERTIAN. See *Ague.*

TESTS or *reagents* are substances employed to determine the name or character of any other substance, or to detect its presence in compounds. They are used in both the solid and fluid state; generally the latter, when they are known as *liquid tests.* Their *application* as *reagents* is called "*testing.*" For this purpose they are commonly added, drop by drop, to the *liquid to be tested* contained in a *test-tube* or *test-glass.* A *simple way* of employing them, is to place a few drops of the *liquid* or *substance* for examination on a *slip* of *common white glass,* and to add to them a drop of the *test-liquid.* By placing the glass over a sheet of white paper, the effect will be rendered more perceptible. See *Test Papers, &c.*

TESTING. Assay by cupellation.

TETANINE. See *Strychnine.*

TETANUS. Spasm with rigidity. When it affects the under jaw, it is called *trismus* or *locked-jaw;* when the body is drawn backward by the contraction of the muscles, it is called *opisthotonos;* when the body is bent forward, *emprosthotonos;* and when the body is drawn to one side, *pleurosthotonos.*

The *cause* of *tetanus,* in *temperate climates,* is generally irritation of the nerves, arising from local injuries, especially punctured or lacerated wounds. Of these the most trivial are occasionally sufficient to produce *locked-jaw.* Thus, a lady known to the writer lost her life in this way from simply cutting one of her corns carelessly; and a young man of our acquaintance, in the full vigour of life and health, died after a few days' illness, from his foot having been slightly punctured by an old nail on which he accidentally trod. In *hot climates* the disease is occasionally produced by exposure to cold, or by suddenly suppressed perspiration. The last variety is curable; the former one, scarcely ever so. The proper *treatment* is a matter still undetermined. *Sedatives, antispasmodics,* and *powerful stimulants,* have each had their advocates. Large doses of wine and spirits, in conjunction with opium, have occasionally been administered with success. *Electricity* and the *vapour bath* have also proved useful. In all cases the bowels should be moved by *active aperients,* either by the mouth or per anum.

TETRATHIONIC ACID. See *Trithionic Acid.*

TETTERS. The popular name of several cutaneous diseases.

Branny tetter, or *pityriasis,* is an eruption in which there is a dry and reddened state of the skin, occurring in patches of every variety of size, and marked by the copious production of minute bran-like scales. It is always accompanied by itching more or less severe, and sometimes unendurable. The face, scalp, breast, hands, and feet, are the parts usually attacked. The *treatment* is similar to that of the other scaly eruptions.

Crusted Tetter, or *ecthyma.* See *page* 380.

Dry Tetter. See *Psoriasis.*

Humid Tetter. Several vesicular eruptions which are accompanied by a watery discharge, and the formation of a thick crust are known by this name; but chiefly the variety called by surgeons, *eczema.* This affection is frequently observed in irritable habits, and is occasionally mistaken for the itch. It consists of small vesicles, often forming patches or blotches, and produces, as these die off, a desquamation of the cuticle. The discharge, left to itself, dries up by evaporation, and forms a crust which gets progressively thicker. Around the lips and on the face of children this crust not unfrequently forms, as it were, a mask; and on the scalp it mats the hair together, and is peculiarly unpleasant. Eczema exhibits several degrees of severity. When it attacks the scalp it is often called the *humid scall,* and constitutes one of the most common varieties of "*scald head.*" A milder form of this disease which attacks the face of infants, during lactation, is often called the *milk-scall.* The *treatment* of this and allied affections is noticed at *page* 380.

Yellow Crusted Tetter, or *impetigo,* is a pustular eruption, that has been generally referred to at *page* 380. "*Impetigo,* in one respect, resembles the humid tetter, namely, in the oozing of fluid from the excoriated skin. It is this fluid, or humour, which causes the great thickness of the crusts, and their reproduction when once removed. A resemblance may be traced, also, in the manner of evolution of the eruption, for sometimes the mattery pimples break out in clusters of regular form and various size upon a single part of the body, and at other times they are scattered irregularly over the entire surface of the skin; the former is termed *figured* (*impetigo figurata*), the latter *scattered* (*impetigo sparsa*); the former presents occasionally another peculiarity, namely, growth by the circumference and evanescence in the centre, forming a *crusted ringworm.*" (Eras. Wilson.)

THEBAINE. Syn. *Thebaia, Paramorphia.* A crystaline substance obtained by Thibourméry from an *infusion of opium* that has had its morphia extracted by acting on it by an excess of *lime.* The residuum dissolved in *dilute acid,* precipitated by *ammonia,* and the precipitate dissolved in *alcohol* or *ether,* yields *pure thebaine* on evaporation.

Prop., &c. It forms, when pure, colourless needles, like those of narcotine; it has a sharp metallic taste; is fusible; strongly alkaline, soluble in ether; freely soluble in alcohol; and scarcely soluble in water; with the weak acids it forms salts which do not readily crystallize. It is *distinguished* from *morphia* by its insolubility in potassa; by not becoming *blue* on the addition of sesquichloride of iron, and by not being *reddened* by nitric acid. It is *distinguished* from *codeia* by both itself and salts being difficultly crystallizable. (Kane.) 1 gr. injected into the jugular vein of a dog, acts like strychnia, and causes tetanus and death in a few minutes. (Magendie.)

THEINE. Syn. *Theina.* A peculiar crystallizable azotized substance extracted from tea. It is identical with *caffeine*, and may be obtained from *tea* in the same manner as that substance is from coffee. The best *gunpowder* tea contains fully 6% of *theine*, about one half of which is lost in the present careless mode of making *infusion of tea* for the table.

According to Prof. Liebig, the daily use of tea and coffee is capable of effecting important services in the animal economy. "We may consider these vegetable compounds (*théine* and *caféine*), so remarkable for their action on the brain, and the substance of the organs of motion, as elements of food for organs as yet unknown, which are destined to convert the blood into nervous substance, and thus recruit the energies of the moving and thinking faculties." M. Peligot, at a recent meeting of the French Academy of Sciences, expressed his belief that "tea contains essential principles of nutrition, far exceeding in importance its stimulating properties; and is, in every respect, one of the most desirable articles of general use." "The nutritious qualities of tea and coffee, as compared with those of soup, are vastly in favour of the former."

THENARD'S BLUE. See *Blue Pigments* and *Ultramarine.*

THEOBROMINE. A peculiar principle, closely resembling caffeine or theine, found by Woskresensky in the *seed* of the *theobroma cacao*, or the nuts from which chocolate is prepared. Its form is that of a light, white, crystalline powder, which is rather less soluble than caffeine. It is obtained like caffeine.

THERIACA. A name given in ancient pharmacy to various compound medicines, chiefly electuaries or confections, employed as antidotes to poisons or infection. The *theriaca Andromachi*, Ph. L. 1746, contained above 60 ingredients. *Mithridate* and *Venice treacle* are examples of this class.

THERMOMETERS. *Fahrenheit's thermometer* is the one universally employed in England, while *Celsius'*, or the *centigrade scale*, is principally used on the continent. *Reaumur's* is another scale occasionally employed. De Lisle's thermometer was formerly used in Russia, and some other parts of the North of Europe. As references to these scales are frequently met with in books, it is useful to know their relative value, and the method of reducing the one to the other. The BOILING POINT *of water* is indicated by 212° on *Fahrenheit's scale*, 100° on the *centrigrade scale*, 80° on that of *Reaumur*, and 0° on that of *De Lisle;* the FREEZING-POINT *of water* marks 32° *Fahrenheit*, and 0° or zero, on the *centigrade* and *Reaumur*, and 150° on the scale of De Lisle. The 0° or zero of Fahrenheit is 32° below the freezing point of water.

1. To reduce *Centigrade* degrees to those of FAHRENHEIT, *multiply* them by 9, *divide* the *product* by 5, and to the *quotient* add 32; that is—

$$\frac{\text{Cent.}^\circ \times 9}{5} + 32 = \text{Fahr.}^\circ$$

2. To reduce FAHRENHEIT'S degrees to *Centigrade:*—

$$\frac{\text{Fahr.}^\circ - 32 \times 5}{9} = \text{Cent.}^\circ$$

3. To reduce *Reaumur's* to FAHRENHEIT'S:—

$$\frac{\text{Reau.}^\circ \times 9}{4} + 32 = \text{Fahr.}^\circ$$

4. To convert FAHRENHEIT'S to *Reaumur's:*—

$$\frac{\text{Fahr.}^\circ - 32 \times 4}{9} = \text{Reaumur.}^\circ$$

Thermometers intended to register extreme degrees of heat are called *Pyrometers* (which see).

THIALDINE. *Prep.* Crystallized *aldehyd-ammonia,* 1 part; is dissolved in *water,* 14 parts; and the solution, after being *very slightly* alkalized with *caustic ammonia,* is subjected to a feeble stream of *sulphuretted hydrogen;* the white crystalline deposit formed after some time, is washed with a little *cold water,* dissolved in *ether*, the solution mixed with a *little alcohol,* and then abandoned to spontaneous evaporation. It forms large, regular, transparent, colourless, rhombic prisms; it melts at 110° Fahr.; is aromatic; neutral; freely soluble in alcohol and ether; scarcely soluble in waters; and forms crystallizable salts with the acids. Heat decomposes it.

THIONURIC ACID. A white crystalline acid, obtained by the action of a *saturated solution of sulphurous acid* in *water*, in slight excess, on a *cold solution of alloxan.* Its saturated solution, heated to the boiling-point, congeals into a semifluid, crystalline mass of *uramile.*

THIOSINNAMINE. A peculiar substance formed when the *volatile oil of black mustard seed* is placed in contact with a solution of *pure ammonia.* Colourless prismatic crystals, which are basic, bitter-tasted, and soluble in water.

THORINA. Syn. *Thoria*, *Oxide of Thorium.* A primitive earth discovered by Berzelius, in 1828, in a rare mineral called *thorite.*

Prep. The mineral is reduced to powder, digested in *hydrochloric acid*, and the resulting solution evaporated to dryness; the residuum is redissolved in *dilute acid*, the solution, after filtration, treated with *sulphuretted hydrogen*, and then precipitated with *pure ammonia;* the precipitate after being washed with *water*, is exposed to a red heat.

Prop., *&c.* A very heavy white powder; insoluble in all acids except the sulphuric; it is precipitated as a hydrate by caustic alkalies, and is then easily soluble in the acids and alkaline carbonates. It is *distinguished* from all the other earths by its great density, its sp. gr. being 9·402.

THORIUM. The metallic base of thorina. It is obtained by the action of *potassium* on the *chloride of thorium*, and washing the resulting mass in water.

THORN-APPLE. The *datura stramonium* (Linn.) The *leaves* (*stramonii folium*,—Ph. L.) and the *seeds* (*stramonii semen*,—Ph. L.; *Stramonium*,—Ph. E. & D.) are officinal. Both are anodyne, narcotic, and sedative; but not hypnotic. The whole plant is intensely *poisonous.* No antidote is known. The *leaves* are occasionally *smoked* to relieve the paroxysms of spasmodic asthma; but should be used with caution. General Gent, who introduced the practice into England from Ceylon, fell a victim to it. *Dose.* 1 to 4 or 5 gr.; in asthma, gout, headache, severe chronic pains, &c. It is said to be almost specific in many of the last.

THRIDACE. See *Lactucarium.*

THROAT AFFECTIONS. We intend here only to allude to those arising from exposure or cold. The list is therefore a short one. *Croup*, one of the most important, has been already briefly noticed.

Quinsy or *inflammatory sore-throat*, the *tonsillitis phlegmonoides* of medical writers, commonly commences with stiffness and pain on one side of the throat, and swelling of the tonsils, attended by febrile symptoms which increase as tumefaction advances, and sometimes become extreme. There is great restlessness and anxiety, considerable difficulty in swallowing even liquids, the respiration is painful and laborious, and the speech obstructed. When the inflammation is not resolved, these symptoms rapidly increase in severity, the patient suffers the greatest misery, the tumour suppurates rapidly, the abscess bursts, and with the rupture comes almost immediate relief. It occasionally happens that the other side of the throat then becomes affected, and goes through the same stages; but in general this is not the case, and the patient rapidly recovers, a few detergent gargles, and a light nutritious diet being all that is required. Sometimes, at the very commencement of the attack, the inflammation may be resolved by the patient sucking a lozenge or powder, every hour or two, containing $\frac{1}{4}$ or $\frac{1}{2}$ gr. of *tartarized antimony* carefully triturated with about 20 gr. of *lump sugar;* so as to keep up a constant state of nausea or vomiting for hours.

Malignant sore throat (*angina*, *cynanche*, or *tonsillitis maligna*) is marked by the inflammation of the tonsils being more superficial; but no sooner does it occur than it passes into small ulcers of varied colours and appearance, extending to the pharynx, and spreading over the whole fauces, into the nostrils, and even around the glottis, and down the œsophagus. These ulcers rapidly slough, and the febrile symptoms of a typhoid character which are present throughout, become more or less severe. In this way the disease often hastens to a fatal termination, and, being highly contagious, often extends itself to all, or nearly all the members of a family. The *treatment* must be similar to that adopted for typhus fever. *Stimulating gargles* containing *capsicum*, the *mineral acids*, or *port wine*, are useful local remedies.

THRUSH. Syn. *Aphtha*,—Lat. A disease of infancy, which in its common form, is marked by small white ulcers upon the tongue, palate, and gums. In some cases it extends through the whole course of the alimentary canal, and, assuming a malignant form, proves fatal. The *treatment* consists of a gentle emetic of ipecacuanha wine, followed by an occasional dose of *rhubarb-and-magnesia*, to keep the bowels clear, and to arrest diarrhœa. The ulcerations may be touched with a little *honey of borax;* and if they assume a dark colour, or there be much debility, astringents and tonics should be had recourse to. In all cases the diet should be light, but supporting; as imperfect nutrition is a common cause of the disease.

TIC DOULOUREUX. According to a writer in one of the medical periodicals, a *solution* of *atropia*, 2 gr., in *water*, 1 fl. dr., to which *nitric acid*, 1 drop (minim), has been previously added, applied as a paint, by means of a camel's hair pencil to the part of the face over the spot affected, immediately and completely subdues the pain, or at all events within 3 to 5 minutes, in all accidental cases, and affords considerable relief in others. The application is to be continued until some relief is experienced. The solution, being very *poisonous*, must not be taken internally, nor applied to the skin when broken. See *Atropia* and *Neuralgia.*

TIGLINE. The acrid principle of *croton oil.*

TIN. Syn. *Stannum.*—Ph. E. & D. This metal has been known from the most remote antiquity, being mentioned in the books of Moses (*Numb.* xxxi, 22), and by Homer (*Iliad,* x, 25), and other early writers. The ancients obtained it principally, if not solely from Cornwall. The Phœnicians traded with England for this metal, at least 1000 years before the birth of Christ.

Tin occurs in nature in the state of oxide, and, more rarely as sulphuret (*tin pyrites*). In Cornwall it is found under the form of *tin-stone* (peroxide), associated with copper ore, in the slate and granite rocks, and as an alluvial deposit (*stream tin*) in the beds of rivers.

Prep. The *ore* is first reduced to powder in *stamping mills, washed* to remove earthy matter, and then roasted to expel arsenic and sulphur; it is next *deoxidized* or *reduced* by smelting it with about 1-6th of its weight of *powdered culm,* and a little *slaked lime;* it is, lastly, *refined* by *liquation,* followed by a second smelting of the *purer portion,* which, after being treated, in a state of fusion, for some time with *billets of green wood,* or "*tossed,*" as the workmen call it, is allowed to settle, and is then cast into moulds, forming *refined* or *block tin.* Sometimes the *blocks* are afterwards heated until they become brittle, when they are allowed to fall from a considerable height, by which they are broken into small fragments which form *grain tin* or *tin in tears.*

Prop. Tin approaches silver in whiteness and lustre; in hardness it is intermediate between gold and lead; it is very malleable when pure, but the presence of a very small quantity of any other metal, particularly lead, deprives it of this property; when rubbed it evolves a peculiar odour, and when bent backwards and forwards it emits a peculiar crackling noise; it melts at 442° Fahr.; volatilizes at a white heat; and when heated to redness with free access of air, is speedily converted into the pulverulent *gray protoxide,* and by longer ignition, into a yellowish-white powder, which is the *peroxide,* or the *putty powder* of polishers. Sp. gr. 7·29 to 7·31.

Pur. "It is almost entirely dissolved by hydrochloric acid, yielding a colourless solution; the precipitate thrown down by potash is white, and soluble in excess of the precipitant." (Ph. L. 1836.) If it contain ARSENIC brownish black flocks will be separated during the solution, and arseniuretted hydrogen evolved, which may be inflamed and tested in the usual manner. (See *p.* 89-91.) The presence of other metals in tin may be detected by treating the *hydrochloric solution* with *nitric acid,* sp. gr. 1·16, first in the cold, and afterwards with heat, until all the tin is thrown down in the state of *insoluble peroxide.* The decanted *acid solution* from PURE TIN leaves *no residuum* on evaporation. If, after all the acid has been dissipated by heat, dilution with *water* occasion a heavy white precipitate, the tin contained BISMUTH; if, after dilution, a *solution of sulphate of ammonia* or *of soda* produce a similar white precipitate (*sulphate of lead*), it contained LEAD; if liquor of ammonia, added in excess, occasion reddish-brown flocks, or if *red prussiate of potash* give a blue precipitate, it contained IRON; and, if the *clear supernatant liquid* leave a residuum on evaporation, it is COPPER. If the first solution be made in a large quantity of *dilute hydrochloric acid* to which a few drops of *dilute nitric acid* be from time to time added, the whole of the ARSENIC will be left in an insoluble metallic state.

Tests. The salts of *protoxide of tin* are characterised as follow:—1. Caustic potassa gives a bulky white precipitate, readily soluble in excess of the precipitant; on concentrating the solution the precipitate is changed from hydrated protoxide to peroxide, which remains in solution, and metallic tin, which separates in brown flakes.—2. Ammonia, and the carbonates of potassa, soda, and ammonia, give white precipitates insoluble in excess.—3. Sulphuretted hydrogen gives, in neutral and acid solutions, a dark brown precipitate, which is soluble in liquor of potassa, in the alkaline sulphurets (especially when they contain an excess of sulphur), and in strong hot hydrochloric acid; and insoluble in nitric acid, even when boiling.—4. Hydrosulphuret of ammonia produces a like brown precipitate, soluble in excess of the precipitant, provided the latter contains an excess of sulphur.—5. Terchloride of gold gives, in the cold, on the addition of a little nitric acid, a precipitate of the purple of Cassius.—6. Bichloride of mercury gives a black precipitate, but, in excess, it produces a white one.—7. Bichloride of platinum gives an orange-coloured precipitate.

The *salts* of *peroxide of tin* behave with reagents as follows:—1. Potassa, ammonia, and their carbonates give a white precipitate which is freely soluble in an excess of potassa and in acids, sparingly soluble in excess of ammonia, only very slightly soluble in excess of carbonate of potassa, and insoluble in excess of carbonate of ammonia.—2. Sulphuretted hydrogen gives, in acid and neutral solutions, a golden-yellow precipitate, either at once, or on heating the liquid, which is readily soluble in pure potassa, the alkaline sulphurets, and boiling hydrochloric acid; less soluble in liquor of ammonia, and insoluble in nitric acid.—3. Hydrosulphuret of ammonia gives a similar precipitate, freely soluble in excess of the precipitant, and again precipitated unaltered by acids.—4. A plate of metallic zinc throws down metallic tin, under the form of gray scales or a spongy mass, from solutions free from nitric acid; and from those containing free nitric acid, white hydrated peroxide of tin, or a mixture of the oxide and metal.—5. Bichloride of mercury gives a white precipitate.—6. Ferrocyanide of potassium gives no precipitate at first, but after a time the whole forms a thick jelly.

Assay. Each grain of peroxide of tin (see above), after being washed and gently ignited, is equivalent to 0·78365 gr. of PURE TIN. The *loss of weight* represents the impurities. Each gr. of *sulphate of lead*, so treated, is equiv. to 0·683 gr. of METALLIC LEAD (nearly).

Uses. The uses of tin in the *arts* are well known. In *medicine* 1 to 3 dr. of the *filings* or *powder*, made into an electuary with *treacle*, are sometimes given in tapeworm, for 2 or 3 successive mornings, followed by an aperient.

TIN (Chlorides of) Of these two are known:—

TIN (Protochloride of). Syn. *Chloride of Tin, Muriate of do.; Stanni Chloridum, Stanni Murias,*—Lat. *Prep.* 1. (*Anhydrous.*) By transmitting *hydrochloric acid gas* over *grain-tin* heated in a glass tube; or, better, by distilling a mixture of *chloride* of *mercury* and *tin* in fine powder. Gray; solid; resin-like; fusible; and volatile.

2. (*Liquid* or *hydrated.*) By digesting *granulated tin* in hot *hydrochloric acid* as long as any hydrogen gas is evolved, observing to keep an excess of tin always present. *Used* as a powerful deoxidizing agent. It may be obtained in needle-like crystals by cautious evaporation.

TIN (Perchloride of). Syn. *Bichloride of Tin, Permuriate of do.; Stanni Bichloridum, Stanni Permurias,*—Lat. *Prep.* 1. (Liebig.) By dissolving *grain-tin* in a mixture of *hydrochloric acid*, 2 parts; *nitric acid* and *water*, of each, 1 part; (all by volume;) observing to add the tin by degrees, and to allow one portion to dissolve before adding another; as without this precaution the action is apt to become violent, and peroxide of tin to be deposited. (See *below.*)

2. (*Anhydrous; Libavius's Fuming Liquor.*) By heating *protochloride of tin* in *chlorine gas;* or, by distilling a mixture of *powdered tin*, 1 part; with *corrosive sublimate*, 3 parts (5 parts,—Fownes). A very volatile, colourless, mobile liquid, which fumes in the air, and boils at 248° Fahr.; when mixed with 1-3rd of its weight of water, it solidifies to a crystalline mass.

Obs. Liquid bichloride of tin is much used by dyers, under the name of *Spirits of Tin, Dyer's Spirits, Tin Mordant, &c.*, the proportions of the ingredients and the state of dilution being various according to circumstances, or the caprice of the manufacturer. A process which has been highly recommended, and which seems preferable to all others, is to prepare a simple solution of the *proto-chloride*, and to convert it into a solution of the *bichloride*, either by the addition of *nitric acid* and a gentle heat, or by passing *chlorine* through it. See *Tin Mordants.*

TIN (Subchloride of). Syn. *Oxychloride of Tin, Submuriate of do.* A white powder, obtained by pouring a large quantity of *water* on *crystallized protochloride of tin.* Insoluble.

TIN (Iodides of). *Prep.* 1. (*Iodide of Tin, Protiodide of do.; Stanni Iodidum,*—Lat. *Granulated tin*, 2 parts; *iodine*, 5 parts; heat them together. A fusible, brownish-red, translucent substance, soluble in water.

2. (*Periodide.*) By dissolving *hydrated peroxide of tin* in *hydriodic acid.* Yellow, silky crystals.

TIN (Oxides of). *Prep.* 1. (*Oxide* or *Protoxide; Stanni Oxydum,*—Lat.) Precipitate a *solution* of *protochloride of tin* with *carbonate of potassa;* well wash and dry the powder at a heat under 196° Fahr., with as little exposure to the air as possible. A white, or grayish-white powder, soluble in acids and in the pure fixed alkalies. When heated in an atmosphere of carbonic acid it loses its water, and changes to a dense, black powder, which is the *anhydrous protoxide.* In this state it is nearly insoluble in acids; kindled in the air, it burns like tinder, producing the binoxide.

2. (*Sesquioxide.*) Obtained by mixing *fresh, moist hydrated peroxide of iron* with a solution of the *neutral protochloride of tin.* It falls as a gray, slimy precipitate, which is soluble in hydrochloric acid and ammonia. (Fuchs.)

3. (*Binoxide, Peroxide; Stannic Acid.*)—*a.* By adding *potassa* or an *alkaline carbonate* to a solution of *perchloride of tin.* Soluble in acids and pure alkalies. Its compounds with the latter are sometimes called *stannates.* (See *p.* 1154.)

b. By the action of *nitric acid* on *metallic tin;* the resulting white powder being well washed with water; or by heating *metallic tin* above its melting point, in the air. Yellow; anhydrous; insoluble.

Obs. Frémy has given the name of *metastannic acid* to the oxide prepared by the action of nitric acid on metallic tin; the other (3, *a,*) he calls *stannic acid.* (See *p.* 1083.)

TIN (Sulphurets of). There are three sulphurets of tin corresponding to the oxides just referred to:—

TIN (Protosulphuret of). Syn. *Sulphuret of Tin, Sulphide of do. Prep.* A brittle bluish-gray compound, obtained by agitating *melted tin* with its own weight of *sulphur*, in a close vessel, and, afterwards, strongly heating the product.

TIN (Sesquisulphuret of). A yellowish-gray compound, formed by heating the *protosulphuret*, mixed with 1-3rd of its weight of *sulphur*, to low redness.

TIN (Bisulphuret of). Syn. *Bisulphide of Tin, Bronze Powder, Mosaic Gold; Aurum Musivum, Aurum Mosaicum, Stanni Bisulphuretum,*—Lat. *Prep.* 1. To *pure tin,* 12 *oz.*, melted by a gentle heat, add of *mercury,* 6 *oz.;* to the powdered mass, when cold, add of *sal ammoniac,* 6 *oz.; flowers of sulphur,* 7 *oz.;* and, after thorough admixture, place the compound in a glass flask or matrass, and gradually heat it, imbedded in sand, to low redness, and continue the heat for several hours, or until white fumes cease to be disengaged; cinnabar, protochloride of tin, and sal ammoniac sublime, whilst the *aurum musivum* remains at the bottom of the vessel under the form of soft, and very brilliant, gold-coloured flakes.

2. (Berzelius.) *Peroxide of tin* and *sulphur,* of each, 2 parts; *sal ammoniac,* 1 part; mix, and expose it to a low red heat in a glass or earthenware retort, until sulphurous fumes cease to be evolved.

3. (Marquis de Bullion.) *Tin* and *mercury,* of each, 8 *oz.;* mix, add to the amalgam, *sulphur,* 6 *oz.; sal ammoniac,* 4 *oz.;* mix well, and expose the compound for 3 hours on a sand heat, so as to render the bottom of the matrass *obscurely* red.

4. (Chaptal.) As the last, but expose the matrass to a naked fire, and apply a violent heat, when the mixture will take fire, and a sublimate will form in the neck of the matrass, consisting of very beautiful *aurum musivum,* in hexagonal plates.

Obs. In the firing or sublimation, if too great a heat be employed, only a gray sulphuret of tin is obtained. *Used* as a metallic gold colour, or substitute for powdered gold, in bronzes, varnish work, sealing-wax, &c.

TIN (Crystallized). See *page* 799.

TIN FILINGS. See *below.*

TIN GLASS. See *Bismuth.*

TIN MORDANTS. Syn. *Dyer's Spirit, Solution of Tin, Spirit of do., Nitromuriate of Tin.* These, as noticed above, vary greatly in their composition and character.

Prep. 1. Take of *aquafortis,* 8 parts; *sal ammoniac* or *common salt,* 1 part; dissolve, and add, very gradually, of *grain-tin,* 1 part; and, when dissolved, preserve it in stoppered bottles from the air. This is the common "*spirit of tin*" of the dyers.

2. (Berthollet.) *Nitric acid,* at 30° Baumé, 8 parts; *sal ammoniac,* 1 part; dissolve, then add by degrees, of *tin,* 1 part; and when dissolved, dilute the solution with 1-4th of its weight of water.

3. (Dambourney.) *Hydrochloric acid,* at 17° Baumé, 4 parts; *nitric acid,* at 30° Baumé, 1 part; mix, and add by degrees, of *Molucca tin,* 1 part.

4. (Hellot.) *Nitric acid* and *water,* of each, 1 *lb.; sal ammoniac,* 1 *oz.; nitre,* ½ *oz.;* dissolve, then add, by degrees, of *granulated tin,* 2 *oz.*

5. Poerner.) *Nitric acid* and *water,* of each, 1 *lb; sal ammonia,* 1½ *oz.;* dissolve, then add, by very slow degrees, of *pure tin beaten into ribands,* 2 *oz.*

6. (Schoeffer.) *Nitric acid* and *water,* of each, 2 *lb.; sal ammoniac,* 2 *oz.; pure tin,* 4½ *oz.;* as last. All the above are used chiefly for dyeing scarlet, more particularly with cochineal.

7. (*Lac Spirit.*) From *grain-tin,* 1 *lb.;* slowly dissolved in *hydrochloric acid* (sp. gr. 1·19), 20 *lb.* Recommended as a *solvent* for *lac dye.* For use, ¾ to 1 *lb.* of the liquid is digested on each *lb.* of the dye for 5 or 6 hours, before adding it to the dye-bath. See *Mordants, Stannate of Soda, &c.*

8. *Hydrochloric acid,* 6¾ *lb.; aquafortis,* ½ *lb.; grain-tin,* gradually added, 1 *lb.* Recommended for *lac dye.*

TIN-PLATE. Iron-plate covered with a *coating of tin*, by dipping it into a bath of that metal.

TIN POWDER. Syn. *Tin Filings, Tin Dust; Stanni Pulvis,*—Ph. E. & D. *Prep.* 1. (Ph. E.) Melt *grain-tin* in an *iron vessel*, pour it into an earthenware mortar heated a little above its melting point, and triturate briskly as the metal cools; lastly, sift the product, and repeat the process with what remains in the sieve.

2. (Ph. D.) Melt *grain-tin* in a *black-lead crucible*, and, whilst it is cooling, stir it with a *rod of iron* until it is reduced to powder; let the finer particles be separated by means of a sieve, and when, after having been several times in succession shaken with distilled water, the decanted liquor appears quite clear, let the product be dried for use.

Obs. Powdered tin is also prepared by filing and rasping. *Dose.* 2 to 4 dr., as a vermifuge. *Polisher's putty*, coloured with ivory black, is frequently substituted for this powder, and hence arises the *ill effects* that sometimes follow its use.

TINNING. *Proc.* 1. *Plates* or *vessels of brass* or *copper*, boiled with a *solution of stannate of potassa*, mixed with *turnings of tin*, become, in the course of a few minutes, covered with a *firmly attached layer* of *pure tin.*

2. A similar effect is produced by boiling the articles with *tin filings* and *caustic alkali* or *cream of tartar.*

Obs. By either of the above methods *chemical vessels* made of *copper* or *brass* may be easily and perfectly tinned.

TINCAL. See *Borax.*

TINCTURE. Syn. *Tinctura,* — Lat. *Teinture,* — Fr. Tinctures (*tincturæ; alcoolés, alcoolatures;*) are solutions of the active principles of bodies, obtained by digesting them in alcohol more or less dilute. *Ethereal tinctures* (*tincturæ æthereæ; ethérolés, ethérolatures;*) are similar solutions prepared with ether. The merit of having *invented* tinctures is usually assigned to Arnoldus de Villa Nova, who was Professor of Medicine, at Montpellier, about the end of the 13th century. He was certainly the first person who systematically employed alcohol for the purpose of extracting the active principles of vegetable matter.

Prep. "Tinctures are usually prepared by reducing the solid ingredients to small fragments, coarse powder, or fine powder, macerating them for 7 days, or longer, in *proof spirit* or *rectified spirit*, straining the solution through *linen* or *calico* (or paper), and finally expressing the residuum strongly, to obtain what fluid is still retained in the mass. They are also advantageously prepared by the *method of displacement* or *percolation.*" (Ph. E.) "All tinctures should be prepared in closed *glass* (or stoneware) *vessels*, and be shaken frequently during the process of maceration." (Ph. L.) *Cooper's patent jars* are very convenient for the preparation of tinctures, as they are made with wide mouths, large enough to admit the hand, and yet may be closed in an instant, with as much ease and certainty as an ordinary stoppered bottle.

Tinctures are better clarified by *repose* than by *filtration*, as in the latter case a considerable portion is retained by the filtering medium, and lost by evaporation. The *waste* in this way is never less than 10% of spirit. In all *ordinary cases*, it is sufficient to allow the tincture to settle for a few days, and then to pour off the clear supernatant portion through a *funnel* loosely choked with a piece of *sponge* or *tow;* after which the remaining foul portion of the liquid may be filtered through *bibulous paper* in a *covered* funnel. The filtration should be conducted as rapidly as possible, for the double purpose of lessening the amount lost by evaporation, and the action of the air on the fluid. Tinctures which have been long exposed to the air, frequently lose their transparency within a few days after being filtered, owing to the oxidizement and precipitation of some portion of the matter previously held in solution; a change which occurs even in stoppered bottles. *Resinous* and *oily tinctures,* as those of *myrrh, tolu,* and *lavender* (comp.), may be generally restored to their former brightness by the addition of a quantity of *rectified spirit,* equal to that which they have lost by evaporation; but many tinctures resist this mode of treatment, and require refiltering.

Ethereal tinctures are best prepared by *percolation*, and should be both *made* and *kept* in stoppered bottles.

Qual. The *tinctures* of the *shops* are usually very uncertain and inferior preparations, owing to their manufacture being carelessly conducted, and *refuse drugs* and an *insufficient quantity of spirit* being employed in their production. It is a general practice among the druggists to substitute a *mixture* of equal parts of *rectified spirit* and *water*, or a spirit of about 26 u. p., for PROOF SPIRIT; and a mixture of 2 gall. of *water* with 5 gall. of *rectified spirit*, for RECTIFIED SPIRIT. In some *wholesale drug-houses*, *all* the *simple tinctures* (except those that are of a very active or valuable kind, as laudanum, for instance) are made with 1 *lb.* of the *dry ingredient* to the gall. of *spirit*, irrespective of the instructions in the pharmacopœia. Appearance is the object which is alone aimed at, without reference to quality. If the tincture be perfectly transparent, and has a good colour, the conscience of the seller and the stomach of the consumer are alike satisfied.

Assay. 1. The RICHNESS in ALCOHOL may be readily determined by the *method of alcoholmetry*, No. 6; but more accurately, by the *method* of M. Gay-Lussac (No. 7). That of tinctures containing simple extractive, saccharine, or like organic matter in solution, may be approximately found from the *boiling point*, or from the *temperature of the vapour* of the boiling liquid. (See *p.* 35-6.)

2. The QUANTITY of SOLID MATTER *per cent.* may be ascertained by evaporating to dryness 100 grains-measure, in a weighed capsule, by the heat of boiling water.

3. The QUANTITY of the INGREDIENTS used in the preparation of tinctures may be inferred from the *weight* last found, reference being had to the known per centage of extract, which the substances employed yield to spirit of the strength under examination. When the ingredients contain alkaloids, or consist of saline or mineral matter, an assay may be made for them.

Uses, &c. Tinctures, from the quantity of alcohol which they contain, are necessarily administered in small doses, unless in cases where stimulants are indicated. The most important and useful of them are those that contain very active ingredients, such as the *tincture of opium, foxglove, hemlock, henbane, &c.* In many instances the *solvent*, even in doses of a few fluid drachms, acts more powerfully on the living system than the principles it holds in solution; and when continued for some time, produces the same deleterious effects as the habitual use of ardent spirits. When the action of a substance is the reverse of stimulant, it cannot with propriety be exhibited in this form, unless the dose be so small that the operation of the spirit cannot be taken into account; as with the *narcotic tinctures.* Hence, this class of remedies are in less frequent use than formerly.

The following list embraces all the *formulæ* of the *tincturæ* of the British Pharmacopœias, with a few others likely to be useful to the reader. These will furnish *examples* for the preparation of others in less general use; care being had to proportion the ingredients with due reference to the proper or usual dose of tinctures of that class.

TINCTURE (Acetate of Iron). Syn. *Tinctura Ferri Acetatis,*—Ph. D. *Prep.* (Ph. D.) To *water*, 9 fl. oz.; add of *pure sulphuric acid*, 6 fl. dr.; and in the mixture, with the aid of a gentle heat, dissolve *sulphate of iron*, 8 *oz.;* next add of *pure nitric acid*, ½ fl. oz.; previously diluted with *water*, 1 fl. oz.; and evaporate the resulting solution to the consistence of a thick syrup; dissolve this in *rectified spirit*, 1 quart; also dissolve of *acetate of potassa*, 8 *oz.*, in another quart of *rectified spirit;* and having thoroughly mixed the solutions, by frequent agitation in a large bottle, filter the whole, with expression, first through *calico*, and then through *paper.* Sp. gr. 0·891. *Dose.* 15 to 60 drops, in water; in the same cases as the other chalybeates.

TINCTURE (Acetate of Zinc). Syn. *Tinctura Zinci Acetatis,* — Lat. *Prep.* (Ph. D. 1826.) *Acetate of potassa* and *sulphate of zinc*, of each, 1 oz.; rub them together, then add of *rectified spirit*, 16 fl. oz.; macerate for a week, and filter. Astringent. Diluted with water, it is used as a collyrium and injection.

TINCTURE (Aconite). Syn. *Tinctura Aconiti*—Ph. L. *Tinct. Aconiti Radicis,*—Ph. D. *Prep.* (Ph. L.) Take of *aconite root*, coarsely powdered, 15 oz. (20 *oz.*,—Ph. D.); *rectified spirit*, 1 quart; macerate for 7 days, press, and filter.

Obs. These tinctures differ materially in strength. *Dose.* Of the Ph. L., 5 to 10 drops; of the Ph. D., 3 to 6 drops, two or three times daily (carefully watching its effects); in rheumatism, gout, syphilis, &c., where a narcotic sedative is indicated. Diluted with water, it forms an excellent embrocation in rheumatism, neuralgia, &c. It should be applied by means of a small sponge, tied to the end of a stick or glass rod. The Ph. D. formula is nearly the same as that for Dr. Turnbull's *concentrated tincture of aconite root*, and that given by Dr. Pereira. The *tinctura aconiti foliorum*, of the Ph. U. S., is made with 1 oz. of the *dried* leaves, to 8 fl. oz. of *rectified spirit.*

TINCTURE (Aloes). Syn. *Tinctura Aloës,* — Ph. L. & E., & Ph. D. 1826. *Prep.* (Ph. L.) *Socotrine* or *hepatic aloes*, coarsely powdered, 1 oz.; *extract of liquorice*, 3 oz.; *water*, 1½ pint; *rectified spirit*, ½ pint; macerate for 7 days, and filter. The formula of the Ph. E. is nearly similar. Purgative and stomachic. *Dose.* ¼ to 1 fl. oz.

TINCTURE (Aloes,—Compound). Syn. *Tincture of Aloes and Myrrh; Tinctura Aloës Composita,*—Ph. L., & Ph. D. 1826.

Tinctura Aloës et Myrrhæ,—Ph. E. *Elixir Aloës*,—Ph. L. 1746. *Elixir Proprietatis*,—Ph. L. 1721. *Prep.* 1. (Ph. L. & E.) *Socotrine* or *hepatic aloes*, coarsely powdered, 4 oz.; *hay saffron*, 2 oz.; *tincture of myrrh*, 1 quart; macerate for 7 days, with occasional agitation, and strain. The Dublin College (1826) omits the saffron.

2. (*Wholesale.*) From *aloes*, 1 *lb.*; *myrrh*, ¾ *lb.*; *hay saffron*, 2 *oz.*; *rectified spirit*, 5 pints; *water*, 3 pints; as the last. Purgative, stomachic, and emmenagogue. *Dose.* ½ to 2 fl. dr.

TINCTURE (Ammonia, — Compound). Syn. *Tinctura Ammoniæ Composita*,—Ph. L. *Prep.* 1. (Ph. L.) *Mastic*, 2 dr.; *rectified spirit*, 9 fl. dr.; digest until dissolved, decant, add of *oil of lavender*, 14 drops; *stronger solution of ammonia*, 1 pint; and mix well.

2. (Ph. L. 1836; *Eau de Luce; Aqua Luciæ; Spiritus Ammoniæ Succinatus*,—Ph. L. 1788.) As the last, but adding 4 drops of *oil of amber* along with the oil of lavender.

Obs. This preparation is reputed antacid, antispasmodic, and stimulant. *Dose.* 10 to 20 drops, in water; in hysteria, low spirits, &c. In the East Indies, *eau de luce* is regarded almost as a specific for the bite of the *cobra di capello* and other venomous reptiles.

TINCTURE (Ammonio-chloride of Iron). Syn. *Ammoniated Tincture of Iron, Mynsicht's do. do.; Tinctura Ferri Ammonio-chloridi*,—Ph. L. *Tinctura Ferri Ammoniati*,—Ph. L. 1824. *T. Martis Mynsichti*,—Ph. L. 1721. *Prep.* (Ph. L.) *Ammonio-chloride of iron*, 4 oz.; *proof spirit* and *distilled water*, of each, 1 pint; dissolve. *Dose.* 20 to 60 drops, or more; as a stimulant, chalybeate tonic. "A fl. oz. of this, on potassa being added, yields 5·8 gr. of sesquioxide of iron." (Ph. L.)

TINCTURE (Angustura). See *p.* 1233.

TINCTURE (Arnica). Syn. *Tinctura Arnicæ, Tinctura Arnicæ Florum*, — Lat. *Prep.* (Ph. Bor. and Hamb. Cod.) *Flowers of arnica montana*, 1½ oz.; *spirit*, sp. gr. 0·900 (15½ o. p.), 1 ℔; digest for 8 days, and strain with expression. *Dose.* 10 to 30 drops; in diarrhœa, dysentery, gout, rheumatism, paralysis, &c.

TINCTURE (Arnica-root). Syn. *Tinctura Arnicæ Radicis*,—Lat. *Prep.* From *arnica root*, 2 *oz.*; *proof spirit*, 1 pint; as the last.

TINCTURE (Aromatic). See *page* 1233.

TINCTURE (Assafœtida). Syn. *Tinctura Assafœtidæ*,—Ph. L. E. & D. *Tinctura Fœtidæ*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Assafœtida* (small), 5 oz.; *rectified spirit*, 1 quart; macerate for 7 days (14 days,—Ph. D.), and filter. "It cannot be made by percolation without delay." (Ph. E.)

2. (*Wholesale.*) *Assafœtida*, 2½ *lb.*; *boiling water*, 2 quarts; dissolve, add of *rectified spirit*, 1½ gall.; agitate well for 3 or 4 days, then let it settle, and decant the clear portion. *Dose.* ½ to 2 fl. dr.; in hysteria, flatulent colic, &c.

TINCTURE (Assafœtida,—Ammoniated). See *Fœtid Spirit of Ammonia* (*page* 1172).

TINCTURE (Asthmatic). See *page* 1231.

TINCTURE (Balsam of Peru). Syn. *Tinctura Balsami Peruviani*,—Lat. *Prep.* (Ph. L. 1788.) *Balsam of Peru*, 4 oz.; *rectified spirit*, 16 fl. oz.; dissolve. Pectoral, stimulant, and fragrant. *Dose.* 10 to 30 drops.

TINCTURE (Balsam of Tolu). See *Tincture of Tolu.*

TINCTURE (Bark). See *Tincture of Cinchona.*

TINCTURE (Belladonna). Syn. *Tinctura Belladonnæ*,—Ph. L. & D. *Prep.* 1. (Ph. L.) *Dried leaves of belladonna*, 4 oz. (5 *oz.*, in coarse powder,—Ph. D.); *proof spirit*, 1 quart; macerate for 7 days (14,—Ph. D.), press, and filter.

2. (*Wholesale.*) From the *dried leaves*, 1 *lb.*; *proof spirit*, 1 gall.; macerate 14 days. *Dose.* 5 to 10 drops, gradually increased; also, *externally*, diluted with water.

TINCTURE (Benzoin, — Compound). Syn. *Friar's Balsam, Traumatic do.; Tinctura Benzoini Composita*,—Ph. L. & E. *Tinct. Benzoës Comp.*,—Ph. D. 1826, & Ph. L. 1788. *Balsamum Traumaticum*,—Ph. L. 1746. *Balsam for Cuts, Commander's Balsam, Vervain's do., Wound do., Jesuits' Drops, Wade's do.*, — Obs. var. *Prep.* 1. (Ph. L.) *Gum benzoin*, coarsely powdered, 3½ oz.; *prepared storax*, 2½ oz.; *balsam of tolu*, 10 dr.; *socotrine* or *hepatic aloes*, in coarse powder, 5 dr.; *rectified spirit*, 1 quart; macerate, with frequent agitation, for 7 days, and strain.

2. (Ph. E.) *Benzoin*, 4 oz.; *balsam of Peru*, 2½ oz.; *East Indian* (hepatic) *aloes*, ½ oz.; *rectified spirit*, 1 quart.

Obs. Either of the above formulæ produces a most beautiful tincture, truly balsamic. The following is, however, very generally employed by the wholesale druggists, and the product, though possessing a very rich colour, is thin and watery.

3. (*Wholesale.*) From *gum benzoin*, 4 *lb.*; *aloes* (lively coloured), 1¼ *lb.*; *liquid storax*, 1 *lb.*; *balsam of tolu*, ¼ *lb.*; *powdered*

turmeric (best), 6 *oz.; rectified spirit*, 5½ gall.; digest with frequent agitation for 10 days, then add of *hot water*, 1½ gall.; again digest for 4 days, and, after 24 hours' repose, decant the clear portion.

Dose. 10 drops to 2 fl.dr.; as a stimulating expectorant, in chronic coughs, and various breath affections. It is also employed to stop the bleeding from cuts, &c., and promote their healing.

TINCTURE (Bitter Stomachic). See *page* 1234.

TINCTURE (Brandish's). See *p.* 1238.

TINCTURE (Buchu). Syn. *Tinctura Diosmæ; Tinctura Bucku*,—Ph. E. *Tinct. Buchu*,—Ph. D. *Prep.* (Ph. E.) *Buchu leaves*, 5 oz.; *proof spirit*, 1 quart; macerate 7 days (14 days,—Ph. D.); or proceed by the method of percolation. *Dose.* 1 to 4 fl. dr.; as a tonic, sudorific, and diuretic. It is inferior to the fresh infusion.

TINCTURE (Calumba). Syn. *Tinctura Calumbæ*,—Ph. L. & E. *Tinct. Colombæ*,—Ph. D. *Prep.* (Ph. L.) *Calumba root*, finely sliced, 3 oz.; *proof spirit*, 1 quart; macerate a week, (14 days,—Ph. D.), press, and filter. "Or, more conveniently by percolation, allowing the calumba, in moderately fine powder, to first soak in a little of the spirit for 6 hours." (Ph. E.)

Obs. This tincture is commonly made with 1 *lb.* of *calumba root* to the gallon of a mixture of equal parts of *rectified spirit* and *water*. *Dose.* 1 to 2 fl. dr.; as a stomachic bitter and tonic, usually joined with soda or chalybeates.

TINCTURE (Camphor). Syn. *Spirit of Wine and Camphor; Camphorated Spirit; Tinctura Camphoræ*,—Ph. E. & D., & Ph. L. 1836. *Spiritus Camphoræ*,—Ph. L. *Spiritus Camphoratus*,—Ph. D. 1826, & Ph. L. 1788. *Prep.* 1. (Ph. E.) *Camphor*, 2½ oz.; *rectified spirit*, 1 quart; dissolve. This is only one half as strong as the Ph. L. preparation.

2. (Ph. D.) *Camphor*, 1 *oz.; rectified spirit*, 8 fl. oz. Stimulant and anodyne. *Dose.* 10 to 60 drops. Also as a liniment for sprains, bruises, chronic rheumatism, &c. For the Ph. L. formula see *Spirits* (p. 1173).

TINCTURE (Camphor,—Compound). Syn. *Camphorated Tincture of Opium, Asthmatic Elixir, Paregoric Elixir, Asthmatic Tincture; Tinctura Camphoræ Composita*,—Ph. L. *Tinctura Opii Camphorata*,—Ph. E. & D., & Ph. L. 1788. *Elixir Paregoricum*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Camphor*, 50 gr.; *powdered opium* and *benzoic acid*, of each, 72 gr.; *oil of aniseed*, 1 fl. dr.; *proof spirit*, 1 quart; macerate for 7 days, and filter. The formulæ of the Ph. E. & D. are nearly similar. The *oil of aniseed*, probably one of the most useful and characteristic of the ingredients, was omitted in the Ph. L. 1824, but was restored in that of 1836.

2. (*Wholesale.*) From *powdered opium*, 3 *oz.; benzoic acid, camphor*, and *oil of aniseed*, of each, 2 *oz.; rectified spirit* and *water*, of each, 3 gall.; as before.

Obs. This tincture is a popular and excellent pectoral and anodyne, where there are no inflammatory symptoms. *Dose.* ½ to 2 fl. dr.; in troublesome coughs, &c. ½ fl. oz. contains about 1 gr. of opium.

TINCTURE (Cantharides). Syn. *Tinctura Cantharidis*,—Ph. L. E. & D. *Tinctura Lyttæ*,—Ph. L. 1809. *Prep.* 1. (Ph. L.) *Powdered cantharides*, 4 dr., (½ *oz.*,—Ph. D.); *proof spirit*, 1 quart; macerate for 7 days (14 days,—Ph. D.), and strain, with expression.

2. (*Wholesale.*) From *powdered cantharides*, 2¼ *oz.; rectified spirit* and *water*, of each, ½ gall.; as the last. *Dose.* 10 drops, gradually raised to 1 fl. dr., in any bland liquid; in fluor albus, gleets, incontinence of urine, lepra, &c. It should be used with caution. The Ed. College recommends it to be prepared by displacement.

TINCTURE (Capsicum). Syn. *Tincture of Cayenne Pepper; Tinctura Capsici*,—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Capsicum*, bruised, 10 dr.; *proof spirit*, 1 quart; digest 14 days, (or percolate,—Ph. E.) *Dose.* 10 to 60 drops; in atonic dyspepsia, scarlet fever, ulcerated sore throat, &c. It is also made into a gargle.

2. (Ph. D.) *Cayenne pods*, bruised, 1½ *oz.; proof spirit*, 1 pint; macerate for 14 days. This is of fully twice the strength of the preceding.

TINCTURE (Capsicum,—Concentrated.) See *Essences.*

TINCTURE (Cardamoms). Syn. *Tinctura Cardamomi*,—Ph. E., & Ph. L. 1836. *Tinct. Amomi Repentis*,—Ph. E. 1817. *Prep.* (Ph. L. 1836.) *Cardamom seeds*, 3½ oz., (4½ oz.,—Ph. E.); *proof spirit*, 1 quart; digest for 14 days, (or percolate, —Ph. E.)

Obs. The shells should be sifted from the *seeds* before maceration, and they are preferably ground in a pepper-mill instead of being bruised in a mortar. Aromatic and carminative. *Dose.* 1 to 2 fl. dr., as an adjunct to purgative mixtures.

TINCTURE (Cardamoms,—Compound). Syn. *Stomachic Tincture; Tinctura Cardamomi Composita*,—Ph. L. E. & D. *Tinctura Stomachica*,—Ph. L. 1746. *Prep.* 1.

(Ph. L.) *Cardamoms* (without the shells), *caraways*, and *cochineal*, of each, bruised, 2½ dr.; *cinnamon*, bruised, 5 dr.; *raisins*, stoned, 5 oz.; *proof spirit*, 1 quart; macerate 7 days, then strain, with expression.

2. (Ph. E., & Ph. L. 1836.) As the last, but using only 1 dr. of *cochineal*, and macerating 14 days; or, "it may be prepared by the method of displacement,"—Ph. E.

3. (*Wholesale.*) From *cardamoms* and *caraway seeds*, of each, 4 *oz.; cochineal* (s. g.), 6 *oz.; cassia*, 8 *oz.; sultana raisins*, 5 *lb.; proof spirit*, 4 gall., (or *rectified spirit* and *water*, of each, 2 gall.); macerate, &c., as before.

Obs. The Dublin College omitted the cochineal and raisins in their Ph. of 1826; but have restored them in their new one. The order of the London College to stone the raisins, is seldom adopted in practice; by which the tincture is rendered unfit to be employed in dispensing prescriptions containing quinine, or other alkaloids. When parties are too lazy or conceited to follow the instructions in their pharmacopœia, they had better use sultana raisins, which have no stones. *Dose.* 1 to 4 fl. dr.; as a cordial and stomachic, but chiefly as an adjunct, for its colour and flavour.

TINCTURE (Cascarilla). Syn. *Tinctura Cascarillæ*,—Ph. L. E. & D. *Tinct. Crotonis Eleutheriæ*,—Ph. E. 1839. *Prep.* (Ph. L.) *Cascarilla*, bruised, 5 oz.; *proof spirit*, 1 quart; macerate for 7 days, (14 days,—Ph. D.; or *percolate*,—Ph. E.) An excellent tonic and stomachic; chiefly employed as an adjunct to mixtures, &c. *Dose.* 1 to 2 fl. dr.

TINCTURE (Cassia). Syn. *Tinctura Cassiæ*,—Lat. *Prep.* (Ph. E.) *Cassia*, 3½ oz.; *proof spirit*, 1 quart; macerate for 7 days, or percolate. Stomachic and carminative. *Dose.* 1 to 2 fl. dr.

TINCTURE (Castor). Syn. *Tinctura Castorei*,—Ph. L. & E. *Tinct. Castorei Rossici*,—Ph. D. 1826. *Prep.* (Ph. L.) *Castor*, bruised, 2½ oz.; *rectified spirit*, 1 quart; macerate for 7 days, (or *percolate*,—Ph. E.)

Obs. The Dublin College ordered *Russian castor* in their Ph. of 1826; but the scarcity and high price of that variety, we fear, too often precludes its use. The *tincture of the shops* is usually made with only 8 *oz.* of *castor* to the gall. of *proof spirit*. Nervine and antispasmodic. *Dose.* 20 drops to 2 fl. dr.; in hysteria, epilepsy, &c.

TINCTURE (Castor,—Ammoniated). Syn. *Elixir Fœtidum; Tinctura Castorei Composita; Tinctura Castorei Ammoniata*,—Ph. E. *Prep.* (Ph. E.) *Castor*, bruised, 2½ oz.; *assafœtida*, in small fragments, 10 dr.; *spirit of ammonia*, 1 quart; digest 7 days in a well-closed vessel. Stimulant and antispasmodic. *Dose* and *uses* as the last. With the addition of ½ oz. of *opium*, it forms the *Elixir Uterinum*, or *Elixir Castorei Thebaicum* of foreign Pharmacopœias.

TINCTURE (Catechu). Syn. *Compound Tincture of Catechu; Tinctura Catechu Composita*,—Ph. L. *Tinctura Catechu*,—Ph. E. & D., & Ph. L. 1836. *Tinct. Japonica*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Catechu*, in powder, 3½ oz., (4 *oz.*,—Ph. D.); *cinnamon*, bruised, 2½ oz., (2 *oz.*,—Ph. D.); *proof spirit*, 1 quart; macerate for 7 days, (or percolate,—Ph. E.)

2. (*Wholesale.*) From *catechu*, 2 *lb.; oil of cassia*, 3 fl. dr.; *rectified spirit* and *water*, of each 1 gall.; macerate for 10 days. *Dose.* 1 to 2 fl. dr., as a warm astringent; in diarrhœa, &c., either alone, or combined with chalk.

TINCTURE (Chirayta). Syn. *Tinctura Chiraytæ; Tinctura Chirettæ*,—Ph. D. *Prep.* (Ph. D.) *Chiretta* or *chirayta* (bruised), 5 *oz.; proof spirit*, 1 quart; macerate for 14 days. Tonic and stomachic. *Dose.* ½ to 2 fl. dr.

TINCTURE (Cinchona). Syn. *Tincture of Bark; Tinctura Cinchonæ*,—Ph. L. E. & D. *Tinctura Corticis Peruviani; Tinct. C. P. Simplex*,—Ph. L. 1746. *Prep.* (Ph. L.) *Yellow cinchona bark* (bruised), 8 oz.; *proof spirit*, 1 quart; macerate for 14 days, (or *percolate*,—P. E.)

Obs. The Dublin College orders *pale bark*, and the Edinburgh, either species according to prescription. *Dose.* 1 to 3 fl. dr.; as a tonic, stomachic, and febrifuge.

TINCTURE (Pale Cinchona). Syn. *Tincture of Pale Bark; Tinctura Cinchonæ Pallidæ*,—Ph. L. *Prep.* From *pale bark*, as the last.

TINCTURE (Cinchona,—Compound). Syn. *Compound Tincture of Bark, Huxham's Tincture of do., Fever Tincture; Tinctura Cinchonæ Compositæ*,—Ph. L. E. & D. *Tinct. Corticis Peruviani Composita*,—Ph. L. 1788. *Prep.* 1. (Ph. L.) *Pale bark*, bruised, 4 oz.; *dried bitter-orange peel*, 3 oz., (2 *oz.*,—Ph. D.); *serpentary root*, bruised, 6 dr.; *hay saffron*, 2 dr.; *cochineal*, in powder, 1 dr.; macerate for 7 days, (14 days,—Ph. D.; or, *percolate*,—Ph. E.); press, and filter.

2. (*Wholesale.*) From *pale bark*, 3½ *lb.; dried orange peel*, 2 *lb.; serpentary root*, 4 *oz.; hay saffron*, 1 *oz.; cochineal*, ½ *oz.; proof spirit*, 4 gall., (or *rectified spirit* and

water, of each, 2 gall.); macerate for 14 days.

Obs. In the Ph. E. yellow bark is ordered. *Dose* and *use*, as the last.

TINCTURE (Cinnamon). Syn. *Tinctura Cinnamomi*, Ph. L. & E., & Ph. D. 1826. *Aqua Cinnamomi Fortis*,—Ph. L. 1721. *Prep.* (Ph. L.) *Cinnamon*, bruised, 3½ oz.; *proof spirit*, 1 quart; macerate for 7 days, (or *percolate*,—Ph. E.) In the shops *cassia* is usually substituted for cinnamon, and *spirit* 26 *u. p.* for proof spirit. *Dose.* 1 to 4 fl. dr.; as a cordial, aromatic, and stomachic.

TINCTURE (Cinnamon,—Compound). Syn. *Aromatic Tincture; Tinctura Cinnamomi Composita*,—Ph. L. E. & D. *Tinctura Aromatica*,—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Cinnamon*, bruised, 1 oz.; *cardamoms*, (bruised, without the shells), ½ oz.; *long pepper* and *ginger*, of each, 2½ dr.; *proof spirit*, 1 quart; digest for 7 days, (or *percolate*,—Ph. E.) The Ph. E. *omits* the ginger, and uses ½ oz. more *cardamoms*.

2. (Ph. D.) *Cinnamon*, 2 *oz.; cardamoms*, 1 *oz.; ginger*, ½ *oz.: proof spirit*, 1 quart; macerate for 14 days. The following form is current in the wholesale houses.

3. *Cassia*, 1 *lb.; cardamoms*, 6 *oz.; long pepper* and *ginger*, of each, ¼ *lb.; oil of cassia*, 1½ fl. dr.; *proof spirit*, 4 gall., (or *rectified spirit* and *water*, of each, 2 gall.) Cordial, aromatic, stomachic. *Dose.* 1 to 2 fl. dr.; in atonic gout, debility, flatulence, &c.

TINCTURE (Clutton's). See *page* 1234.

TINCTURE (Cochineal). Syn. *Tinctura Cocci Cacti*,—Ph. D. *Prep.* (Ph. D.) *Cochineal*, in fine powder, 2 *oz.; proof spirit*, 1 pint. Antispasmodic and sedative; but chiefly employed for its colour. *Dose.* ½ to 2 fl. dr.

TINCTURE (Colchicum). Syn. *Gout Tincture, Tincture of Meadow Saffron; Tinctura Colchici*,—Ph. L. & E. *Tinctura Seminum Colchici*,—Ph. D. *Prep.* (Ph. L.) *Seeds of meadow saffron* (colchicum autumnale), bruised (finely ground in a coffee mill,—Ph. E.), 5 oz.; *proof spirit*, 1 quart; macerate for 7 days (14 days,—Ph. D.) or, *percolate*,—Ph. E.); then press, and filter. *Dose.* 15 or 20 drops to 1 fl. dr.; in gout, &c.

TINCTURE (Colchicum—Compound). Syn. *Tinctura Colchici Composita*,—Ph. L. *Spiritus Colchici Ammoniatus*,—Ph. L. 1824. *Prep.* (Ph. L.) *Colchicum seeds*, bruised, 5 oz.; *aromatic spirit of ammonia*, 1 quart; digest for 7 days, then press, and filter. *Dose.* 20 drops to 1 fl. dr.; in gout, &c.

TINCTURE (Colchicum Flowers). Syn. *Tinctura Florum Colchici; Eau Medicinale d'Husson*,—Dr. Wilson. *Prep.* Take of the *fresh juice of colchicum flowers*, 2 parts; *French brandy* (or *proof spirit*), 1 part; mix, and in a few days decant, or filter, and preserve it in small bottles in a cool place.

TINCTURE (Copaiba,—Alkaline). Syn. *Tinctura Copaibæ Alkalina*,—Lat. *Prep.* (Lewis Thompson.) Dissolve *carbonate of potassa*, 2 oz.; in *water*, 1 pint; and add to this, *balsam of copaiba*, in a thin stream, constantly stirring, until the mixture, at first white and milky, becomes clear like jelly or amber, which will generally take place when about a pint of balsam has been added; set the mixture aside for two or three hours, then pour in of *rectified spirit*, 1 quart, and mix the whole together. *Sweet spirit of nitre* may be substituted for spirit of wine, provided it does not contain free acid. *Dose.* 1 to 2 tea-spoonfuls.

TINCTURE (Cubebs). Syn. *Essence of Cubebs; Tinctura Cubebæ*,—Ph. L. & D. *Tinctura Piperis Cubebæ*,—Ph. D. 1826. *Prep.* 1. (Ph. L.) *Cubebs* (bruised or ground in a pepper-mill), 1 ℔; *proof spirit*, 1 quart; macerate for 7 days, press out the liquor, and filter. *Dose.* ½ to 1 fl. dr., three or four times a day; in gonorrhœa, &c.

2. (Ph. D., & Ph. L. 1836.) *Cubebs*, 5 *oz.; rectified spirit*, 1 quart (*proof spirit*,—Ph. D. 1826); macerate for 14 days. *Dose.* 1 to 2 fl. dr.

TINCTURE (Cusparia). Syn. *Tinctura Cuspariæ*,—Ph. E. *Tinct. Angosturæ*,—Ph. D. 1826. *Tinct. Bonplandiæ Trifoliatæ*,—Ph. E. 1817. *Prep.* (Ph. E.) *Angostura bark* or *cusparia*, 4½ oz.; *proof spirit*, 1 quart; digest or percolate. Tonic, stimulant, and stomachic. *Dose.* 1 to 2 fl. dr.

TINCTURE (Deadly-nightshade). See *Tincture of Belladonna.*

TINCTURE (De Coetlogon's). See *p.* 1235.

TINCTURE (Digitalis). See *below.*

TINCTURE (Elecampane). Syn. *Tinctura Inulæ, Tinct. Helenii*,—Lat. *Prep.* (P. Cod.) *Powdered elecampane*, 4 oz.; *proof spirit*, 1 pint; macerate for 15 days. Tonic, deobstruent, and expectorant. *Dose.* ½ to 2 fl. dr.; in dyspepsia, palsy, dropsies, uterine obstructions, &c.

TINCTURE (Ergot). Syn. *Tinctura Secalis Cornuti; Tinctura Ergotæ*,—Ph. D. *Prep.* 1. (Apothecaries' Hall.) *Ergot* (ground in a coffee-mill), 2½ oz.; *proof spirit*, 1 pint; digest for 7 days. *Dose.* A tea-spoonful to excite the action of the uterus in labour.

2. (Ph. D.) *Ergot*, 8 *oz.; proof spirit*,

1 quart; macerate for 14 days, and strain with expression. *Dose.* 20 drops to 1 fl. dr.; as the last.

TINCTURE (Ergot,—Ethereal). Syn. *Tinctura Ergotæ Ætherea,*—Ph. L. *Prep.* (Ph. L.) *Ergot,* bruised, 15 oz.; *ether,* 1 quart; macerate for 7 days, press, and filter. *Dose.* 10 drops to 1 fl. dr.

TINCTURE (Febrifuge,—Clutton's). Syn. *Tinctura Febrifuga Cluttoni,*—Lat. *Prep.* Take of *febrifuge spirit,* 8 fl. oz.; *angelica root, serpentary,* and *cardamom seed,* of each, 1½ dr.; digest a week, and filter.

Obs. The original formula for *Dr. Clutton's Febrifuge Spirit,* is as follows:—*Oil of sulphur by the bell, oil of vitriol,* and *sea salt,* of each, 1 oz.; *rectified spirit,* 3 oz.; mix, digest for a month, and distil to dryness. "Water acidulated with these and sweetened to the taste, forms a cooling diuretic and diaphoretic julep. Though never admitted into the pharmacopœias, these preparations are favorites with a few practitioners."

TINCTURE (Foxglove). Syn. *Tinctura Digitalis,*—Ph. L. E. & D. *Prep.* (Ph. L.) *Dried foxglove leaves,* 4 oz. (5 *oz.,*—Ph. D.); *proof spirit,* 1 quart; macerate for 7 days (14 days,—Ph. D.; or, *percolate,*—Ph. E.), then press, and strain.

Obs. This tincture is a powerful sedative, diuretic, and narcotic. The commencing *dose* should be 10 drops, gradually and cautiously increased to 30, or even 40; in asthmas, dropsies, fevers, phthisis, &c. "If 40 fl. oz. of spirit be allowed to pass (percolate) through, the sp. gr. will be 0·944; and the solid contents of 1 fl. oz. will amount to 24 gr." (Ph. E.)

TINCTURE (Galbanum). Syn. *Tinctura Galbani,*—Lat. *Prep.* (Ph. D. 1826.) *Galbanum,* 2 oz.; *proof spirit,* 32 fl. oz.; digest 7 days. Stimulant and antispasmodic. *Dose.* 1 to 3 fl. dr. "If less nauseous than tincture of assafœtida, it is also less powerful." (Dr. A. T. Thomson.)

TINCTURE (Galls). Syn. *Tinctura Gallæ,*—Ph. L. & D. *Tinctura Gallarum,*—Ph. E. *Prep.* (Ph. L.) *Galls,* in powder, 5 oz.; *proof spirit,* 1 quart; macerate for 7 days (14 days,—Ph. D.; or, *percolate,*—Ph. E.), then express the liquid, and filter it. Astringent and styptic. *Dose.* ½ to 2 fl. dr. It is chiefly used as a test for iron.

TINCTURE (Gentian,—Compound). Syn. *Bitter Stomachic Tincture; Tinctura Gentianæ Composita,*—Ph. L. E. & D. *Tinctura Amara,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) *Gentian root,* sliced and bruised, 2½ oz.; *dried orange peel,* 10 dr.; *cardamoms,* bruised, 5 dr.; *proof spirit,* 1 quart; macerate for 7 days (or *percolate,*—Ph. E.) The Edinburgh college substitutes *canella* for cardamoms, and adds of *cochineal,* ½ dr.

2. (Ph. D.) *Gentian root,* 3 *oz.; dried bitter-orange peel,* 1½ *oz.; cardamoms,* ½ *oz.; proof spirit,* 1 quart; macerate for 14 days.

3. (*Wholesale.*) *Gentian,* 2½ *lb.; dried orange peel,* 1¼ *lb.; bruised cardamoms,* ½ *lb.; proof spirit,* 4 gall. (or *rectified spirit* and *water,* of each, 2 gall.); digest as last.

Obs. This is an elegant and popular stomachic bitter and tonic. *Dose.* 1 to 2 fl. dr.; in dyspepsia, loss of appetite, &c.

TINCTURE (Gentian,—Ammoniated). Syn. *Tinctura Gentianæ Ammoniata,*—Lat. *Elixir Antiscrofuleux,*—Fr. *Prep.* (P. Cod.) *Gentian,* 1 oz.; *sesquicarbonate of ammonia,* ¼ oz.; *proof spirit,* 32 fl. oz. As the last; but preferred in acidity and low spirits.

TINCTURE (Ginger). Syn. *Tinctura Zingiberis,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Ginger,* bruised, 2½ oz.; *rectified spirit,* 1 quart; macerate for 7 days, (or *percolate,*—Ph. E.)

2. (*Wholesale.*) *Coarsely powdered unbleached Jamaica ginger,* 1¼ *lb.; rectified spirit* (or, *spirit distilled from the essence*), 1½ gall.; *water,* ½ gall.; digest as above. Stimulant and carminative. *Dose.* 1 to 2 fl. dr.

Obs. The formula of the Ph. D. 1826, resembles the above; that of the new Ph. D. orders 8 *oz.* of *ginger* to 1 quart of *rectified spirit.* The product is, consequently, of fully 3 times the strength of that of the others; and is similar to the common *essence of ginger* of the shops.

TINCTURE (Gout). Syn. *Tinctura Antarthritica,*—Lat. *Prep.* 1. (*Dr. Graves's.*) Take of *dried orange peel* and *powder of aloes and canella,* of each, 2 oz.; *rhubarb,* 1 oz.; *French brandy* (or *proof spirit*), 1 quart; digest a week, and strain with expression. *Dose.* 1 to 2 tea-spoonfuls, night and morning.

2. (*Dr. Wilson's.*) See *page* 1233.

3. See *Tincture of Colchicum.*

TINCTURE (Guaiacum). Syn. *Tinctura Guaiaci,*—Ph. E. & D., & Ph. L. 1836. *Prep.* (Ph. E., & Ph. L. 1836.) *Guaiacum resin* (powdered), 7 oz. (8 *oz.,*—Ph. D.); *rectified spirit,* 1 quart; digest for 14 days, and filter. An excellent sudorific, in chronic gout and rheumatism. *Dose.* 1 to 3 fl. dr., taken in milk.

TINCTURE (Guaiacum,—Compound). Syn. *Ammoniated Tincture of Guaiacum, Volatile do.; Rheumatic Drops; Tinctura Guaiaci Composita,*—Ph. L. *Tinctura*

Guaiaci Ammoniata,—Ph. E., Ph. L. 1824, & Ph. D. 1826. *Tinct. Guaiaci,*—Ph. L. 1788. *Tinct. Guaiacina Volatilis,*—Ph. L. 1746. *Prep.* (Ph. L.) *Guaiacum,* in coarse powder, 7 oz.; *aromatic spirit of ammonia* (*spirit of ammonia,*—Ph. E.), 1 quart; digest for 7 days, and decant or filter. A powerful, stimulating sudorific and emmenagogue, in chronic rheumatism, gout, amenorrhœa, &c. *Dose.* 1 to 2 fl. dr., in milk, or some viscid liquid.

TINCTURE (Haffenden's Balsamic). Syn. *De Coetlogon's Balsamic Tincture.* This is a nostrum, of many virtues, prepared from *tincture of serpentary* (of double strength), 1½ fl. oz.; *compound tincture of benzoin,* 1 fl. oz.; *tinctures of tolu* and *opium,* of each, ½ fl. oz.; with *rectified spirit,* q. s. to render the mixture "bright," should it turn milky. (*Anat. of Quackery.*)

TINCTURE (Hatfield's). *Prep.* From *gum guaiacum* and *soap,* of each, 2 dr.; *rectified spirit,* 1 pint; digest for a week. *Used* as tinct. of guaiacum; also *externally.*

TINCTURE (Hellebore). Syn. *Tincture of Black Hellebore; Tinctura Hellebori,*—Ph. L., & Ph. D. 1826. *Tinctura Hellebori Nigri,*—Ph. L. 1824. *Tinct. Melampodii,*—Ph. L. 1746. *Prep.* (Ph. L.) *Black-hellebore root,* bruised, 5 oz.; *proof spirit,* 1 quart; macerate 7 days, then strain with expression.

Obs. This tincture is a powerful emmenagogue, and was a favorite remedy with Dr. Mead, in uterine obstructions and certain cutaneous affections. *Dose.* 20 drops to 1 fl. dr.

TINCTURE (White Hellebore). See *Tincture of Veratrum.*

TINCTURE (Hemlock). Syn. *Tinctura Cicutæ; Tinctura Conii,*—Ph. L. & E. *Tinct. Conii Maculati,*—Ph. D. 1826. *Prep.* 1. (Ph. L.) *Dried hemlock leaves,* 5 oz.; *proof spirit,* 1 quart; digest a week, press and filter. In the Ph. L. 1836, *cardamom seeds,* 1 oz., was added.

2. (Ph. E.) *Fresh hemlock leaves,* 12 oz.; express the *juice,* bruise the residuum, and treat it, by *percolation,* first with *tincture of cardamoms,* 10 fl. oz.; and next with *rectified spirit,* 1½ pint; mix the liquids, and filter. Deobstruent and narcotic. *Dose* of the Ph. L., 20 to 60 drops; that of the Ph. E. tincture, is less, it being a much stronger and certain preparation. See *Hemlock.*

TINCTURE (Hemp). See *below.*

TINCTURE (Henbane). Syn. *Tinctura Hyoscyami,*—Ph. L. E. & D. *Prep.* (Ph. L.) *Dried leaves of henbane,* 5 oz.; *proof spirit,* 1 quart; macerate for 7 days (14 days,—Ph. D.; or, *percolate,* Ph. E,), then press, and filter. Anodyne, sedative, soporific, and narcotic. *Dose.* 20 drops to 2 fl. dr.

Obs. This, as well as the *tinctures* of *foxglove, hemlock, hops, jalap, lobelia inflata, rhatany, savine, squills, senna, valerian, wormwood, &c.,* is usually prepared by the druggists with 1 *lb.* of the *dried leaves* (or dried drug), to each gall. of a *mixture* of equal parts of *rectified spirit* and *water.*

TINCTURE (Hops). Syn. *Tinctura Lupuli,*—Ph. L. & E. *Tinctura Humuli,*—Ph. D. 1826, & Ph. E. 1817. *Prep.* (Ph. L.) *Hops,* 6 oz.; *proof spirit,* 1 quart; digest 7 days, then press, and filter. Anodyne, sedative, and soporific. *Dose.* ½ to 2 fl. dr. For the formulæ of the Ph. E. & D., see *Tincture of Lupuline.*

TINCTURE (Hudson's). See *page* 1240.

TINCTURE (Huxham's). See *page* 1232.

TINCTURE (Indian Hemp). Syn. *Tinctura Cannabis; Tinctura Cannabis Indicæ,*—Ph. D. *Prep.* (Ph. D.) *Purified extract of Indian hemp,* ½ *oz.; rectified spirit,* ½ pint; dissolve. 21 drops (minims) contain 1 gr. of the extract.

Obs. The formulæ of O'Shaughnessy and the Bengal Ph. are similar. *Dose.* 10 drops, every ½ hour, in cholera; 1 fl. dr., every ½ hour, in tetanus, till the paroxysms cease, or catalepsy is induced. (See *p.* 562.)

TINCTURE (Indian Tobacco). See *Tincture of Lobelia.*

TINCTURE (Iodine). Syn. *Tinctura Iodinei,*—Ph. E. *Tinctura Iodinii,*—Ph. D. 1826. *Prep.* (Ph. E.) *Iodine,* 2½ oz.; *rectified spirit,* 1 quart; dissolve, and preserve it in well-closed bottles. *Dose.* 5 to 30 drops, twice or thrice daily, where the use of iodine is indicated. *Externally,* as a paint, &c.

Obs. The formulæ of Magendie, the Ph. U. S., and the Paris Codex, are similar.

TINCTURE (Iodine,—Compound). Syn. *Antiscrofulous Drops; Tinctura Iodinii Composita,*—Ph. L. & D. *Prep.* (Ph. L. & D.) *Iodine,* 1 oz.; *iodide of potassium,* 2 oz.; *rectified spirit,* 1 quart; dissolve. *Dose, &c.* As the last.

TINCTURE (Ipecacuanha). Syn. *Tinctura Ipecacuanhæ,*—Lat. *Prep.* (Ph. Bor.) *Ipecacuanha* (coarsely powdered), 1 oz.; *spirit,* sp. gr. 0·897 to 0·900 (16 to 17 o. p.), 8 oz.; macerate for 8 days. The tincture of the P. Cod. has twice this strength. *Dose.* 10 or 12 drops to 2 fl. dr., according to the intention.

TINCTURE (Jalap). Syn. *Tinctura Jalapæ,*—Ph. L. E. & D. *Tinctura Jalapii,*—Ph. L. 1788. *Prep.* (Ph. L.) *Jalap,* coarsely powdered, 5 oz. (10 oz.,—Ph. L.

1836; 7 oz.,—Ph. E.); *proof spirit*, 1 quart (1½ pint,—Ph. D.); macerate for 7 days (or, *percolate*,—Ph. E.), then press, and filter. Cathartic. *Dose.* 1 to 4 fl. dr.

TINCTURE (Kino). Syn. *Tinctura Kino*, —Ph. L. & E., & Ph. D. 1826. *Prep.* (Ph. L.) *Powdered kino*, 3½ oz.; *rectified spirit*, 1 quart; macerate for 7 days (or, *percolate*,—Ph. E.), and filter. Astringent. *Dose.* 1 to 2 fl. dr., combined with chalk mixture, in diarrhœa, &c.

TINCTURE (Lactucarium). Syn. *Tinctura Lactucarii*, — Lat. *Prep.* (Ph. E.) *Powdered lactucarium*, 4 oz.; *proof spirit*, 1 quart; digest or percolate. Anodyne, soporific, antispasmodic, and sedative. *Dose.* 20 to 60 drops; in cases for which opium is unsuited. 10 drops (minims) contain 1 gr. of lactucarium.

TINCTURE (Lavender, — Compound). Syn. *Red Lavender, Red Lavender Drops, Red Hartshorn; Tinctura Lavendulæ Composita*,—Ph. L. & D. *Spiritus Lavandulæ Compositus*,—Ph. E., Ph. D. 1826, & Ph. L. 1824. *Sp. Lavendulæ Co. Matthiæ*,—Ph. L. 1721. *Prep.* 1. (Ph. L.) *Cinnamon* and *nutmegs*, of each, bruised, 2½ dr.; *red sanders wood*, sliced, 5 dr.; *rectified spirit*, 1 quart; macerate for 7 days, then strain with expression, and dissolve in the strained liquid, *oil of lavender*, 1½ fl. dr., *oil of rosemary*, 10 drops.

2. (Ph. L. 1836.) *Spirit of lavender*, 1½ pint; *spirit of rosemary*, ½ pint; *red sanders wood* (rasped), 5 dr.; *cinnamon* and *nutmegs* (bruised), of each, 2½ dr.; macerate for 14 days.

3. (Ph. E.) *Spirit of lavender*, 1 quart; *spirit of rosemary*, 12 fl. oz.; *cinnamon*, 1 oz.; *nutmegs*, ½ oz.; *red sanders*, 3 dr.; *cloves*, 2 dr.; as No. 1.

4. (Ph. D.) *Oil of lavender*, 3 fl. dr.; *oil of rosemary*, 1 fl. dr.; *cinnamon*, 1 *oz.; nutmegs*, ½ *oz.; cloves* and *cochineal*, of each, ¼ *oz.; rectified spirit*, 1 quart; macerate for 14 days.

5. (*Wholesale.*) From *oil of cassia*, ¾ fl. oz.; *oil of nutmeg*, 1 fl. oz.; *oils of lavender* and *rosemary*, of each, 4½ fl. oz.; *red sanders* (rasped), 3 *lb.; proof spirit*, 6 gall. (or, *rectified spirit* and *water*, of each, 3 gall.); digest 14 days. Should it be cloudy, add a little more proof spirit.

Obs. Compound tincture of lavender is a popular stimulant, cordial, and stomachic. *Dose.* 1 to 3 tea-spoonfuls (½ to 2 fl. dr.); in lowness of spirits, faintness, flatulence, hysteria, &c.

TINCTURE (Lemons). Syn. *Tinctura Limonum*, — Ph. L. *Tinctura Limonis*, — Ph. D. *Prep.* (Ph. L.) *Fresh lemon peel*, 3½ oz. (cut thin, 5 *oz.*,—Ph. D.); *proof spirit*, 1 quart; macerate for 7 days (14 days,—Ph. D.), then express the liquid, and filter it. An aromatic bitter and stomachic. *Dose.* ½ to 2 fl. dr.

TINCTURE (Lobelia). Syn. *Tincture of Indian Tobacco; Tinctura Lobeliæ Inflatæ; Tinctura Lobeliæ*,—Ph. L. E. & D. *Prep.* (Ph. L.) *Dried* and *powdered lobelia inflata*, 5 oz.; *proof spirit*, 1 quart; macerate for 7 days (14 days,—Ph. D.; or, *percolate*, — Ph. E.), press, and filter. *Dose.* As an *expectorant*, 10 to 60 drops; as an *emetic* and *antispasmodic*, 1 to 2 fl. dr., repeated every third hour until it causes vomiting. It is principally employed in spasmodic asthma, and some other pulmonary affections.

TINCTURE (Lobelia,—Ethereal). Syn. *Tinctura Lobeliæ Ætherea*, — Ph. L. & E. *Prep.* 1. (Ph. L.) *Indian tobacco*, powdered, 5 oz.; *ether*, 14 fl. oz.; *rectified spirit*, 26 fl. oz.; macerate 7 days, press, and filter.

2. (Ph. E.) *Dry lobelia*, 5 oz.; *spirit of sulphuric ether*, 1 quart; by digestion for 7 days, or by percolation. *Dose.* 6 or 8 drops to 1 fl. dr.

3. (*Whitlaw's.*) From *lobelia*, 1 *lb.; rectified spirit* and *spirit of nitrous ether*, of each, 4 pints; *sulphuric ether*, 4 *oz. Dose, &c.* As the last.

TINCTURE (Lupuline). Syn. *Tincture of Hops; Tinctura Lupuli*,—Ph. E. *Tinctura Lupulinæ*, — Ph. D. *Prep.* (Ph, D.) *Lupuline* (the yellowish-brown powder attached to the scales of hops, separated by friction and sifting), 5 *oz.; rectified spirit*, 1 quart; macerate for 14 days (or, proceed by *displacement*,—Ph. E.), press, and filter. *Dose.* ½ to 2 fl. dr. See *Tincture of Hops.*

TINCTURE (Matico). Syn. *Tinctura Matico*, — Ph. D. *Prep.* (Ph. D.) *Matico leaves*, in coarse powder, 8 *oz.; proof spirit*, 1 quart; macerate for 14 days, and strain with expression. *Dose.* 1 to 2 fl. dr., as an internal astringent or hæmostatic. It is a very feeble remedy, as matico leaves are destitute of either tannin or gallic acid, and derive their power of stopping local bleeding from the peculiar mechanical construction of their surface.

TINCTURE (Meadow Saffron). See *Tincture of Colchicum.*

TINCTURE (Monesia). Syn. *Tinctura Monesiæ*,—Lat. *Prep.* From *monesia*, 2½ oz.; *proof spirit*, 1 pint; macerate a week. Astringent. *Dose.* ½ to 2 fl. dr.

TINCTURE (Musk). Syn. *Tinctura Moschi*,—Lat. *Prep.* (Ph. D. 1826.) *Musk*, 2 dr.; *rectified spirit*, 16 fl. oz.; digest 7 days. Antispasmodic; but principally used as a perfume, being too weak for medical use.

TINCTURE (Myrrh). Syn. *Golden Tooth-drops; Tinctura Myrrhæ,*—Ph. L. E. & D.) *Prep.* 1. (Ph. L.) *Myrrh,* in powder, 3 oz. (3½ oz.,—Ph. E.; 4 *oz.,*—Ph. D.); *rectified spirit,* 1 quart; macerate for 7 days (14 days,—Ph. D.; or, by *displacement,*—Ph. E.), and filter.

2. (*Wholesale.*) *Myrrh* (in coarse powder), 2¼ *lb.; rectified spirit,* 2 gall.; *water,* 1 gall.; as the last.

Obs. Tincture of myrrh is tonic and stimulant. *Dose.* ½ to 1 fl. dr., as an adjuvans in mixtures, gargles, &c. Chiefly used, diluted with water, as a dentifrice or wash for ulcerated and spongy gums.

TINCTURE (Myrrh,—Compound). Syn. *Tinctura Myrrhæ Composita,*—Lat. *Prep.* From *myrrh* and *socotrine aloes,* of each, 2 *lb.; rectified spirit,* 3 gall.; *water,* 2 gall.; digest for 14 days. This is frequently substituted for "*compound tincture of aloes*" in the wholesale trade.

TINCTURE (Nux Vomica). Syn. *Tinctura Nucis Vomicæ,*—Lat. *Prep.* (Ph. D. 1826.) *Nux vomica* (ground in a coffee-mill), 2 oz.; *rectified spirit,* 8 fl. oz.; macerate 7 (14) days. *Dose.* 5 to 20 drops; in paralysis, &c. It is *poisonous.*

TINCTURE (Odontalgic). Syn. *Toothache Tincture; Tinctura Odontalgica,*—Lat. *Prep.* 1. *Tincture of opium,* 1 fl. dr.; *ether,* 2 fl. dr.; *oil of cloves,* 15 drops.

2. *Rectified spirit,* 3 fl. dr.; *chloroform,* 2 dr.; *creasote,* 1 dr.; mix.

3. (Collier.) *Pellitory of Spain,* 4 dr.; *camphor,* 3 dr.; *opium,* 1 dr.; *oil of cloves,* 2 fl. dr.; *rectified spirit,* 16 fl. oz.; digest for a week.

4. (Niemann.) Digest 60 or 80 *common lady-birds* (coccinella septempunctata,—Linn.) in *rectified spirit,* 1 fl. oz.; for 8 days, and strain.

Obs. The above are commonly applied, on a small piece of lint, in toothache. For other formulæ see *Drops, Tinctures of Myrrh* and *Pellitory, &c.*

TINCTURE (Opium). Syn. *Laudanum, Liquid do., Anodyne Tincture, Thebaic do.; Tinctura Opii,*—Ph. L. E. & D. *Tinct. Opii, Tinct. Thebaica,* or *Laudanum Liquidum,*—Ph. E. 1817. *Tinct. Opii Simplex, Tinct. Meconii,*—Ph. Bor., &c. *Prep.* 1. (Ph. L.) *Powdered opium,* 3 oz. (3 *oz.,*—Ph. D.); *proof spirit,* 1 quart; macerate for 7 days (14 days,—Ph. D.), and strain, with expression.

2. (Ph. E.) *Opium,* sliced, 3 oz.; *boiling water,* 13½ fl. oz.; digest, with heat, for 2 hours, break down the opium with the hand, strain, and express the infusion; then macerate the residuum, for about 20 hours in *rectified spirit,* 1 pint 7 fl. oz.; next strain, press, mix the watery and spirituous infusions, and filter.

Obs. This preparation has a deep brownish red colour, and the characteristic odour and taste of opium. 14 *minims* or *measured drops* of the *London,* and about 15 minims of the *Edinburgh* and *Dublin tinctures,* are equivalent to 1 gr. of *dry opium,* or 1·12 gr. of *ordinary opium.* 14 *minims* of this tincture are equal to about 25 *drops* of it poured from a bottle. Its sp. gr. is 0·952. (Phillips.) *Dose.* 10 to 60 drops; as an anodyne, sedative, or hypnotic. The following form is substituted for that of the Pharmacopœia by many of the wholesale drug houses:—Take of *Turkey opium,* 2½ *lb.; boiling water,* 9 quarts; digest till dissolved or disintegrated, cool, add of *rectified spirit,* 2 gall.; and, after repose for 24 hours, decant the clear portion. *Prod.* 4 gall.

TINCTURE (Opium,—Ammoniated). Syn. *Ammoniated Tincture of Opium, Scotch Paregoric; Tinctura Opii Ammoniata,*—Ph. E. *Tinct. O. A.,* or *Elixir Paregoricum,*—Ph. E. 1817. *Prep.* (Ph. E.) *Benzoic acid* and *hay saffron,* of each, 6 dr.; *opium,* sliced, 4 dr.; *oil of aniseed,* 1 dr.; *spirit of ammonia* (Ph. E.), 1 quart; digest for a week, and filter. Stimulant, antispasmodic, and anodyne. *Dose.* 20 to 80 drops; in *hysteria, hooping-cough, &c.*

Obs. This preparation is called *paregoric,* or *paregoric elixir,* in Scotland, but should be carefully distinguished from the compound tincture of camphor, which passes under the same names in England; as the former contains about 4 times as much opium as the latter. 80 minims or 145 poured drops contain about 1 gr. of opium.

TINCTURE (Opium,—Camphorated). See *Compound Tincture of Camphor.*

TINCTURE (Orange-peel). Syn. *Tinctura Aurantii,*—Ph. L. E. & D. *Tinct. Corticis Aurantii,*—Ph. L. 1788. *Prep.* (Ph. L.) *Dried orange peel,* 3½ oz. (4 *oz.*—Ph. D.); *proof spirit,* 1 quart; digest for 7 days (14 days,—Ph. D.; or, by *percolation,*—Ph. E.), press, and filter. A grateful bitter stomachic. *Dose.* 1 to 3 fl. dr.; chiefly as an adjuvant in mixtures, &c.

TINCTURE (Pellitory). Syn. *Toothache Tincture; Tinctura Pyrethri,*—Lat. *Prep.* 1. *Pellitory of Spain* (bruised), 1 *oz.; rectified spirit,* ¼ pint; digest a week. In the P. Cod. a tincture is ordered prepared with spirit about 41 o. p.; and another prepared with *spirit of sulphuric ether.*

2. (*Compound,*—Brande.) *Pellitory root,*

4 dr.; *camphor*, 3 dr.; *oil of cloves*, 2 dr.; *opium*, 1 dr.; *rectified spirit*, 6 fl. oz.; digest for eight days. Both the above are *used* for the toothache. See *Paraguay Roux* and *Tincture* (Odontalgic).

TINCTURE (Phosphorus,—Ethereal). Syn. *Æther Phosphoratus*, *Tinctura Phosphori Ætherea*,—Lat. *Prep.* 1. (Ph. Hann. 1831.) *Phosphorus* (powdered by agitation with rectified spirit), 16 gr.; *ether*, 2 oz.; macerate, with agitation, for 4 days, then decant the clear portion, and preserve it in a stoppered bottle, in a cool dark situation.

2. (P. Cod.) *Phosphorus*, cut small, 1 part; *ether*, 50 parts; digest with occasional agitation for 1 month, and decant the clear. *Dose.* 5 to 15 drops, in any bland vehicle, thrice daily; in impotency, low sinking conditions of the system, &c.

TINCTURE (Quassia). Syn. *Tinctura Quassiæ*,—Ph. E., & Ph. D. 1826. *Prep.* (Ph. E.) *Quassia*, in chips, 10 dr.; *proof spirit*, 1 quart; digest 7 days. Bitter, tonic. *Dose.* ½ to 2 fl. dr.; in dyspepsia, &c.

TINCTURE (Quassia,—Compound). Syn. *Tinctura Quassiæ Composita*,—Ph. E. *Prep.* (Ph. E.) *Cardamoms* and *cochineal*, of each, bruised, ½ oz.; *powdered cinnamon* and *quassia chips*, of each, 6 dr.; *raisins*, 7 oz.; *proof spirit*, 1 quart; digest for 7 days (or, by *percolation*), then press, and filter. Aromatic and tonic. *Dose* and *use*, as the last.

TINCTURE (Quinine,—Compound). Syn. *Fever Drops; Tinctura Quinæ Composita*, —Ph. L. *Prep.* (Ph. L.) *Disulphate of quinine*, 5 dr. 1 scrup. (or, 320 gr.); *tincture of orange peel*, 1 quart; digest, with agitation, for 7 days, or until solution is complete.

Obs. Unless the tincture employed as the solvent be of the full strength, some of the disulphate remains undissolved. It is an excellent medicine when faithfully prepared. *Dose.* ½ to 2 fl. dr.; in debility, dyspepsia, &c.

TINCTURE (Red Lavender). See *p.* 1236.

TINCTURE (Rhatany). Syn. *Tinctura Krameriæ*,—Ph. D. *Prep.* (Ph. D.) *Rhatany root*, in coarse powder, 8 *oz.; proof spirit*, 1 quart; macerate for 14 days, then press, and filter. Astringent. *Dose.* 1 to 2 fl. dr. The formula of the Ph. U. S. is similar.

TINCTURE (Rhubarb). Syn. *Tinctura Rhei*,—Ph. E., Ph. L. 1824, & Ph. D. 1826. *Tinct. Rhabarbari*,—Ph. L. 1788. *Prep.* 1. (Ph. E.) *Powdered rhubarb*, 3½ oz.; *cardamom seeds*, bruised, ½ oz.; *proof spirit*, 1 quart; digest or proceed by the method of displacement.

2. (Ph. L. 1824.) *Rhubarb*, 2 oz.; *cardamoms*, 4 dr.; *saffron*, 2 dr.; *proof spirit*, 32 fl. oz. Both the above are cordial, stomachic, and laxative. *Dose.* 1 fl. dr. to 1 fl. oz.

TINCTURE (Rhubarb, — Compound). Syn. *Tinctura Rhei Composita*,—Ph. L. & D. *Tinct. Rhabarbari Comp.*,—Ph. L. 1788. *Prep.* 1. (Ph. L.) *Rhubarb*, sliced, 2½ oz.; *liquorice root*, bruised, 6 dr.; *ginger* (bruised), and *hay saffron*, of each, 3 dr.; *proof spirit*, 1 quart; macerate for 7 days, then press, and filter.

2. (Ph. D.) *Rhubarb*, 3 *oz.; cardamoms*, 1 *oz; liquorice root*, ½ *oz.; saffron*, ¼ *oz.; proof spirit*, 1 quart; macerate for 14 days.

3. (Ph. L. 1824.) *Rhubarb*, 2 oz.; *liquorice root*, 4 dr.; *ginger* and *saffron*, of each, 2 dr.; *proof spirit*, 16 fl. oz.; *water*, 12 fl. oz.

Obs. This tincture is a popular remedy in diarrhœa and colic, and is an especial favorite with drunkards. *Dose*, as a *stomachic*, 1 to 3 fl. dr.; as a *purgative*, ½ to 1½ fl. oz. The tincture of rhubarb of the shops is mostly inferior, being generally deficient both in rhubarb and spirit. The following forms we have seen extensively employed in the wholesale trade:—*East Indian rhubarb*, 20 *lb.; boiling water*, q. s. to cover it; infuse for 24 hours, then slice the rhubarb, and put it into a cask with *moist sugar*, 14 *lb.; ginger*, bruised, 3½ *lb.; hay saffron*, 1 *lb.; carbonate of potash*, ½ *lb.; bruised nutmegs*, ¼ *lb.; rectified spirit*, 19 gall.; *water*, 21 gall.; macerate with frequent agitation for 14 days, decant the clear portion, and press and filter the bottoms. Those houses that adhere to the Ph. L. for 1824, substitute *cardamom seeds*, 5 *lb.* for the ginger. For the corresponding Ph. E. formula see the last article.

TINCTURE (Rhubarb,—Brandish's Alkaline). Syn. *Tinctura Rhei Alkalina Brandishii*,—Lat. *Prep.* From *rhubarb*, in coarse powder, 1½ *oz.; Brandish's alkaline solution*, 1 quart; macerate for a week. In the original formula, only ½ *oz.* of rhubarb is ordered. *Dose.* 20 drops to 2 fl. dr., in any bland liquid, not acidulous; in acidities, dyspepsia, &c.

TINCTURE (Rhubarb and Aloes). Syn. *Tinctura Rhei et Aloës*,—Ph. E. *Sacred Elixir, Elixir Sacrum*,—Ph. L. 1721. *Prep.* (Ph. E.) *Rhubarb*, in powder, 1½ oz.; *Socotrine* or *East Indian aloes*, 6 dr.; *cardamom seeds*, bruised, 5 dr.; *proof spirit*, 1 quart; macerate 7 days, or percolate. A warm stomachic purgative. *Dose.* ½ fl. oz. to 1 fl. oz.

TINCTURE (Rhubarb and Gentian). *Tinctura Rhei Amara; Tinctura Rhei et Gentianæ,*—Ph. E. *Prep.* (Ph. E.) *Rhubarb,* 2 oz.; *gentian,* ½ oz.; *proof spirit,* 1 quart; proceed as for the last. Stomachic, tonic, and purgative. *Dose.* 1 fl. dr. to 1 fl. oz.

TINCTURE (Rhubarb and Senna). Syn. *Warner's Gout Cordial; Tinctura Rhei et Sennæ,*—Ph. U. S. *Prep.* (Ph. U. S.) *Rhubarb,* 1 oz.; *senna* and *red sanders wood,* of each, 2 dr.; *coriander* and *fennel seed,* of each, 1 dr.; *saffron* and *extract of liquorice,* of each, ½ dr.; *stoned raisins,* 6 oz.; *proof spirit,* 2½ pints; macerate for 14 days. A popular stomachic and laxative. *Dose.* ½ to 1½ fl. oz. For another formula see *page* 541.

TINCTURE (Riemer's Nervous). *Prep.* From *oil of juniper,* 1 part; *volatile liquor of hartshorn,* 4 parts; *rectified spirit,* 16 parts. *Dose.* 1 tea-spoonful, in water.

TINCTURE (Ruspini's). See *page* 1240.

TINCTURE (Saffron). Syn. *Tinctura Croci,*—Ph. E. & D. *Tinct. Croci Sativæ,* Ph. E. 1817. *Prep.* (Ph. E.) *Hay saffron,* 2 oz. (2 *oz.,*—Ph. D.); *proof spirit,* 1 quart (1 pint,—Ph. D.); proceed either by maceration (for 14 days,—Ph. D.) or by displacement. Stimulant, and emmenagogue. *Dose.* 1 to 2 fl. dr. Chiefly used for its colour and flavour.

TINCTURE (Senna,—Compound). Syn. *Tincture of Senna, Elixir of Health; Tinctura Sennæ Compositæ,*—Ph. L. E. & D. *Tinct. Sennæ,*—Ph. L. 1824. *Elixir Salutis,*—Ph. L. 1721. *Prep.* 1. (Ph. L.) *Senna,* 3½ oz.; *caraway seeds,* bruised, 3½ dr.; *cardamom seeds,* bruised, 1 dr.; *stoned raisins,* 5 oz.; *proof spirit,* 1 quart; macerate for 7 days, press, and filter.

2. (Ph. E.) *Senna* and *stoned raisins,* of each, 4 oz.; *sugar,* 2½ oz.; *corianders,* 1 oz.; *jalap,* 6 dr.; *caraways* and *cardamoms,* of each, 5 dr.; *proof spirit,* 1 quart; digest, or proceed by percolation.

3. (Ph. D.) *Senna,* 4 *oz.*; *caraway* and *cardamom seeds,* of each, bruised, ½ *oz.; proof spirit,* 1 quart; macerate for 14 days.

4. (*Wholesale.*) From *senna,* 6 *lb.: treacle,* 2 *lb.; caraways,* ¾ *lb.; cardamoms,* ¼ *lb.; rectified spirit* and *water,* of each, 4 gall.; as before. Carminative, stomachic, and purgative. *Dose.* ¼ to 1 fl. oz.

Obs. "If Alexandrian senna be used for this preparation, it must be freed from *cynanchum* (argel) leaves, by picking." (Ph. E.)

TINCTURE (Serpentary). Syn. *Tincture of Virginian Snake-root; Tinctura Serpentariæ,*—Ph. L. & E., & Ph. D. 1826. *Tinct. Serpentariæ Virginianæ,*—Ph. L. 1721. *Prep.* (Ph. L.) *Serpentary,* bruised, 3½ oz. (*cochineal,* 1 dr.,—Ph. E.); *proof spirit,* 1 quart; macerate for 7 days (or, by *percolation,*—Ph. E.), strain, and filter. Stimulant, tonic, and diaphoretic. *Dose.* 1 to 3 fl. dr.

TINCTURE (Sesquichloride of Iron). Syn. *Tincture of Muriate of Iron, Tincture of Steel, Steel Drops; Tinctura Ferri Sesquichloridi,*—Ph. L. & D. *Tinct. Ferri Muriatis,*—Ph. E. *Ferri Muriatis Liquor,* —Ph. D. 1826. *Tinct. Martis cum Spiritû Salis,*—Ph. L. 1721. *Prep.* 1. (Ph. L.) *Sesquioxide of iron,* 6 oz.; *hydrochloric acid,* 1 pint; mix, and digest in a sand bath, frequently shaking, (with a gentle heat for a day,—Ph. E.,) until solution is complete, then add, when cold, of *rectified spirit,* 3 pints, and (in a short time) filter. —Sp. gr. 0·992. "1 fl. oz., potash being added, deposits nearly 30 gr. of sesquioxide of iron." (Ph. L.)

2. (Ph. D.) *Iron wire,* 8 *oz.; pure hydrochloric acid,* 1 quart; *distilled water,* 1 pint; mix, and dissolve by a gentle heat; next add, in successive portions, of *pure nitric acid,* 18 fl. dr.; evaporate by a gentle heat to a pint, and, when cold, mix this in a bottle with *rectified spirit,* 1½ pint; lastly, after 12 hours, filter. Sp. gr. 1·237.

Obs. This tincture is an active ferruginous tonic. *Dose.* 10 to 30 drops, gradually increased, taken in water, ale, or wine. In the old *Tinctura Martis,* Ph. L., iron filings, and in the *T. Ferri muriatis,* Ph. E. 1817, black oxide of iron, were used instead of the sesquioxide or carbonate. "*Bestuchef's Nervine Tincture*" of the P. Cod. is prepared by dissolving 1 dr. of dry sesquichloride of iron, in 7 dr. of spirit of sulphuric ether. See *De la Motte's Drops* (p. 342).

TINCTURE (Sesquinitrate of Iron). Syn. *Tinctura Ferri Sesquinitratis, Tinct. Ferri Persesquinitratis,* — Lat. *Prep.* (Onion.) *Iron filings,* ½ oz.; *nitric acid* (1·5), 2¼ oz.; dissolve, add of *hydrochloric acid* (1·16), 6 dr., simmer for 2 or 3 minutes, cool, add of *rectified spirit,* 8 oz.; and filter. Proposed as a substitute for the last preparation; but the name misrepresents its chemical constitution.

TINCTURE (Squills). Syn. *Tinctura Bechica; Tinctura Scillæ,*—Ph. L. E. & D. *Prep.* (Ph. L.) *Squills,* recently dried, and sliced (or in coarse powder), 5 oz.; *proof spirit,* 1 quart; macerate for 7 days (14 days,—Ph. D.; or, by *percolation,*—Ph. E.), press, and filter. A stimulating expectorant and diuretic. *Dose.* 10 to 30 drops; in chronic coughs, and other bronchial affections.

TINCTURE (Stomachic). Compound tincture of cardamoms. Compound tincture of gentian is also, occasionally, so called.

TINCTURE (Stramonium). Syn. *Tincture of Thorn-apple; Tinctura Stramonii,*—Ph. D. & U. S. *Prep.* (Ph. D.) *Stramonium* or *thorn-apple seeds* (bruised), 5 *oz.; proof spirit,* 1 quart; macerate for 14 days (or, *by displacement,*—Ph. U. S.), then press, and filter. Anodyne. *Dose.* 10 to 20 drops; in neuralgia, rheumatism, &c. Said to be superior to laudanum.

TINCTURE (Sumbul). Syn. *Tinctura Sumbuli,* — Lat. From *sumbul,* bruised, 5 oz.; *proof spirit,* 1 quart; macerate for a week, and strain with expression. Stimulant and tonic. *Dose.* 10 to 30 or 40 drops.

TINCTURE (Thorn-apple). See *Tincture of Stramonium.*

TINCTURE (Tobacco). Syn. *Tinctura Nicotianæ, Tinctura Tabaci,*—Lat. *Prep.* From *pure manufactured tobacco,* 1¼ oz.; *proof spirit,* 1 pint; macerate for 7 days. *Compound spirit of juniper* is often used instead of proof spirit. Sedative and narcotic. *Dose.* 10 to 30 drops. A tincture is also made from the fresh leaves. See *Vegetable Juices* (and *below*).

TINCTURE (Tolu). Syn. *Tinctura Tolutana,*—Ph. L. E. & D. *Tinctura Balsami Tolutani,*—Ph. L. 1836, & Ph. D. 1826. *Tinct. Toluiferæ Balsami,*—Ph. E. 1839. *Prep.* (Ph. L.) *Balsam of Tolu,* 2 oz. (3½ oz.,—Ph. E.); *rectified spirit,* 1 quart (1 pint,—Ph. D.); dissolve (by the aid of a gentle heat,—Ph. E. & D.), and filter.

Obs. This tincture is reputed pectoral and expectorant; but it is chiefly used as an adjuvant in mixtures, on account of its flavour. *Dose.* 10 to 60 drops.

TINCTURE (Tooth). *Prep.* 1. (Greenhough's.) From *bitter almonds,* 2 *oz.; Brazil wood, cinnamon,* and *orris root,* of each, ½ *oz.; alum, cochineal,* and *salt of sorrel,* of each, 1 dr.; *spirit of scurvy grass,* 2 fl. oz.; *proof spirit,* 1½ pint; macerate a week.

2. (*Hudson's.*) From the *tinctures of myrrh* and *cinchona,* and *cinnamon water,* equal parts, with a little *arquebusade* and *gum arabic.*

3. (*Ruspini's.*) From *orris root,* 8 oz.; *cloves,* 1 oz.; *ambergris,* 20 gr.; *rectified spirit,* 1 quart; digested for 14 days. The above are used as cosmetics for the teeth and gums. The last has long been a popular dentifrice.

TINCTURE (Toothache). See *Odontalgic Drops, Essences, Tinctures, &c.*

TINCTURE (Valerian). Syn. *Tinctura Valerianæ,*— Ph. L. E. & D. *Prep.* (Ph. L.) *Valerian root,* bruised, 5 oz.; *proof spirit,* 1 quart; macerate 7 days (14 days, —Ph. D.; or, by *percolation,*—Ph. E.), press, and filter. Tonic and antispasmodic. *Dose.* 1 to 3 fl. dr.; in hysteria, epilepsy, &c.

TINCTURE (Valerian, — Compound). Syn. *Ammoniated Tincture of Valerian, Volatile do.; Tinctura Valerianæ Composita,*—Ph. L. *Tinct. Valerianæ Ammoniata,*—Ph. E., Ph. D. 1826, & Ph. L. 1788. *Tinct. V. Volatilis,*—Ph. L. 1746. *Prep.* (Ph. L.) *Valerian root,* bruised, 5 oz.; *aromatic spirit of ammonia* (simple, — Ph. E.), 1 quart; macerate for 7 days (or, by *percolation,*—Ph. E.), then press, and filter. Stimulant, tonic, and antispasmodic. *Dose* and *use,* same as those of the simple tincture, than which it is thought to be more powerful. The *tincture of the shops* is generally made with only 1 *lb.* of the *root* to the gallon.

TINCTURE (Veratrum). Syn. *Tincture of White Hellebore; Tinctura Hellebori Albi; Tinct. Veratri,*—Ph. E. *Tinct. V. Albi,*—Ph. E. 1817. *Prep.* (Ph. E.) *White hellebore,* 4 oz.; *proof spirit,* 1 pint; digest or percolate. *Dose.* 10 drops, 2 or 3 times a day, gradually increased; in gout, rheumatism, &c., as a substitute for *colchicum;* also, *externally.*

TINCTURE (Virginian Snake-root). See *Tincture of Serpentary.*

TINCTURE (Vittie-vayr). Syn. *Tinctura Vetiveriæ,*—Lat. *Prep.* From *vittie-vayr* (roots of *andropogon muricatum*), 2½ oz.; *proof spirit,* 1 pint; macerate a week. Stimulant, tonic, and sudorific. *Dose.* 15 to 30 drops.

TINCTURE (Warburg's Fever). Syn. *Tinctura Febrifuga Warburgii.* According to M. Fuchs, this tincture may be exactly imitated as follows:—Take of *hepatic aloes* and *zedoary root,* of each, 1 dr.; *saffron,* 3 gr.; *angelica root* and *camphor,* of each, 2 gr.; *spirit* (0·897, or about 18 o. p.), 3 oz.; make a tincture (which should be 25 dr.), and dissolve in it (by the aid of a gentle heat), 30 gr. of *disulphate of quinine.* It is put up in 5-dr. bottles, each of which contains a dose, and is sold at about 5*s.* English. If the spirit be weaker than 18 or 20 o. p., some of the *disulphate* remains undissolved.

TINCTURES (Concentrated). Syn. *Tincturæ Concentratæ Haenli,*—Lat. *Prep.* (Ph. Baden.) Digest 8 parts of the *vegetable powder* in 16 of *spirit* of the sp. gr. 0·857 (45 o. p.) for 4 days at 72° Fahr., with occasional agitation, then press and filter; to the *marc* or *residuum* add as much *spirit* as it has absorbed, and again press, and filter;

the *weight* of the *mixed liquors* should be 16 parts. In this way are prepared *concentrated tinctures* of *aconite leaves; arnica* and *chamomile flowers; belladonna, digitalis, hemlock, henbane, peppermint,* and *savine leaves; ipecacuanha* and *valerian roots, &c.*

TINCTURES (Culinary). See *Essences, Spirits, &c.*

TINCTURES (Ethereal). Syn. *Tincturæ Æthereæ,*—Lat. *Prep.* (P. Cod.) From the *vegetable substance,* 1 oz.; *sulphuric ether,* 4 oz. (or 6 fl. oz.); by maceration, for 4 days, in a well-closed vessel; or, *preferably,* by *percolation* in a cylindrical glass vessel furnished with a stopper, and terminating at the lower end in a funnel, obstructed with a little cotton. The *powder* being introduced over the *cotton,* pour on it enough *ether* to moisten it, put in the stopper, fix the tube into the neck of a bottle, and leave it for 48 hours; then add, gradually, the remaining portion of the *ether,* and lastly, *enough water* to displace the *ether* absorbed. In this manner are prepared the *ethereal tinctures* of *aconite leaves, arnica flowers, belladonna, hemlock, foxglove, tobacco, pellitory, solanum, valerian, stramonium, &c.,* of the Paris Codex.

The *ethereal tinctures* of *amber, ambergris, assafœtida, cantharides* (acetic ether), *castor, musk, tolu, &c.,* are prepared by maceration only.

TINCTURES (Odoriferous). These are prepared from *odoriferous substances* by the usual processes of digestion or percolation. See *Spirits* (*p.* 1179).

TINCTURES (from Recent Vegetables). See *Vegetable Juices.*

TINDER (German). See *Amadou.*

TISANES. Syn. *Ptisans; Ptisanæ,*—Lat. This form of medicine is much used in France. They may be readily prepared by slightly medicating *barley, rice,* or *tamarind water, lemonade, &c.* See *Juleps, Decoctions, Infusions, Ptisans, &c.* (and *below*).

Tisane Antiscorbutique. An infusion of *buckbean* and the fresh *roots* of *horseradish.*

Tisane Antivenerienne, Tisane de Feltz. See *page* 319.

Tisane Commune. A *decoction* of *pearl-barley* and *couch-grass,* flavoured with *liquorice root.*

Tisane Pectorale. An *infusion* of the *roots* of *liquorice* and *marsh-mallow, Canadian maiden-hair,* and the *flowers* of the *red-poppy* and *coltsfoot,* in a *decoction* of rice.

Tisane Royale. From *senna, fresh chervil,* and *sulphate of soda,* of each, 4 dr.; *aniseed* and *cinnamon,* of each, 1 dr.; 1 *lemon,* sliced; *cold water,* 1¾ pint; macerate for 24 hours, stirring occasionally, then press and filter. Aperient. *Dose.* A wine-glassful, or more, repeated every half-hour, until it operates.

Tisane de Vinache, also called *T. Royale.* See *page* 319.

TISSUE (Blistering). See *Vesicants.*

TITANIC ACID. Syn. *Peroxide of Titanium.* This acid is found nearly pure in the minerals *rutile* and *anastase.* It may be obtained from *rutile* by fusing it, in powder, along with 3 times its weight of *carbonate of potash,* powdering and washing the resulting compound, dissolving it in strong *hydrochloric acid,* diluting the solution with *water,* and boiling it; when most of the *titanic acid* falls down, and after being collected on a filter, and well-washed, first with *dilute hydrochloric acid,* and then with *water,* is nearly pure. It *may also* be *prepared* by calcining *titanium* or *titanite* along with *nitre,* and decomposing the resulting *titanate of potassa,* as above.

Prop., &c. The precipitated acid is white, and soluble in acids; heat decomposes the solutions; ignition converts it into *metatitanic acid.*

TITANIUM. A rare metal, discovered by Klaproth, in mechanite, in 1794, and first minutely examined by Wollaston, in 1822. It is occasionally found at the bottom of the smelting furnaces of iron works, under the form of minute crystals, having a coppery lustre.

Prep. Pure *titanium* in a finely divided state may be obtained by heating the *double fluoride of titanium and potassium* with *potassium.*

Prop., &c. Extremely hard; brittle; more infusible than even platinum; insoluble in all acids, except the nitrohydrochloric, and then only when reduced to very fine powder; sp. gr. 5·3. With oxygen it forms an *oxide* or *protoxide,* which is a deep purple powder, obtained by placing a piece of metallic zinc or iron in the hydrochloric solution of titanic acid; and, a *peroxide* or *binoxide,* which is *titanic acid.* With *chlorine* it forms at least two compounds. *Bichloride of titanium,* obtained by passing chlorine over a mixture of titanic acid and charcoal strongly heated, is a colourless, volatile liquid, closely resembling bichloride of tin.

TOAST (Essence of). This is *liquid burnt sugar* or *spirit colouring. Used* to make *extemporaneous toast-and-water* (3 or 4 drops to the glass), and to flavour soups, gravies, &c.

TOBACCO. Syn. *Tabac*,—Fr. *Tabacum*, Ph. L. E. & D. The *prepared leaf* of *nicotiana tabacum* (Linn.) The name was given to this herb by the Spaniards, because it was first seen by them at *Tabasco* or *Tabaco*, a province of Yucatan, in Mexico.

The *tobacco* of *commerce* is chiefly obtained from Virginia, and other parts of the United States, but the finest varieties are imported from Havannah and from the East. The plants are gathered when mature, during hot dry weather, and are hung up in pairs, in sheds, to dry. When sufficiently dry, the leaves are separated from the stems, bound up in bundles, and these are formed into bales, or packed in hogsheads, for exportation.

Prep. To impart to the *dried leaves* the characteristic odour and flavour of tobacco, and to render them agreeable to "smokers" and "snuffers," it is necessary that they should undergo a certain preparation, or kind of fermentation. If a *fresh green leaf* of tobacco be crushed between the fingers, it emits merely the herbaceous smell common to most plants; but if it be triturated in a mortar along with a very small quantity of *quicklime* or *caustic alkali*, it will immediately exhale the peculiar odour of *manufactured tobacco.* This arises from the active and volatile ingredients being liberated from their previous combination, by the ammonia developed by fermentation, or the action of a stronger base. Tobacco contains a considerable quantity of *hydrochlorate of ammonia*, and this substance, as is well known, when placed in contact with *lime* or *potassa*, immediately evolves *free ammonia.* If we reverse the case, and saturate the excess of alkali in prepared tobacco by the addition of any mild acid, its characteristic odour entirely disappears. In the *preparation* of *tobacco* previously to its manufacture for *sale*, these changes are effected by a species of fermentation. The *tobacco*, either *unprepared* or cut into *pieces*, is placed in layers or heaps, and sprinkled with a weak solution of *common salt* and *water* (about the sp. gr. 1·107), or "*sauce*," as it is called; the salt being added to prevent the tobacco becoming mouldy, and to keep it moist, as well as to moderate the fermentation. *Molasses* is also frequently added to the sauce when a *violet* or *dark coloured product* is desired; and some persons, with a like intention, add a *decoction* or *solution of extract of liquorice. Pure water*, without any addition, is, however, quite sufficient to promote and maintain the perfect fermentation of tobacco, and, of late years, the larger and more respectable houses assert that they have employed *nothing* else. The *leaves* soon become *hot* and evolve ammonia; during this time the *heaps* require to be occasionally opened up and turned over, lest they become too hot, take fire, or run into the putrefactive fermentation. The extent to which the process is allowed to proceed, varies for different kinds of snuff or tobacco from *one* to *three* months.

Pur. The cheap tobacco vended in the shops is largely adulterated. Tobacco is now offered for sale at 3*d.* per ounce, *i. e*, 4*s.* per pound, while the duty alone amounts to about 3*s.* 3*d.*, thus leaving only 9*d.* to be divided among the grower, the importer, the manufacturer, and the retailer; besides which there is a loss by weighing it out in small quantities, and by evaporation. Is it possible for this tobacco to be genuine? It cannot be. It is a well-known fact that this tobacco is largely adulterated with foreign matter. It is a general practice to moisten it with *treacle water*, in which a little *saltpetre* has been dissolved, for the purpose of making it sufficiently adhesive to retain the *fine sand* which is afterwards added, and to make it burn well. All this is done to increase the weight. When *foreign vegetable matter* is mixed with tobacco, *Bengal safflower* (at the price of 28*s.* per cwt.) is preferred. It is infused in a very weak *solution* of *potassa* or *ammonia;* the former giving a dark brown colour resembling "*Shag*," and the latter a light brown, approaching in appearance to "*Returns*." Considerable loss, however, having occurred from some of the vegetable matter being dissolved out, an *improvement* has been *lately* introduced; the *safflower*, having been moistened, is placed in trays in an empty *sugar hogshead* or other suitable cask, into which the *ammoniacal gas* is allowed to pass. By this process the weight is *increased;* whereas, by the earlier methods of preparing it, a *loss* of *one half* was sustained. (Chem., iii, 304.) *Another means* of *profit* is the use of extremely heavy paper (rich in plaster) for wrappers. In a recent trial, a London tobacconist admitted clearing £2 per week, by thus selling paper at 4*s.* per *lb.* that cost him only 3½*d.*

Qual., *&c.* Tobacco is a powerful narcotic, sedative, and emetic; and is also cathartic and diuretic; but the last in a weaker degree than either squills or foxglove. Its action is violently depressing and relaxing, producing fainting, and even death, in comparatively small quantities. Toxicologists rank it among the more active narcotico-acrid poisons; and physicians, when they wish to produce sudden physical prostration, in accidents or spasmodic diseases, order an enema of the infusion or smoke of tobacco. (See *p.* 375.) Its deleterious properties depend on the presence of *nicotine*, one of the most frightful vegetable poisons known (see *p.* 819), of which ordinary tobacco contains from 6 to 11%. Yet of such a vegetable substance, so rich in such a deadly poison, nearly 40,000,000*lb.* are annually consumed in these countries. And "with what results?" probably inquires the reader. We dread to tell. Let those interested,—let the multitudes of smokers suffering from countless nervous ailments, irremediable dyspepsia, imperfect vision, and mental confusion or derangement imperceptibly leading to insanity,—let the debased sot who intoxicates himself with tobacco because he is too poor, too mean, or too despicable to do so on wine, or beer, or spirit,—let the myriads it has led to drunkenness, answer the question. An eminent physician tells us, that many cases of insanity may be fairly ascribed to the excessive use of tobacco. In the American statistical tables of lunacy this fact has been long acknowledged. Indeed, it would be monstrous to suppose that so powerful an agent as tobacco could be daily "*smoked*," or "*snuffed*," or "*chewed*," without being productive of the most serious consequences. *Opium eating* is incompatible with the enjoyment of health,—the excessive use of *alcoholic liquors* is still more so, besides being more morally degrading; but the *constant use of tobacco* is more pernicious than both of them, besides which, it is the common incentive to habitual drunkenness, and thus indirectly fills our workhouses and gaols. The *temperance* and *teetotal advocates* have begun at the wrong end of their mission. They should have made their first onslaught on the use of tobacco. Unfortunately, the tight-laced gentleman whose feelings of propriety would be outraged by swallowing a glass of wine before dinner, if at all, considers it a harmless proceeding to throw himself into a state of pleasing narcotism — nay, to speak truthfully—of moody intoxication or quiet drunkenness, by inhaling the fumes of his favorite "weed," even before breakfast. But what avails the words of truth and philanthropy, the teachings of science, or the records of dear-bought experience, against the self-indulgence and the prevailing habits of a people; more especially when that habit or, rather say, *vice*, is upheld by law, is a rich source of revenue to a government, and is practised, and even defended, by the dignitaries of our holy religion. "Truth,' says Milton, "comes into the world like a bastard, to the injury or ruin of its parent;" and we think we may add, that in no earthly mission is the apostle of truth so much neglected and contemned, as when his efforts are directed against the luxuries and degrading habits of his race. Were the use of tobacco as infrequent, as it is now general, it would be held in abhorrence, and its devotees placed beyond the pale of sanity and civilisation. The regal author of a "*Counterblast to Tobacco*" was a true philanthropist and philosopher in his way.

"He who devoteth himself to the weed begetteth sickly offspring, who are frequently short-lived, and are weaker minded than those of other men." Youth should, especially, eschew the use of tobacco, as their physical growth is commonly, nay nearly always, arrested on their initiation therein. *Smoking* is, however, undoubtedly the least pernicious method of employing tobacco, although it is, perhaps, the most filthy, and the most annoying to those who do not use it.

The injurious effects of *smoking* have been greatly increased, of late years, by the substitution of ridiculously short pipes for the long ones previously in use.

(For the effects of tobacco on both mind and body, *see* an excellent little pamphlet by Mr. Lizars, which will prove invaluable to those who choose to attend to its monitions.)

TOBACCO (British). Syn. *Herb Tobacco; Tabacum Anglicum, Species Sternutoriæ,*—Lat. *Prep.* Take of *thyme*, *marjoram*, and *hyssop*, of each, 2 *oz.; betony* and *eyebright*, of each, 3 *oz.; rosemary* and *lavender*, of each, 4 *oz.; coltsfoot*, 1 *lb.;* mix, press them together, and cut the mass in imitation of manufactured foreign tobacco. Some asthmatic subjects add 5 or 6 *oz.* of *stramonium* or *thorn-apple leaves;* others add ½ *lb.* of *genuine tobacco.*

TOBACCO (Indian). See *Lobelia.*

TODDY. Obtained from various species of *palms*, by cutting off the end of the flowering bud, and collecting the sap. *Used*, fresh, as a cooling beverage; and, after fermentation, as an intoxicating one. *Sweetened grog* is so called in Cornwall, and in some other parts of England.

TOFFY. Syn. *Everton Toffy.* A sweetmeat *prepared* by heating *brown sugar*, in a saucepan or skillet, with about one half its weight of *fresh butter*, for 15 to 20 minutes, or until a "little of it dropped into *cold water* forms a lump that breaks crisply;" it is then poured into a *buttered tin mould.*

TOILET REQUISITES. See *Essences, Oils, Pommades, Perfumes, Soaps, &c.*

TOKAY. A luscious, yet agreeable wine, made at Tokay, in Hungary. It is preferred in the *turbid* state, and, hence, it is agitated before pouring it into the glass.

TOLENE. A volatile, colourless liquid, obtained, along with *benzoic acid* and *cinnameine*, when *balsam of tolu* is distilled along with *water*. It boils at 338° Fahr.

TOLU (Balsam of). Syn. *Balsamum Tolutanum*,—Ph. L. E. & D. "Balsam flowing from the incised trunk" of "*myrospermum toluiferum*, hardened." (Ph. L.) It is a stimulating expectorant, and has long been a popular pectoral. *Dose.* 5 to 20 gr., dissolved in spirit, or made into an emulsion. See *Tinctures.*

Pure balsam of tolu is *perfectly* soluble in alcohol, forming a *transparent* solution. It is frequently adulterated, in which case it has a *weaker smell*, is *less soluble in alcohol*, and the *tincture formed with that fluid is opaque.*

A *factitious balsam of tolu* is occasionally met with in trade, formed of equal parts of *orange lac* reduced to a proper consistence with *rectified spirit*, and "brought up" with a few drops of the *oils of cassia* and *nutmeg*, dissolved in a little *essence of vanilla.*

TOLUIDINE. An organic base obtained by the action of *sulphuret of ammonium* on *nitro-toluide*, in the manner adopted for *aniline*. It forms colourless crystals, sparingly soluble in water, freely soluble in alcohol and ether, is basic, and possesses an aromatic odour and flavour.

TOLUOLE. Syn. *Benzoene.* A peculiar liquid hydrocarbon, found among the products of the destructive distillation of *balsam of tolu* which has been previously freed from essential oil by distillation along with *water*. From these it is obtained pure by a second distillation. It may *also* be *prepared* by distilling *toluylic acid* with *lime* or *baryta*. It is an ethereal liquid, which is sparingly soluble in alcohol, freely so in ether, and boils at 226° Fahr. Sp. gr. 0·870.

TOLUYLIC ACID. A new organic acid, obtained by Mr. Noad, by the action of *dilute nitric acid* on *cymol*. It closely resembles benzoic acid.

TOMBAC. A species of brass with excess of zinc. *Red tombac* is red brass or Dutch gold; *white tombac*, an alloy of copper with arsenic.

TONICS. Medicines that increase the tone of the muscular fibre, and impart vigour to the system. The principal *mineral tonics* are,—*iron, zinc, copper, silver, arsenic, bismuth, mercury*, and the *mineral acids.* The principal *vegetable tonics* are—*cinchona, cinchonine, quinine*, the *vegetable bitters*, and some of the *aromatics.* Of the above, *iron, bark*, and its preparations, and the *aromatic bitters*, are those generally employed, and which prove most genial to the constitution. Many tonics, as *cinchona*, and *quinine*, are remarkable for curing diseases of a periodic character. *Iron* appears to act by altering or improving the condition of the blood; whilst the *vegetable bitters* probably act indirectly by giving tone to the stomach.

TONQUIN REMEDY. Syn. *Pulvis Trunchinensis, P. Alexipharmicus Sinensis*, —Lat. *Prep.* From *valerian*, 20 gr.; *musk*, 16 gr.; *camphor*, 6 gr.; mix. Antispasmodic and alexiterial, in doses of 6 to 12 gr., in hooping-cough, &c.; 1 dr., in hydrophobia, exanthemata, and mania. (See *page* 1060.)

TOOTHACHE. Syn. *Odontalgia*,—Lat. This annoying affection frequently arises from sympathy with a *disordered stomach.* In such cases a *saline purgative* should be administered, and an *emetic*, if required, When *cold* is the cause, an excellent remedy is a hot *embrocation of poppy-heads*, followed by the *use of flannel* and *diaphoretics.* When it arises from a *hollow* or *decayed tooth*, the best application is a *piece of lint* moistened with *creasote* or a *strong spirituous solution of creasote*, and closely rammed into the cavity of the tooth. *Laudanum*, the *essential oils* of *cloves, caraway*, and *cajeput*, and *essence* or *tincture of pellitory of Spain*, are also used in the same way. To *prevent* the *recurrence* of the latter kind of toothache, the cavity should be filled with an *amalgam of gold*, or with *mineral marmoratum* or some other good cement. In many cases, *chewing* a piece of *good ginger*, or, still better, a small piece of *pellitory*, will afford relief in a few minutes. The celebrated John Wesley recommended a "few whiffs" at a pipe containing a little *caraway seed* mixed with the *tobacco.* A "touch" of one of Pulvermacher's or Meinig's *electric chain-batteries*, will often instantly remove the toothache after all other means have failed. See *Drops, Essences, Tinctures, &c.*

TOOTH CEMENTS. *Prep.* 1. *Amalgam of gold*, applied warm. *Silver*, and, even *tin*, are also used in the same way.

2. A piece of *native uncoloured gutta percha*, softened in *hot water*, and applied at once. Efficient and durable.

3. *Zinc filings*, 1 part; *quicksilver*, 2

parts; mixed and applied at once. Not very durable.

4. (*Bernotte's.*) From *powdered mastic* mixed with about half its weight of *ether*, and, afterwards, with enough *finely powdered burnt alum* to form a stiff paste. *Taveare's Cement* is similar.

5. (Mr. Evans.) *Pure tin*, 2 parts; *cadmium* and *bees' wax*, of each, 1 part; melt them together, cast the compound metal into a small ingot, and reduce it to filings. For *use*, form these into a *liquid amalgam* with *quicksilver*, q. s.; squeeze out the *excess of quicksilver* through a piece of *chamois leather*, and at once apply it to the tooth. (See No. 9.) Recommended as very durable and unobjectionable.

6. (*Marmoratum.*) From *anhydrous phosphoric acid*, 12 gr.; *pure caustic lime*, 13 gr.; both finely pulverized, mixed rapidly in a mortar, and applied, in the *dry state*, as rapidly as possible, as it soon becomes moist; the mixed powder, after being well-pressed in, is smoothed off with the finger moistened with a *drop* of *water*. This is white and durable, and soon acquires great hardness. In its composition it resembles the natural earthy matter of the teeth.

7. (*Mineral Marmoratum.*) The same as *mineral succedaneum*, with the addition of a little *powdered glass* or *quartz*. A common sort is made of *levigated glass* mixed with *amalgam of tin*.

8. (*Mineral Metallic Cement.*) Add finely levigated *steel filings* to some *mineral succedaneum*. Dark coloured; inferior to *mineral marmoratum*.

9. (*Mineral Succedaneum.*) This is merely amalgam of gold first above noticed. The common method of proceeding is to heat *pure gold* in a *bright iron ladle*, and to add enough *pure mercury* to render it of a doughy consistence at the heat of hot water; when cold, the excess of mercury, if any, must be removed by pressure in a piece of *chamois leather*. For *use*, a little must be kneaded, as hot as possible, in the hand, and at once wedged into the cavity of the tooth.

10. (*Ostermaier's.*) Same as No. 6.

11. (*Poudre Metallique.*) The article sold in Paris under this name, is said to be a triple *amalgam* of *mercury*, *silver*, and *ammonium*, with the latter in excess; part of the ammonium escapes as ammoniacal gas, whilst the remainder of the ammonium, silver, and mercury, remains as a firm alloy in the cavity of the tooth. (Redwood.)

12. (*Silica.*) From *levigated porcelain*, *plaster of Paris*, and *iron filings*, equal parts; made into a paste with the thickest *quick-drying copal varnish.*

13. (*Vienna Cement,*) From *powdered asbestos* made into a paste with *mastic varnish.*

14. (*Wirth's.*) From *levigated quartz*, made into a paste with very thick *mastic varnish.*

Obs. It is absolutely necessary for success that the teeth be well cleaned out, and wiped dry, before applying any of the above *stoppings* or *cements.*

TOOTH COSMETICS. See *Dentifrices*, *Pastes*, *Powders*, *Tinctures*, *&c.*

TOOTH-RASH. See *Strophulus.*

TOPAZ. See *Gems.*

TORMENTIL. Syn. *Tormentillæ Radix; Tormentilla,*—Ph. L. & E. The *root* or *rhizome* of *potentilla tormentilla* (tormentilla erecta,—Linn.) It is astringent and febrifuge, without being stimulant. *Dose.* 20 to 60 gr.; in agues, diarrhœa, &c.; also, formerly, in syphilis.

TOUCH-NEEDLES. See *Assaying.*

TOUCH-WOOD. See *Amadou.*

TOUS-LES-MOIS. The *fecula* of the *roots* of *canna edulis.* (Ph. D.); intended as a substitute for arrow-root. To the naked eye, it closely resembles the finest quality of potato starch; but under the microscope, its granules are found to be oblong, oval, with a concentric structure, and larger than those of the potato tuber.

TOXICOLOGY. See *Poison.*

TRACING PAPER. It has been recently stated that a very excellent *tracing paper*, that will bear writing on with chalk, pencils, or even steel pens, may be *prepared* from *Damara resin*, formed into a varnish, and applied as described at *page* 933. An *extemporaneous tracing paper* may be made by moistening the *paper* with *spirit of wine* or with *rectified oil of turpentine.*

TRAGACANTH. Syn. *Gum Dragon*, *Gum Tragacanth; Tragacantha,*—Ph. L. E. & D. "The *juice* exuded from the *bark* of *astragalus verus* hardened by the air." (Ph. L.) It differs from gum arabic in being only semi-transparent, and in swelling up, forming a kind of jelly, but not dissolving in cold water; with which, however, when pure, it forms as thick a mucilage as 24 parts of gum arabic. It is *entirely* soluble in boiling water.

TRAGACANTHINE. Syn. *Adragantine.* The portion of *gum tragacanth* which is insoluble in cold water.

TRANSPARENCIES. Water-colour pictures on paper, linen, or calico, if executed in non-opaque or glazing colours, may be converted into transparencies by simply brushing over their backs with *Canada balsam* thinned down, when necessary, with a little *oil of turpentine.* For coarse work, *boiled oil* may be employed.

TRAUMATIC BALSAM. See *p* 1230.

TRAUMATICINE. This article, as manufactured by the Gutta Percha Company, is simply a *solution* of *white* and *dry unmanufactured gutta percha* in *bisulphuret of carbon.* A small portion dropped on a wound, or raw surface, almost instantly forms a pliable, waterproof, and airtight defensive covering to the part. The only objection to the preparation is the fœtid odour of the menstruum, which, however, is lost in a few seconds; or may be obviated by employing *chloroform* as the solvent.

TREACLE. Syn. *Molasses; Theriaca; Sacchari Fæx,*—Ph. L. & E. The viscid, brown, uncrystallizable syrup which drains from moist sugar during its formation (*common treacle* or *molasses*), and from the sugar-refining moulds (*treacle, sugar-house molasses*). The last, according to Dr. Ure, has generally the sp. gr. 1·4, and contains about 75% of solid matter.

Treacle is more laxative than sugar, and always contains more or less free acid. It is used as the *vehiculum* in some of the pill-masses of the Ph. L. See *Sugar &c.*

TREACLE (German). Syn. *Theriaca Germanicæ.* An evaporated *infusion* or *decoction* of *juniper berries.* It is sweet-tasted, aromatic, and diuretic.

TREACLE (Venice). Syn. *London Treacle; Theriaca; Theriaca Andromachi.* The *theriaca* of the Ph. L. 1746 consists of 61 ingredients, and contains 1 gr. of *opium* in 75 gr.; that of the *Paris Codex* consists of 72 ingredients, and contains 1 gr. of *opium* in 72 gr.; that of the Ph. E. 1744, consists of 10 ingredients, and contains 1 gr. of *opium* in every 100 gr. It is *prepared* as follows:—Take of *serpentary root,* 6 oz.; *valerian* and *contrayerva roots,* of each, 4 oz.; *aromatic powder,* 3 oz.; *guaiacum resin, castor,* and *nutmeg,* of each, 2 oz.; *saffron* and *opium* (dissolved in a little wine), of each, 1 oz.; *clarified honey,* 75 oz.; reduce all the dry ingredients to fine powder, then mix them. The *confection* or *electuaries* of *catechu* and *opium* are the representatives of the above polypharmic compounds in the modern British pharmacopœias. The same efficacy was ascribed to the "*theriaca*" as to the *mithridate* noticed at *page* 791.

TRI-, *tris-*. See *Nomenclature.*

TRIP. See *Sesquioxide of Iron.*

TRIPOLI. Syn. *Rotten Stone; Alana; Terra Cariosa.* A mineral employed as a *polishing powder,* originally imported from *Tripoli,* in Barbary. It consists almost entirely of silica, and is composed of the skeletons of minute infusoria, the precise character of which is readily distinguishable under the microscope.

TRISMUS. See *Tetanus.*

TRITHIONIC ACID. Syn. *Sulphuretted Hyposulphuric Acid.* A compound discovered by M. Langlois, and obtained by gently heating *sulphur* in a *solution of carbonate of potassa* previously saturated with *sulphurous acid;* the resulting *trithionate of potassa* is next decomposed by *hydrofluosilicic acid,* and the liquid acid concentrated in vacuo. *Tetrathionic acid* has been formed by MM. Fordos and Gélis; and *pentathionic acid,* by M. Wackenroder.

TRITOXIDE. See *Nomenclature.*

TRITURATION. Syn. *Tritura, Trituratio,*—Lat. The act of rubbing a solid body to powder. See *Pulverization.*

TROCHES. See *Lozenges.*

TRONA. A native true *sesquicarbonate of soda,* found on the banks of the soda-lakes of Sokena, in Africa.

TROPHAZOME. A concentrated *infusion of minced lean meat* mixed with the fluid obtained from the *residuum* after being heated for 20 minutes in a water bath, and flavoured with *salt* and *spices,* the whole being, lastly, simmered for a few minutes. Excellent for convalescents.

TROUT. The *salmo fario* of Linnæus, a highly esteemed fish, found in most of the rivers and lakes of this country. Other members of the genus *salmo* are also so called; as, *salmo eriox,* the bull or grey trout; *salmo ferox,* the great grey or lake trout; *salmo trutta,* the salmon trout, &c. All of these varieties are in the finest condition from the end of May to late in September.

TRUSS. See *Surgery* (Popular).

TSCHILLIES. See *Pepper* (Cayenne).

TUMOUR. A permanent swelling, enlargement, or induration, possessing a distinct locality and more or less restricted in extent. There are two principal classes, —*sarcomatous tumours,* or those which are firm and of a fleshy consistence; and *encysted tumours,* or those consisting of a sac containing matter more or less pulpy or fluid. Of each of these classes there are numerous varieties. The *treatment of ordinary tumours* is either by resolution or dispersion, by the application of repellants or resolvents, or even pressure, supported by a low diet; or, their suppuration or ripening, is promoted by warmth, stimulating applications, and a liberal diet. The former, applies to both varieties; the latter chiefly to those that suppurate readily and afterwards heal kindly. The choice must, however, depend almost entirely on the precise character of the tumour, and existing circumstances, as the locality, habit of body, &c. See *Abscess*, *Boils*, *&c.*

TUNGSTEN. Syn. *Tungstenum*, *Wolframium; Scheelium* (?). A heavy, gray, brittle metal, discovered by Messrs. Delhuyart. It occurs in *wolfram*, a mineral tolerably abundant in Cornwall, united with oxygen (*tungstic acid*), manganese, and iron, from which it may be obtained by the action of *charcoal*, at a high temperature. It is, however, more conveniently obtained by strongly heating *tungstic acid* in a stream of *hydrogen gas.*

Prop., *&c.* Sp. gr. 17·35; heated in the air it takes fire, producing tungstic acid. *Sesquioxide* or *blue oxide of tungsten* is prepared by heating tungstate of ammonia; and the (*binoxide*, *peroxide*, *brown oxide*, *tungstous acid*), by exposing tungstic acid to a stream of hydrogen at the temperature of *dull* redness. Two *chlorides* and two *sulphurets* have also been formed.

TUNGSTIC ACID. A yellow powder, obtained by digesting native *tungstate of lime*, finely powdered, in *nitric acid.* It is insoluble in water, but dissolves freely in a concentrated solution of pure potassa, forming *tungstate of potassa.*

TURBOT. The *rhombus maximus* (Cuvier), said to be the best, and, excepting the halibut, the largest of our flat fishes. Dutch turbots are the most esteemed.

TURKEY. See *Poultry.*

TURMERIC. Syn. *Curcuma*,—Ph. L. & D. The *rhizome* of *curcuma longa* (Linn.) The best is imported from Ceylon. It is stimulant and carminative, but is chiefly used in dyeing yellow, and as an ingredient in *curry-powder;* also as a test for alkalies. It gives a fugitive *golden yellow* with weld, and an *orange tinge* to scarlet. It dyes *wool* and *silk*, mordanted with common salt, or sal ammoniac, a *fugitive yellow.* *Dose.* 10 to 30 gr. See *Curcumine.*

TURNBULL'S BLUE. Syn. *Ferricyanide of Iron*, *Hydroferridcyanate of do.; Ferri Ferridcyanidum*,—Lat. *Prep.* Precipitate a solution of *protosulphate of iron* with another of *red prussiate of potash* (ferridcyanide of potassium).

Obs. This is a variety of Prussian blue, remarkable for its beautiful colour, and may be distinguished from the ordinary Prussian blue of commerce by its action on the yellow prussiate of potash. When boiled in a solution of the latter it is decomposed, a portion is dissolved, and a gray residue remains. Liebig, however, says that it has the same constitution as ordinary Prussian blue.

TURNER'S YELLOW. See *Yellow Pigments.*

TURNSOLE. See *Litmus.*

TURPENTINE. Syn. *Terebinthina* (Americana), — Ph. L. *Terebinthina Vulgaris*,—Ph. L. 1836. "An oleo-resin flowing from the trunk, the bark being removed, of *pinus palustris* (pitch *or* swamp pine) and *pinus tæda* (loblolly *or* old field pine)." —Ph. L. It is viscid, of the consistence of honey, and transparent; by distillation it is resolved into *oil of turpentine*, which passes over into the receiver; and into *rosin*, which remains in the still.

TURPENTINE (Bordeaux). Syn. *French Turpentine.* From the *pinus maritima* or *cluster pine.* Solidifies with magnesia. (Lindley.) *Briançon turpentine*, a nearly similar variety, is from the *pinus cembra* (Linn.) or *Siberian stone pine.*

TURPENTINE (Chian). Syn. *Chio Turpentine*, *Cyprus do.*, *Scio do.; Terebinthina Chia*,—Ph. L. & E. "An oleo-resin flowing from the *incised trunk* of *pistachia terebinthus*" (Linn.)—Ph.L. It is pale, aromatic, fragrant, and has a warm taste devoid of acrimony or bitterness. It is much adulterated. A factitious article (*terebinthina Chia factitia*), made as follows, is also very generally sold for it:—*Black rosin*, 7 *lb.;* melt, remove the heat, and stir in of *balsam of Canada*, 7 *lb.; oils of fennel* and *juniper*, of each, 1 fl. dr.

TURPENTINE (Venice). Syn. *Terebinthina Veneta*,— Ph. E. Liquid resinous exudation from the *abies larix* (pinus larix,—Linn.) or *larch tree.* It is sweeter and less resinous-tasted than common turpentine, but is now scarcely ever met with in trade. *That* of *the shops* is wholly a *factitious article*, made as follows:—*Black rosin*, 48 *lb.;* melt, remove the heat, and add of *oil of turpentine*, 2 gall.

TURPETH MINERAL. Subsulphate of mercury.

TURQUOISE (Factitious). See *Pastes.*

TURTLE. Syn. *Green Turtle.* The *testuda mydas* (Linn.), a *chelonian reptile*, highly esteemed for its *flesh*, *eggs*, and *fat.*

TUSSILAGO. See *Coltsfoot.*

TUTENAG. A name sometimes applied to *German silver;* at others, to *pale brass* and *bell metal.* "In India *zinc* sometimes goes under this name." (Brande.)

TUTTY. Syn. *Tutia, Tuthia, Impure Oxide of Zinc.* The *sublimate* that collects in the chimneys of the furnaces in which the *ores of zinc* are smelted. Drying; astringent. *Used* in eye-waters and ointments.

TYPE METAL. An alloy formed of *antimony*, 1 part; *lead*, 3 parts; melted together. *Small types* are usually made of a harder composition than large ones. A good *stereotype metal* is said to be made of *lead*, 9 parts; *antimony*, 2 parts; *bismuth*, 1 part. This alloy expands as it cools, and consequently brings out a fine impression.

TYPHUS. Syn. *Typhus Fever.* A form of continued fever, marked by extreme debility and depression of the nervous powers, an imperfect reaction of the vascular system, and a tendency to putrefaction. It is generally regarded as contagious or infectious, and is often epidemic. The debilitated and uncleanly are those *most liable* to its *attacks;* and crowded, damp, ill-ventilated, and badly drained buildings and localities, more especially those in which the effluvia from decaying animal or vegetable matter abound, are those in which it is *most prevalent* and *fatal.*

Typhus fever has been divided into two great varieties,—MILD TYPHUS (*nervous fever, slow fever; typhus mitior*), and MALIGNANT TYPHUS (*putrid fever, pestilential do., petechial do.; typhus gravior, typhus malignus*). The last has also received various names, derived from the places where it most prevails; as, *camp fever, hospital do., gaol do.*, and, in cases in which there is much bilious vomiting, *bilious fever.*

The *general symptoms* of *typhus* are "inordinate muscular, nervous, and mental depression; weariness; flying pains; a frequent, small, and fluttering pulse; a foul and brown tongue; impaired taste; and, frequently, nausea and bilious vomiting. As the disease advances the debility increases; the mouth becomes foul, and the breath fœtid; the urine deposits a brown sediment, and, together with the motions, is fœtid, and rapidly putrefies; all these symptoms increase in intensity; the speech becomes inarticulate, muttering, and delirious; there is a tendency to bleeding from the nose, mouth, and bowels; petechiæ, or livid spots, appear upon the surface; the pulse sinks and intermits; the mind wanders; hiccup comes on; the hands and feet become cold; and, under these horrible symptoms, the patient dies. Such is an outline of the ordinary progress of a typhus fever to a fatal termination. In this climate it may endure for three weeks or a month; but in hot countries the symptoms follow each other more rapidly and violently, and it is then not of more than eight or ten days' duration. When it does not terminate fatally, the symptoms begin to assume a more favorable aspect about the twelfth or fourteenth day; the pulse improves, the patient gets some tranquil sleep, perhaps perspires; the urine deposits a red sediment; bilious stools are passed; he becomes more tranquil in mind and body, and his symptoms gradually disappear until health is restored; but it is a disease, the event of which must be anticipated with the utmost caution, for attacks apparently mild sometimes terminate fatally, whilst, in other cases, the constitution has rallied under the most alarming and malignant features."

The *milder form of typhus* generally *commences* with slight shiverings; heavy or vertiginous headache; the tongue exhibits little change; the pulse is only slightly, but somewhat smaller than usual; and the other early symptoms are less marked and severe than in the malignant variety, and are often, otherwise considerably modified. When the patient is of a sound constitution, and not debilitated by age, or bad habits, it is seldom fatal; otherwise it is frequently so. Scarlet fever and other varieties, often assume a typhoid character.

The *treatment* of *typhus* must be greatly regulated by the peculiarities of the case. In the *very commencement* an *antimonial emetic* and a *mild aperient* are proper, followed by aromatic opiates, with camphor and ether. "It is possible that some particular symptom, indicative of local congestion, may call for *bleeding* or *blistering:* the former, except in some very rare cases, should be *local only*, and *very limited* as to quantity." *Serpentaria, Peruvian bark, cascarilla*, and *calumba*, more particularly the first two, are the *tonics* most relied on; and with these should be combined *camphor, aromatic confection, confection of opium*, and *ether;* or, if agreeable to the stomach and bowels, *water* slightly acidulated with the *mineral acids*, or *lemon juice*, on account of their tonic and antiseptic action. As *stimulants*, to keep up the general powers of the system, *wine*, and *brandy*, or even good *ale* or *porter*, may often be *cautiously* had recourse to with advantage. A *supporting spoon diet*, with extreme attention to cleanliness and ventilation, will complete the treatment. A *cold shower-bath* twice or thrice daily on the first attack, and afterwards, sponging with *cold* or *tepid water*, or with *vinegar-and-water*, have also been highly recommended.

The *principal objects* to be kept in view during the above treatment are—"to *assist arterial action*, when deficient;—to *subdue local inflammation*, or at least, to keep it below the point of disorganization; and—to *sustain* the *vital powers* by a proper regulation of the diet, and the judicious use of *stimulants*, when required." (*Med. Lex.*)

TYROSINE. A peculiar crystallizable substance, obtained by Mr. Warren de la Rue, from the *mother-liquor* of *carminic acid.*

ULCER. Syn. *Ulcus*,—Lat. A sore arising from a solution of continuity in any of the soft parts of the body, either open to the surface or to some natural cavity, and attended by a secretion of matter or pus, or by some other kind of discharge.

"*Ulcers* may *arise* from a *variety* of *causes*, as all those which produce inflammation, from wounds, specific irritations of the absorbents, from scurvy, cancer, the venereal or scrofulous virus, &c. The *proximate* or *immediate cause* is, however, an increased action of the absorbents, and a specific action of the arteries, by which a fluid is separated from the blood upon the ulcerated surface." *Cancerous, fistulous, fungous, gangrenous, inveterate, scorbutic, scrofulous, sinuous, syphilitic, &c.*, are terms which will explain themselves. Those resulting from accidental injuries are termed *local* or *simple ulcers;* and those from specific poisons or particular habits of body, *constitutional* or *specific sores* or *ulcers.*

The *treatment* of *ulcers* varies with their character. *Simple* or *local ones*, unless the habit of body be bad, generally give way before extreme cleanliness, and some simple dressing, as noticed under abscess and boils. *Constitutional* or *specific ones* usually require the use of some particular dressing, which varies with the exciting cause. Thus, *ointments containing mercury* are generally regarded as appropriate to those of a SYPHILITIC character; and *ointments* containing *iodine* or the *iodides*, to those of a SCROFULOUS character. INDOLENT ULCERS are commonly dressed with *digestive* or *stimulating ointments*, as those of *resin* and *elemi;* and FOUL ULCERS, with *astringent* or *detergent ointments.* PAINFUL and IRRITABLE SORES are often treated with the *ointment of hemlock* or *henbane*, or some other *anodyne;* whilst to those with a PUTRID TENDENCY, *antiseptic ointments* and *charcoal poultices* are applied. OPEN CANCERS are often dressed with *unguents* containing *arsenic* or *arsenious acid*, due caution being observed. FUNGOUS GROWTHS are suppressed by *escharotics.* In *all cases*, a rigid attention to the general health must be enforced, the *diet* must be carefully regulated, and *fresh air* at home, and *gentle out-door exercise* secured as much as possible. In cases of a CONSTITUTIONAL or SPECIFIC CHARACTER, the *primary disease* must also receive the usual treatment.

According to Mr. Skey, the eminent surgeon of St. Bartholomew's hospital, the administration of a *pill of soap and opium* (pilula saponis cum opio,—*Ph. L.*) exerts a very marked action in promoting the healing of OBSTINATE SORES, more especially those of the legs. See *Cerates, Lotions, Ointments, Poultices, &c.*

ULMINE. Syn. *Ulmic Acid.* A peculiar substance which exudes from the bark of the elm (*ulmus nigra*) and some other trees, and first examined by Klaproth, in 1802. When dry, it is hard, blackish, resinous, readily soluble in the mouth, but insoluble in alcohol and ether. It may always be obtained from *elm-bark*, previously exhausted with *hot alcohol*, and afterward with *cold water*, by digesting it in a *solution of carbonate of potash*, and precipitating the resulting liquid with *dilute hydrochloric acid.* A closely allied substance may be formed artificially by heating *caustic potassa* with *sawdust*, by the action of *sulphuric acid* on *vegetable matter*, and by combining *gallic acid* with *ammonia* and exposing the compound to *oxygen.* (See *page* 1114.)

ULTRAMARINE. Syn. *Lapis-lazuli Blue, Ultramarine do.; Cæruleum Ultramontanum*,—Lat. This beautiful pigment is obtained from the blue mineral *azure stone, lazulite* or *lapis lazuli;* the finest specimens of which are brought from China, Persia, and Great Bucharia.

Prep. Pure *lapis lazuli* (reduced to fragments about the size of a pea, and the colourless pieces rejected), 1 *lb.*, is heated to redness, quenched in *water*, and ground to an impalpable powder; to this is added, of *yellow rosin*, 6 *oz.; turpentine, bees' wax*, and *linseed oil*, of each, 2 *oz.;* previously melted together; the whole is next made into a mass, which is kneaded in successive portions of *warm water*, as long as it colours it blue; from these it is deposited on repose, and is then collected, well washed with clean water, dried, and sorted according to its qualities. The *first water*, which is usually dirty, is thrown away; the *second* gives a blue of the first quality; and the *third,* and following ones, yield samples of less value. The process is founded on the property which the colouring matter of azure-stone has of adhering less firmly to the resinous cement than the foreign matter with which it is associated. When azure-stone has its colour altered by a moderate heat, it is reckoned bad or factitious.

Obs. Ultramarine is the most costly, but at the same time the most splendid and permanent of our blue pigments, and works well in oil.

ULTRAMARINE (Artificial). Syn. *Azure Blue, Meissner Ultramarine, Paris do., Vienna do.; Cæruleum Ultramontanum Factitium,*—Lat. From the researches of MM. Clement & Desormes, & M. Robiquet, it has been inferred that the colour of ultramarine depends on the presence of sulphuret of sodium in a peculiar state of combination with the silicates of soda and alumina; but, according to Elsner & Tirnmon, a minute quantity of sulphuret of iron is also an essential ingredient. It is by heating mixtures of this kind, that the *artificial ultramarine* of commerce is prepared. The finer specimens, thus obtained, are quite equal in durability and beauty of colour to those prepared from lazulite, while they are very much less expensive.

Prep. 1. (Gmelin.) *Sulphur,* 2 parts; *dry carbonate of soda,* 1 part; mix well, gradually heat them in a covered crucible to redness, or till the mixture fuses, then sprinkle in, by degrees, *another mixture* of *silicate of soda* and *aluminate of soda* (containing 72 parts of *silica,* and 70 parts of *alumina*), and continue the heat for an hour. The product contains a little free sulphur, which may be separated by water.

2. (M. Robiquet.) By exposing to a low red heat, in a covered crucible, as long as fumes are given off, a *mixture* of *pure kaolin,* 2 parts; *anhydrous carbonate of soda* and *sulphur,* of each, 3 parts. Some manufacturers who adopt this process use 1-3rd less carbonate of soda.

3. (Tirnmon.) Take of *crystallized carbonate of soda,* 1075 gr.; apply a gentle heat, and when fused in its water of crystallization, shake in of *finely pulverized orpiment,* 5 gr., and when partly decomposed, add as much *gelatinous hydrate of alumina* as contains 7 gr. of anhydrous alumina; *finely sifted clay,* 100 gr., and *flowers of sulphur,* 221 gr., are next to be added, and the whole placed in a *covered crucible,* and at first *gently* heated to drive off the water; but as soon as this is effected, raised to redness, the heat being so regulated that the ingredients only "sinter" together without actually fusing; the mass is then to be cooled, finely pulverized, suspended in *river water,* and brought upon a filter; the product has now a very beautiful delicate green or bluish colour, but on being heated in a covered dish, and stirred about from time to time, until the temperature reaches that of *dull redness,* at which it must be kept for 1 or 2 hours, it changes to a *rich blue.* If the heat of the first calcination has been properly regulated, the whole of the mass taken from the crucible will have a uniform colour; but if *too little heat* has been used, and the ingredients have not been properly mixed, there will be colourless parts, which should be rejected; if *too much heat* has been used, or the mass allowed to *fuse,* brown parts will appear, especially if the crucible is of a bad kind, or easily destroyed; these must also be rejected. (*Compt. Rend.,* 1842.)

ULTRAMARINE (Cobaltic). Syn. *Chinese Blue, Cobalt do., Louisa do., Höpfner's do., Thénard's do., &c.* A very rich blue pigment, with many synonymes, prepared by slowly drying and heating to dull redness a *mixture* of *freshly precipitated alumina* (freed from water as much as possible), 8 to 10 parts; *arseniate* or *phosphate of cobalt,* 1 part. By daylight it is of a pure blue, but by artificial light the colour turns on the violet. For other formulæ see *Blue Pigments.*

ULTRAMARINE ASHES. Syn. *Saunder's Blue.* Obtained from the *resinous mass* left from making *ultramarine,* by melting it with *fresh oil,* and kneading it in water containing a little potash or soda; or, by *burning away* the *wax* and *oil of the mass* and well grinding and washing the residue with *water.* Very permanent but much less brilliant than ultramarine.

UMBER. See *Brown Pigments.*

UNGUENTS. See *Ointments.*

UPAS. The Javan name of several deadly poisons. "*Bohun upas*" is a gum-resin obtained from the *bark* of the *antiaris* or *ipo toxicaria.* (See *Antiarine.*) The "*upas tieuté*" is obtained from the *strychnos tieuté,* and owes its fatal power to strychnia. They are both used to poison arrows and other offensive weapons.

URAMILE. A product of the decomposition of thionuric acid, discovered by Wöhler and Liebig. It is *obtained* by treating a *hot saturated solution of thionurate of ammonia,* with *hydrochloric acid* in excess, and boiling the mixture until a slight turbidity is observed, when the whole is converted into a semifluid mass; this is washed with a little *cold water*, and dried by a gentle heat. Minute acicular crystals, often slightly pinkish; soluble in boiling water and alkaline solutions.

URAMILIC ACID. A product of the decomposition of uramile, discovered by Wöhler and Liebig. A *saturated solution of thionurate of ammonia* in *cold water*, is mixed with a small quantity of *sulphuric acid*, and the *mixture* evaporated over a water bath, when crystals of *uramilic acid* are slowly deposited. Soluble in water; with the alkalies it forms crystallizable salts, called *uramilates*, most of which are soluble.

URANIC ACID. See *Uranium*.

URANIUM. A rare metal, discovered by Klaproth, in 1789. It occurs in the *pechblende* of Saxony, and the *uranite* or *uran mica* of Cornwall.

Prep. Uranium may be extracted from *pechblende* by heating it to redness, cooling, powdering, digesting the powder in *nitric acid diluted with* 3 *or* 4 *parts of water*, in quantity insufficient to dissolve the whole, passing *sulphuretted hydrogen* through the solution, boiling to expel free sulphurous gas, concentrating by evaporation, and setting the remaining fluid aside to crystallize; beautiful lemon-coloured crystals of *pernitrate of uranium* are slowly deposited; these, by exposure to a strong heat, yield *proto-sesquioxide of uranium* (formerly called *protoxide*), which, when heated in *hydrogen gas*, is reduced to a crystalline brown powder, which is the *protoxide* (formerly mistaken for the *metal*); from this last, *metallic uranium* can only be obtained in the manner described under *magnesium*.

Prop., &c. A white malleable metal, unaffected by air or water, but very combustible when heated; in a divided state it appears as a heavy black powder. Sp. gr. 11·5. The *protoxide* is a *brown* crystalline powder, which is pyrophoric, and forms green salts with the acids. The *proto-sesquioxide* is *black* and not basic. The *sesquioxide* (*peroxide of uranium, uranic acid*) is precipitated as a *yellow* hydrate, when a pure alkali is added to a solution of the *sesquinitrate*; and as a *carbonate*, when alkaline carbonates are used. It is best obtained by heating the salt to about 480° Fahr., in an oil bath, as long as any nitrous fumes are disengaged. It is soluble in alkalies in excess, acting the part of a feeble acid.

Tests. The *salts* of *protoxide of uranium* are *characterised* by their green colour; those of the *sesquioxide* or *peroxide* are very beautiful and of a yellow colour. With caustic alkalies they yield a *yellow* precipitate; with ferrocyanide of potassium a *reddish brown* precipitate, resembling ferrocyanide of copper; with hydrosulphuret of ammonia and with infusion of galls, a *brown* one. Sulphuretted hydrogen turns the solutions of the persalts *green*.

Uses. Its ores and oxides are occasionally used to colour glass and enamels.

URATES. See *Uric Acid.*

UREA. Syn. *Cyanate of Ammonia* (Anomalous.) A crystalline, colourless, transparent substance, discovered by Fourcroy and Vauquelin in urine, and by Wöhler as the first organic compound artificially produced.

Prep. 1. (Thénard.) *Fresh urine*, gently evaporated to the consistence of a syrup, is treated with its own volume of *nitric acid* of sp. gr. 1·19; the mixture is shaken and immersed in an ice bath to solidify the crystals of *nitrate* or *supernitrate of urea*; these are washed with *ice-cold water*, drained, and pressed between sheets of blotting paper; they are next dissolved in *water*, and the *solution* is decomposed and precipitated with *carbonate of potassa* (or *carbonate of baryta*); the whole is then gently evaporated nearly to dryness; and the residuum is exhausted with *pure alcohol*, which dissolves the *urea*, which crystallizes out as the solution cools.

2. (Liebig.) See *below*.

Prop., &c. Urea forms four-sided prisms, which are soluble in an equal weight of cold water, and are also freely soluble in alcohol; the solution is neutral to test paper; it is permanent in dry air; has a cooling saline taste; fuses at 250° Fahr.; and is decomposed at higher temperatures. It is said to be diuretic, and has been given in *doses* of 10 to 30 gr., or more, dissolved in sugared water.

UREA (Factitious). Syn. *Cyanate of Ammonia; Ammoniæ Cyanas, Urea Factitia*,—Lat. *Prep.* (Liebig.) *Cyanate of potassa* (prepared by Liebig's process) is dissolved in a small quantity of *water*, and a quantity of *dry neutral sulphate of ammonia*, equal in weight to the cyanate, added; the whole is evaporated to dryness in a water bath, and the *dry residuum* boiled with *alcohol* of 80%; the filtered solution, concentrated by distilling off a portion of the spirit, deposits, as it cools, the *urea* in crystals of considerable magnitude and beauty, and which are *absolutely identical* with the urea obtained from urine. *Prod.* 25% of the weight of the ferrocyanide of potassium used in the preparation of the cyanate employed.

UREA (Nitrate of). Syn. *Ureæ Nitras*.

—Lat. *Prep.* See *Urea;* or it may be prepared by saturating *artificial urea* with *nitric acid.* Diuretic. *Dose.* 2 to 5 gr., twice or thrice daily, in dropsy.

URETHANE. A white, solid, crystallizable substance, formed by the action of either *gaseous* or *liquid ammonia* on *chlorocarbonic acid.* It is very soluble in water, fuses at about 212°, and, when dry, volatilizes unchanged at about 350° Fahr.

URETHYLANE. A solid, crystallizable substance, formed by acting on *chlorocarbonic methyl-ether* with dry *gaseous ammonia.*

URIC ACID. Syn. *Lithic Acid; Acidum Lithicum; A. Uricum,*—Lat. A substance discovered by Scheele, and peculiar to the urine of certain animals, and the excrement of serpents and several birds. The fæces of the boa constrictor consist of little else than *urate of ammonia.* Uric acid is a product of the animal organism, and has never been formed artificially. It constitutes one of the commonest varieties of *urinary calculi,* and of the *red gravel* or *sand,* which is voided in certain morbid states of the urine. *Guano* derives its principal value as a *manure* from the presence of *urate of ammonia.* The gouty concretions of the joints, popularly known as *chalk-stones,* consist chiefly of *urate of soda.*

Prep. Dissolve *urinary lithic calculi,* or the *chalk-like excrement of serpents,* reduced to fine powder, in a solution of *caustic potassa,* by boiling, then add *hydrochloric acid* in excess, again boil for 15 minutes, and well wash the precipitate with *water.*

Prop., &c. Brilliant, very minute, white and silky scales, which are tasteless, inodorous, slightly soluble in boiling water, and dissolve in strong sulphuric acid, but are again precipitated by water. It forms salts with the bases called *urates,* all of which are very sparingly soluble. The *characteristic reaction* of *uric acid* is, that, when moistened with nitric acid and heated, it dissolves, and by evaporation yields a red compound, which, upon the addition of a drop or two of solution of caustic ammonia, assumes a magnificent crimson colour, being converted into *murexide* or *purpurate of ammonia.*

URIC OXIDE. Syn. *Xanthic Oxide.* A rare constituent of urinary calculi, discovered by Marcet.

URINARY AFFECTIONS. Of these deserving a popular notice are—

Diabetes or an *immoderate flow of urine.* Of this disease there are two varieties:—*Diabetes insipidus,* which consists of a superabundant discharge of ordinary urine; and —*diabetes mellitus,* in which the urine has a sweet taste, contains grape sugar, and is capable of affording alcohol by fermentation. The *first variety,* when the patient is not very debilitated or aged, admits of cure by the use of tonics, stimulants, and the mineral acids, supported by a nutritious diet, and regular habits of life. When symptomatic of nervous disease or hysteria, the primary affection must be first combated. The *second variety* is incurable. All that can be done is to avoid exciting causes, to abstain from vegetable food, to support the system by a general tonic treatment, and to allay irritation and as much as possible diminish secretion by the free use of opium.

Difficult micturition or dysuria. The causes are numerous; among them the most frequent are gravel, stone, inflammation of the urinary organs, spasm, stricture, schirrus of the prostate gland, and the absorption of the acrid matter of cantharides. When the urgings to empty the bladder are frequent, and the urine passes off only in drops, or in very small quantities, it is called *strangury.* When a sense of heat and pain attend the discharge, it is styled *ardor urinæ* or *heat of urine.* The nature of the *treatment* depends upon the exciting cause.

Incontinence of urine or *enuresis* commonly arises from want of tone, relaxation, or paralysis of the sphincter of the bladder. Excessive drinking or indulgence of the passions, compression, or the presence of some irritating substance in the cavity, are the more usual causes. In ordinary cases, it may be relieved by the judicious administration of *cubebs, tincture of cantharides,* or *aloetics,* supported by a *tonic course. Blisters to the perinæum* are also serviceable. When occurring in young persons, especially females, during sleep, without any marked cause, the careful application of a little *nitrate of silver,* once or oftener to the orifice of the urethra, will generally remove the habit.

Retention of urine (*retentio urinæ, ischuria*). This, like the preceding, may arise from various causes. The *treatment,* when the case is urgent, is drawing off the urine by means of a *catheter,* carefully introduced through the urethra. When it depends on want of tone in the bladder, tonics, as *chalybeates* and *bark,* are employed. When it depends on spasmodic stricture, fomentations, the warm or hot bath, or opium, often prove successful. In the last, the *tincture of sesquichloride of iron,* in doses of 5 to 10 drops, every 10 or 15 minutes, until nausea comes on, has been highly spoken of. This affection requires prompt treatment, especially when it happens during pregnancy, as when early attacked it is seldom attended with danger; but by a few hours' neglect, it may terminate fatally. Surgical aid should, therefore, be sought as soon as possible.

Boys from the age of about 6 or 7 to 10 or 11 years, are occasionally subject to peculiar attacks after having retired to rest for an hour or two. The patient starts up in bed, moans, struggles, is delirious, talks incoherently, and exhibits a total unconsciousness of all that is passing around him. This condition is purely nervous or spasmodic, and disappears as soon as the bladder is relieved by micturition; an event which should be promoted by placing the patient in the natural position for that purpose, and employing continued coaxing until it occurs. Should this fail, the *warm bath* will generally afford almost immediate relief. We have noticed this affection, because these attacks have been, to our personal knowledge, referred to calculus, and on more than one occasion, an operation was suggested.

URINE. The *density* of the *urine* varies from 1·005 to 1·030; the average, in health being 1·020; when it contains about 380 gr. of solid matter in the pint. According to Berzelius, the proportion is about 6¾ 0/0, the rest being pure water. It *exhibits* a decidedly *acid reaction*, and is never alkaline, except during disease, or the use of large quantities of alkaline salts of the vegetable acids. The *average quantity* secreted during 24 hours, may be taken at 1½ to 1¾ pint.

The *presence* of BILE in *urine*, or other like fluids, may be detected as follows:—Put a *small quantity* of the *suspected liquid* into a test-tube, and add to it, drop by drop, *strong sulphuric acid* until it becomes warm, taking care not to raise the temperature above 122° Fahr.; then add from 2 to 5 drops of *syrup*, (made with 5 parts of *sugar* to 4 of *water*), and shake the mixture. *If the liquid* contain *bile*, a *violet coloration* is observed. *Acetic acid* may be substituted for sugar.

The *presence* of SUGAR, and the quantity present may be determined in the manner described at *p.* 1192-3. *White merino* that has been wet with a solution of *bichloride of tin*, is also said to form a ready test for sugar in urine. A *portion* wetted with the *suspected urine*, and exposed to a heat of about 285° Fahr., becomes *blackened* if *sugar be present.*

The *quantity* of UREA present in *urine* is best determined by treating that liquid with a *solution of pernitrate of mercury* of known strength, alternately with a *solution of baryta*, as long as a white precipitate falls. As soon as the whole of the urea is thrown down, the precipitate assumes a yellow colour.

URINOMETER. An hydrometer adapted to determining the density of urine. That of Dr. Prout is the simplest and best.

URN POWDER. Crocus martis or jeweller's rouge.

URTICARIA. See *Rash.*

USNIC ACID. A substance extracted by *alcohol* from the *usnea barbata* and several other *lichens*. It forms pale yellow needles, possessing a metallic lustre.

USQUEBAUGH. Syn. *Escubac.* Literally, *mad water*, the Irish name of which whiskey is a corruption. At the present time it is applied to a strong cordial spirit, much drunk in Ireland, and made in the greatest perfection at Drogheda.

Prep. 1. *Brandy* or *proof spirit*, 3 gall.; *dates* (without their kernels), and *raisins*, of each, bruised, ¼ *lb.; juniper-berries*, bruised, 1 *oz.; mace* and *cloves*, of each, ¾ *oz.; coriander* and *aniseed*, of each, ½ *oz.; cinnamon*, ¼ *oz.;* macerate, with frequent agitation for 14 days, then filter, and add of *capillaire* or *simple syrup*, 1 gall.

2. *Pimento* and *caraways*, of each, 3 *oz.; mace, cloves*, and *nutmegs*, of each, 2 *oz.; aniseed, corianders*, and *angelica root*, of each, 8 *oz.; raisins*, stoned and bruised, 14 *lb.; proof spirit*, 9 gall.; digest as before, then press, filter, or clarify, and add of *simple syrup*, q. s. Should it turn *milky* add a little *strong spirit*, or *clarify it with alum*, or *filter through magnesia.*

Obs. Usquebaugh is either coloured *yellow* with *saffron* (about ¼ *oz.* per gall.), or *green* with *sap-green* (about ½ oz. per gall.); either being added to the other ingredients, before maceration in the spirit. The Ph. L. 1677 contained a form for this liquor, which has since been superseded by that for *compound tincture of cardamoms.*

VACCINATION. See *Cow-pox.*

VACCINE MATTER. Syn. *Lympha Vaccinicæ.* This is collected either upon the *points* of *lancet-like* pieces of *ivory*, or by opening the *pustule*, and applying a *small glass ball and tube* (like those called by the boys in London candle-pops, or fire-pops) to the orifice, expelling part of the air in the ball by bringing a lighted taper near it, then withdrawing the taper the matter is sucked into the ball, in which it may be sealed up hermetically or cemented, and thus kept for a length of time. It is, however, now generally preserved between two small *pieces of glass.* It is said that *cotton thread* is a convenient and efficient vehicle. *Used* lately as an absolute *preventive* of the *small-pox;* but now, with a view of diminishing the susceptibility of acquiring that disease, and to render it milder if acquired, a circumstance extremely rare indeed. The *matter* may be liquefied with a little *clean water* before application. A degree of heat scarcely higher than that of the blood lessens its efficacy. SMALL-POX MATTER is collected in the same way. (See *page* 1068.)

VACUUM. Empty space; a portion of space void of matter. The possibility of the existence of an absolute vacuum has been a matter of dispute with the metaphysicians and schoolmen ever since the time of Pythagoras, and appears as far from being settled as ever. The *nearest approach* to a perfect vacuum is that of the Torricellian barometer. For *experimental* and *manufacturing purposes,* a sufficient vacuum is produced either by means of the *air-pump,* or filling an inclosed space with *steam,* which is then condensed by the application of cold. Evaporation proceeds much more rapidly, and liquids boil at much lower temperatures in an exhausted receiver, than when exposed to the air. Thus, under ordinary circumstances, *in the air,* ether boils at 96°, alcohol at 177°, and water at 212° Fahr.; but *in vacuo* water boils at about 88°, alcohol at 56°, and ether at — 20° Fahr. In the best vacuum obtainable by a powerful air-pump, *water* placed over oil of vitriol, to absorb the aqueous vapour as it forms, will often enter into *violent ebullition* whilst *ice* is in the *act of formation* on *its surface.* The reduction of the boiling point with reduced pressure is practically taken advantage of by the *pharmaceutist* in the preparation of *extracts,* by the *sugar refiner* in the evaporation of his *syrups,* by the distiller in the production of certain *liqueurs,* and by the *chemist* in a variety of processes of interest or utility. See *Extracts, Evaporation, &c.*

VALERACETONITRILE and *Valeronitrile.* Two remarkable, light, ethereal liquids, obtained, along with other products, when a *dilute solution of gelatine* is distilled with a *mixture* of *bichromate of potassa* and *sulphuric acid.* The first boils at 158°, and the other at 257° Fahr.

VALERAMIDE. A fusible crystalline substance, formed by treating *valerianic ether* with *ammonia.*

VALERIAN. Syn. *Valerianæ Radix; Valeriana,*—Ph. L. E. & D. "The *root* of the wild plant *valeriana officinalis* (Linn.), or *wild valerian.*" (Ph. L.) An excitant, antispasmodic, tonic, and emmenagogue, not only acting on the secretions, but exercising a specific influence over the cerebro-spinal system, and in large quantities producing agitation, mental exaltation, and even intoxication. *Dose.* 10 to 30 or 40 gr., thrice daily; in hysteria, epilepsy, headache (affecting only one side), morbid nervous sensibility, &c. Even the odour of it exerts a species of fascination over cats.

VALERIANIC ACID. Syn. *Angelicic Acid, Valeric Acid; Acidum Valerianicum,* —Lat. *Prep.* 1. By distilling *valerian root* along with about 8 times its weight of *water,* and acting on the *product* with *caustic potassa,* when *valerianate of potassa* is formed, and a volatile oil is separated; by evaporating to dryness, the latter is dissipated, and the dry mixture, treated with *dilute sulphuric acid* and *distilled,* yields an *aqueous solution* of *valerianic acid;* by careful re-distillation this may be deprived of water.

2. (*Artificially.*) A mixture of *potato oil* or *corn-spirit oil* (hydrated oxide of amyle), with about 10 times its weight of *quick-lime* and *hydrate of potassa* in equal proportions, placed in a glass flask, is kept heated to about 400° Fahr., for 10 or 12 hours, by means of a bath of oil or fusible metal; the nearly white solid residuum is mixed with *water,* an excess of *sulphuric acid* added to the mixture, and the whole subjected to distillation; the distillate is supersaturated with *potassa,* evaporated nearly to dryness, to dissipate any undecomposed potato-oil, and then mixed with *weak sulphuric acid* in excess; a light oily liquid (*terhydrated valerianic acid*) separates, which by cautious rectification, yields at *first* water containing a little acid, and afterwards, *pure* (monohydrated) *valerianic acid,* which is perfectly identical with that prepared from valerian root.

3. See *Valerianate of Soda,* Ph. D. This is the most economical process.

Prop., &c. A limpid oily liquid, smelling strongly of valerian root; it has an acid taste and reaction, and leaves a sensation of sweetness and a white spot on the tongue; is inflammable; boils at 370°; is freely soluble in alcohol and ether; dissolves in 30 parts of water; and forms salts called *valerianates,* most of which have a sweetish taste, are soluble, and uncrystallizable; sp.

gr. 0·937; placed in contact with water, it absorbs a portion of it, and is converted into the *terhydrated acid*, with increase of sp. gr., and reduction of the boiling point.

VALERIANIC ACID (Anhydrous). Less odorous than the preceding; boils at 419° Fahr.; contact with water converts it into the ordinary liquid acid. See *Organic Acids.*

VALERIC ACID. See *above.*

VALEROLE. A neutral oily body, found, along with *valerianic acid*, *borneene*, *&c.*, in *oil of valerian.* Oxidizing agents convert it into *valerianic acid.*

VALERONITRILE. See *Valeracetonitrile.*

VALONIA. The cup of a large species of acorn, imported from the Levant. *Used* in tanning leather.

VALYLE. Syn. *Butyle.* A colourless ethereal fluid, forming the chief bulk of the oily liquid, which, along with *butylene*, results from the *electrolysis* of *valerianic acid.* It boils at about 225° Fahr. According to Kolbe, it is the radical of the valerianic compounds.

VANADIC ACID. Syn. *Peroxide of Vanadium*, *Teroxide of do.; Acidum Vanadicum*,—Lat. *Prep.* (Johnston.) From the *native vanadate of lead*, by dissolving it in *nitric acid*, passing *sulphuretted hydrogen* through the solution, to throw down lead and arsenic, and evaporating the resulting *blue liquid* to dryness; the *residuum* is then dissolved in a *solution of ammonia*, and a piece of *sal ammoniac*, considerably larger than can be dissolved, introduced; as the latter dissolves, a pulverulent precipitate of *vanadate of ammonia* is formed, which must be washed, first in a *solution of sal ammoniac*, and then in *alcohol* of 0·860; by exposing *this salt*, in an open platinum crucible, to a heat a little below redness, and keeping it constantly stirred, until it acquires a dark-red colour, *pure vanadic acid* is obtained.

Prop., *&c.* Vanadic acid is orange-coloured, scarcely soluble in water, and forms, with the alkaline bases, soluble salts called *vanadates;* and with the other bases sparingly soluble salts. All of these have an orange or yellow colour. "*Vanadate of ammonia* mixed with *solution of galls* forms a black fluid, which is the best *writing ink* hitherto known. The quantity of the salt required for this purpose is very small; the writing is perfectly black, and not obliterated by alkalies, acids, chlorine, or other reagents, that at the same time will not destroy the paper." (Ure.)

VANADIUM. A rare metal discovered by Sefstöm, in 1830, in some Swedish iron extracted from an iron mine near Jönköping. It has since been found in a lead ore from Scotland.

Prep. 1. The *liquid chloride of vanadium* is introduced into a bulb blown in a glass tube, and *dry ammoniacal gas* passed over it; the latter is absorbed, and a *white saline mass* produced; this is heated by the *flame* of a *spirit-lamp*, when *chloride of ammonium* is volatilized, and *pure metallic vanadium* left behind.

2. (Berzelius.) By placing *fragments* of *fused vanadic acid* and of *potassium*, of equal size, in alternate layers, in a *porcelain crucible*, the potassium being in rather the largest proportion, and after well luting on the cover, heating it *carefully* over a *spirit-lamp;* the cooled mass is then to be washed with *water.*

Prop., *&c.* It is a white brittle substance, of perfect metallic lustre, and a very high degree of infusibility; it is very difficult of reduction; is neither oxidized by air or water, nor attacked by sulphuric, hydrochloric, or even hydrofluoric acid; nitric acid dissolves it slowly, and aqua regia more freely, yielding deep blue solutions. It forms 3 compounds with oxygen:—*Protoxide of vanadium* is obtained by acting on vanadic acid by heat and charcoal or hydrogen gas. Black; non-basic.—*Binoxide of vanadium* (*vanadous acid*), formed by heating to dull redness a mixture of 10 parts of the protoxide, and 12 parts of vanadic acid, in an atmosphere of carbonic acid gas, or out of contact with air and combustible matter. It is also formed by heating vanadate of ammonia in close vessels. A black powder; it forms a series of blue salts, which have a tendency to decomposition, becoming first green and then red. It also unites, as a feeble acid, to alkalies. It is *precipitated*, as a grayish-white hydrate from its solutions, by carbonate of soda in slight excess.—*Bichloride of vanadium* is formed by dissolving the metal in hydrochloric acid, passing a stream of sulphuretted hydrogen through the solution, and evaporating the whole to dryness. Water resolves it into a *blue solution* and an insoluble *oxychloride.*—*Terchloride of vanadium* is a yellow liquid obtained by passing chlorine over a mixture of protoxide of vanadium and charcoal. It is converted by water into hydrochloric and vanadic acids.

Tests. Vanadium is *distinguished* from *chromium*, for which it may be mistaken, by deoxidizing substances giving a *blue* colour to its solutions, but a *green* one to solutions of the latter.

VANILLA. The *dried pods* of *epidendron vanilla* (Linn.) It is chiefly *used* in the manufacture of chocolate and perfumery. As a *medicine* it is much employed on the Continent as an aromatic stimulant and neurotic. *Dose.* 6 to 12 gr.; in asthenic fevers, hysteria, hypochondriasis, impotency, &c.

Vanilla is reduced to powder (*pulvis vanillæ; poudre de vanille*) by slicing it, and triturating the fragments with twice or thrice their weight of *well-dried lump sugar.* For *sucre de vanille,* 11 parts of *sugar* are employed. The very high price of vanilla, of late, has almost precluded its use for common purposes.

VANQUELINA. See *page* 1188.

VAN SWIETEN'S SOLUTION. Contains $\frac{1}{1000}$th part of its weight of *bichloride of mercury;* or ½ gr. per fl. oz. (See *pages* 343 and 1159.)

VAPOUR. See *Evaporation, Steam, &c.*

VAREC, or *blanquette.* The kelp of Brittany.

VARICELLA. See *Chicken-pox.*

VARIOLA. See *Small-pox.*

VARIOLARIA. A peculiar substance found in the *variolaria faginea* (lichen fagineus,—*Linn.*), or *bright-zoned variolaria.*

VARIX. The permanent unequal dilation of a vein, or veins, which are then said to be *varicose.* It is known by the presence of a soft tumour, which does not pulsate, and often assumes a serpentine figure. Those of the groin and scrotum generally form a collection of knots. The *treatment* consists of cold applications, and pressure from bandages. Some cases are relieved by ligature. When occurring in the legs, much standing or walking should be avoided, and the use of the elastic stockings made for the purpose, will be proper.

VARNISH. Syn. *Vernis,*—Fr. Any liquid matter, which when applied to the surface of a solid body, becomes dry, and forms a hard glossy coating, impervious to air and moisture.

Varnishes are commonly divided into two classes—*fat* or *oil varnishes* and *spirit varnishes.* The *fixed* or *volatile oils,* or *mixtures* of them, are used as *vehicles* or *solvents* in the former, and *concentrated alcohol* in the latter. The sp. gr. of *alcohol* for the purpose of making varnishes should not be more than 0·8156 (= 67 o. p.), and it should be preferably chosen of even greater strength. A little *camphor* is often dissolved in it, to increase its solvent power. The *oil of turpentine,* which is the essential oil chiefly employed for varnishes, should be pure and colourless. *Pale drying linseed oil* is the fixed oil generally used; but *poppy oil* and *nut oil* are also occasionally employed. Among the substances which are dissolved in the above menstrua are—*amber, anime, copal, elemi, lac, mastic, sandarach,* and *turpentine,* to impart BODY and LUSTRE; *benzoin,* on account of its agreeable ODOUR; *annotto, gamboge, saffron, socotrine aloes,* and *turmeric,* to give a YELLOW COLOUR; *dragon's blood* and *red sandal wood,* to give a RED TINGE; *asphaltum* to give a BLACK COLOUR and BODY; and *caoutchouc* to impart body, toughness, and ELASTICITY.

In the *preparation* of *spirit varnishes,* care should be taken to *prevent* the *evaporation* of the *alcohol* as much as possible, and also to *preserve* the portion that evaporates. On the *large scale,* a *common still* may be advantageously employed; the head being furnished with a stuffing-box, to permit of the passage of a vertical rod, connected with a stirrer at one end and a working handle at the other. The *gum* and *spirit* being introduced, the head of the still closely fitted on and luted, and the connection made with a proper refrigerator, heat (preferably that of *steam* or a *water bath*), should be applied, and the *spirit* brought to a gentle boil, after which it should be *partially* withdrawn, and *agitation* continued until the *gum* is dissolved. The *spirit which has distilled over* should be then added to the *varnish,* and, after thorough admixture, the whole should be run off, as rapidly as possible, through a *silk-gauze sieve,* into *stone jars,* which should be immediately corked down, and set aside to clarify. On the *small scale,* spirit varnishes are best made by maceration in closed bottles or tin cans, either in the cold, or by the heat of a water bath. In order to *prevent* the *agglutination of the resin,* it is often advantageously mixed with *clean siliceous sand* or *pounded glass,* by which the surface is much increased, and the solvent power of the menstruum greatly promoted.

To ensure the *excellence* of *oil varnishes,* one of the most important points is the use of good drying oil. *Linseed oil* for this purpose should be very pale, perfectly limpid or transparent, scarcely odorous, and mellow and sweet to the taste.—100 gall. of such *an oil* is put into an *iron* or *copper boiler,* capable of holding fully 150 gall., gradually heated to a gentle simmer, and kept near that point for about 2 hours, to expel moisture; the *scum* is then carefully removed, and 14 *lb.* of finely pulverized *scale litharge,* 12 *lb.* of *red lead,* and 8 *lb.*

of *powdered umber* (all carefully dried and free from moisture), are gradually sprinkled in; the whole is then kept well stirred, to prevent the driers sinking to the bottom, and the boiling is continued at a gentle heat for about 3 hours longer; the fire is next withdrawn, and, after 30 to 40 hours' repose the *scum* is carefully removed, and the *clear supernatant oil* decanted from the "bottoms."—The *product* forms the best "*boiled*" or "*drying-oil*" of the varnish-maker.—*Another method* is to heat a *hogshead* of the *oil* gradually for 2 hours, then to gently simmer it for about 3 hours longer, and after removing the scum, to add, *gradually*, 1 *lb.* of the *best calcined magnesia*, observing to mix it up well with the oil, and, afterwards, to continue the boiling pretty briskly for at least an hour, with *constant* agitation. The fire is then allowed to die away, and, after 24 hours, the oil is decanted as before. The product is called "*clarified oil*," and requires to be used with *driers*. It should be allowed to lay in the cistern for 2 or 3 months to clarify. (See *p.* 837-8.)

In the *preparation* of *oil varnishes*, the "*gum*" is melted as rapidly as possible, without discolouring or burning it; and when *completely fused*, the *oil*, also heated to *nearly* the boiling-point, is poured in, after which the mixture is boiled until it appears perfectly homogeneous and clear like oil, when the heat is raised, the driers (if any are to be used) gradually and cautiously sprinkled in, and the boiling continued, with constant stirring, for 3 or 4 hours, or until a little when cooled on a palette knife, feels strong and stringy between the fingers. The mixture is next allowed to cool considerably, but while still *quite fluid*, the *turpentine*, previously made *moderately* hot, is *cautiously* added, and the whole thoroughly incorporated. The *varnish* is then run through a *filter* or *sieve* into *stone jars*, *cans*, or other *vessels*, and set aside to clarify itself by subsidence. *When no driers are used*, the *mixture* of *oil* and *gum* is boiled until it runs perfectly clear, when it is removed from the fire, and, after it has cooled a little, the turpentine is added as before.

It is generally conceived that the *more perfectly* the "*gum*" is fused, or "*run*," as it is called, the larger and stronger will be the product; and the *longer the boiling* of the "*gum*" and *oil* is continued, within moderation, the freer the resulting varnish will work and cover. An *excess of heat* renders the varnish "*stringy*," and injures its flowing qualities. For *pale varnishes* as little heat as possible should be employed throughout the whole process. Good *body varnishes* should contain 1½ *lb.; carriage*, *wainscot*, and *mahogany varnish*, fully 1 *lb.;* and *gold size*, and *black japan*, fully ½ *lb.* of "*gum*" per gall., besides the *asphaltum* in the latter. *Spirit varnishes* should contain about 2½ *lb.* of "*gum*" per gall. The *use* of *too much driers* is found to injure the brilliancy and transparency of the varnish. *Copperas* does not combine with varnish, but only hardens it; *sugar of lead*, however, *dissolves* in it to a greater or less extent. *Boiling oil of turpentine* combines very readily with *melted copal*, and it is an improvement on the common process to use it, either *before*, or in *conjunction* with the *oil*, in the preparation of copal varnish, that it is desired should be very white. "*Gums*" of *difficult solubility* are rendered more soluble by being exposed, in the state of powder, for some time to the air.

Varnishes, like wine, improve by age; and should always be kept as long as possible before use.

From the *inflammable nature* of the *materials* of which *varnishes* are composed, their manufacture should be only carried on in some detached building of little value, and built of uninflammable materials. When a *pot of varnish*, *gum*, or *turpentine*, catches fire, it is most readily extinguished by *closely covering it* with a *piece of stout woollen carpeting*, which should be always kept at hand, ready for the purpose.

An *excellent paper*, by Mr. J. W. Niel, on the *manufacture of varnishes*, will be found in the *Trans. of the Soc. of Arts*, vol. 49. See also the articles *Alcohol*, *Amber*, *Copal*, *Oils*, *&c.*, in this work.

VARNISH (Amber). *Prep.* 1. Take of *amber* (clear and pale), 6 *lb.;* fuse it, add of *hot clarified linseed-oil*, 2 gall.; boil until it "strings well," then let it cool a little, and add of *oil of turpentine*, 4 gall., or q. s. Nearly as pale as copal varnish; it soon becomes very hard, and is the most durable of the oil varnishes; but it requires some time before it is fit for polishing, unless the articles are "*stoved*." When required to dry and harden quicker, "*drying oil*" may be substituted for the linseed oil; or "*driers*" may be added during the boiling.

2. *Amber*, 4 *oz.; pale boiled-oil*, 1 quart; proceed as last. Very hard.

3. *Pale transparent amber*, 5 *oz.; clarified linseed-oil* or *pale boiled-oil*, and *oil of turpentine*, of each, 1 pint; as before.

Obs. Amber varnish is suited for all purposes, where a very hard and durable oil varnish is required. The paler kind is superior to copal varnish, and is often mixed with the latter to increase its hardness and durability. The only objection to it is, the difficulty of preparing it of a very pale colour. It may, however, be easily *bleached* with some *fresh-slaked lime.*

VARNISH (Balloon). See *page* 1259.

VARNISH (Bessemer's). This consists of a pale *oil copal varnish,* diluted with about 6 times its volume of *oil of turpentine,* the mixture being subsequently agitated with about 1-30th part of *dry slaked lime,* and decanted after a few days' repose. 5 parts of the *product* mixed with 4 parts of *bronze powder* forms "*Bessemer's Gold paint.*"

VARNISH (Black). *Prep.* 1. (*Black Amber-varnish.*) From *amber,* 1 *lb.;* fuse, add of *hot drying-oil,* ½ pint; *powdered black rosin,* 3 *oz.;* *asphaltum* (Naples), 4 *oz.;* when properly incorporated and considerably cooled, add of *oil of turpentine,* 1 pint. This is the beautiful black varnish of the coachmakers.

2. (*Ironwork black.*) From *asphaltum,* 48 *lb.;* fuse, add of *boiled oil,* 10 gall.; *red lead* and *litharge,* of each, 7 *lb.;* *dried* and *powdered white copperas,* 3 *lb.;* boil for 2 hours, then add of *dark gum amber* (fused), 8 *lb.;* *hot linseed oil,* 2 gall.; boil for 2 hours longer, or until a little of the mass, when cooled, may be rolled into pills, then withdraw the heat, and afterwards thin it down with *oil of turpentine,* 30 gall. *Used* for the ironwork of carriages, and other nice purposes.

3. (*Black japan; Bituminous varnish.*)—*a.* From *naples asphaltum,* 50 *lb.;* *dark gum animé,* 8 *lb.;* fuse, add of *linseed oil,* 12 gall.; boil as before, then add of *dark gum amber,* 10 *lb.;* previously fused and boiled with *linseed oil,* 2 gall.; next add of *driers,* q. s., and further proceed as ordered in No. 2. Excellent for either wood or metals.

b. From *burnt umber,* 8 *oz.;* *true asphaltum,* 4 *oz.;* *boiled linseed oil,* 1 gall.; grind the umber with a *little of the oil;* add it to the *asphaltum,* previously dissolved in a small quantity of the *oil* by heat; mix, add the *remainder of the oil,* boil, cool, and thin with a sufficient quantity of *oil of turpentine.* Flexible.

4. (*Brunswick Black.*)—*a.* To *asphaltum,* 2 *lb.,* fused in an iron pot, add of *hot boiled-oil,* 1 pint; mix well, remove the pot from the fire, and, when cooled a little, add of *oil of turpentine,* 2 quarts. *Used* to blacken and polish grates and ironwork. Some parties add *driers.*

b. From *black pitch* and *gas-tar asphaltum,* of each, 25 *lb.;* boil gently for 5 hours, then add of *linseed oil,* 8 gall.; *litharge* and *red lead,* of each, 10 *lb.;* boil as before, and thin with *oil of turpentine,* 20 gall. Inferior to the last, but cheaper.

VARNISH (Body). *Prep.* 1. From the *finest African copal,* 8 *lb.;* *drying oil,* 2 gall.; *oil of turpentine,* 3½ gall.; proceed as for *amber varnish.* Very hard and durable.

2. *Pale gum copal,* 8 *lb.;* *clarified oil,* 2 gall.; *dried sugar of lead,* ½ *lb.;* *oil of turpentine,* 3½ gall.; proceed as before, and mix the product, whilst still hot, with the following varnish:—*pale gum animé,* 8 *lb.;* *linseed oil,* 2 gall.; *dried white copperas,* ¼ *lb.;* *oil of turpentine,* 3½ gall.; the mixed varnishes are to be immediately strained into the cans or cistern. *Dries* in about 6 hours in winter, and in about 4 hours in summer. *Used* for the bodies of coaches and other vehicles.

VARNISH (Bookbinder's). *Prep.* Take of *pale gum sandarach,* 3 *oz.;* *rectified spirit,* 1 pint; dissolve by cold digestion, and frequent agitation. *Used* by binders, to varnish Morocco leather book covers. A similar varnish is also prepared from *very pale shell-lac* and *wood naphtha.*

VARNISH (Cabinet-maker's). French polish is occasionally so called.

VARNISH (Carriage). *Prep.* 1. (*Spirit.*) Take of *gum sandarach,* 1¼ *lb.;* *very pale shell-lac,* ⅝ *lb.;* *very pale transparent rosin,* ½ *lb.;* *rectified spirit* of 0·8221 (64 *o. p.*), 3 quarts; dissolve, and add of *pure Canadian balsam,* 1½ *lb.* *Used* for the internal parts of carriages, &c. *Dries* in 10 minutes or less.

2. (*Oil.*)—*a.* (*Best Pale.*) Take of *pale African copal,* 8 *lb.;* fuse, add of *clarified linseed oil,* 2½ gall.; boil until very stringy, then add of *dried copperas* and *litharge,* of each, ¼ *lb.;* again boil, thin with *oil of turpentine,* 5½ gall., mix, whilst both are hot, with the following varnish, and immediately strain the mixture into a covered vessel:—*Gum animé,* 8 *lb.;* *clarified linseed oil,* 2½ gall.; *dried sugar of lead* and *litharge,* of each, ¼ *lb.;* boil as before, thin with *oil of turpentine,* 5½ gall. *Dries* in 4 hours in summer, and 6 in winter. *Used* for the wheels, springs, and carriage parts of coaches, and other vehicles, and by house painters, decorators, &c., who want a *strong, quick-drying,* and *durable varnish.*

b. (*Second Quality.*) From *gum animé,* ("sorts"), 8 *lb.;* *clarified oil,* 3 gall.; *litharge,* 5 *oz.;* *dried* and *powdered sugar of lead* and *white copperas,* of each, 4 *oz.;* boil as last, and thin with *oil of turpentine,* $5\frac{1}{2}$ gall. *Used* as the last.

VARNISH (Chinese). *Prep.* From *mastic* and *sandarach,* of each, 2 *oz.; rectified spirit* (64 o. p.), 1 pint; dissolve. *Dries* in 6 minutes. Very tough and brilliant.

VARNISH (Copal). *Prep.* 1. (*Oil.*)—*a.* From *pale hard copal,* 2 *lb.;* fuse, add of *hot drying-oil,* 1 pint; boil as before directed, and thin with *oil of turpentine,* 3 pints, or q. s. *Dries* hard in 12 to 24 hours.

b. From *clear* and *pale African copal,* 8 *lb.; pale drying oil,* 2 gall.; *rectified oil of turpentine,* 3 gall.; proceed as before, and immediately strain it into the store can or cistern. Very fine, hard, and durable.

2. (*Spirit.*)—*a.* From *coarsely-powdered copal* and *glass,* of each, 4 *oz.; alcohol of* 90^{0}_{0} (64 o. p.), 1 pint; *camphor,* $\frac{1}{2}$ *oz.;* heat the mixture, with frequent stirring, in a water bath, so that the bubbles may be counted as they rise, until solution is complete, and when cold, decant the clear portion.

b. From *copal* (which has been melted, dropped into water, and then dried and powdered), 4 *oz.; gum sandarach,* 6 *oz.; mastic,* 2 *oz.; pure Chio turpentine,* 3 *oz.; powdered glass,* 5 *oz.; spirit of* 90^{0}_{0}, 1 quart; dissolve by a gentle heat. *Dries* rapidly.

3. (*Turpentine.*) To *oil of turpentine,* 1 pint; heated in a water bath, add, in small portions at a time, of *powdered copal* (prepared as above), 3 to 4 *oz.;* dissolve, &c., as before. *Dries* slowly, but is very pale and durable.

4. (*Japanner's copal varnish.*) From *pale African copal,* 7 *lb.; pale drying-oil,* $\frac{1}{2}$ gall.; *oil of turpentine,* 3 gall.; proceed as in No. 1. *Dries* in 20 to 60 minutes, and may be polished as soon as hard, particularly if stoved. See *Japanning.*

Obs. All copal varnishes, when properly made, are very hard and durable, though less so than those of amber; but they have the advantage over the latter of being paler. They are applied on *coaches, pictures, polished metal, wood,* and *other objects* requiring a good durable varnish. *Animé* is frequently substituted for copal in the *copal varnishes* of the shops. See *Body* and *Carriage Varnishes, Copal, &c.*

VARNISH (Crystal). *Prep.* 1. From *genuine pale Canada-balsam* and *rectified oil of turpentine,* equal parts. *Used* for maps, prints, drawings, and other articles of paper, and also to prepare tracing paper, and to transfer engravings.

2. *Mastic,* 3 *oz.; rectified spirit,* 1 pint; dissolve. *Used* to fix pencil drawings.

VARNISH (Drying). Spirit copal varnish.

VARNISH (Dutch). See *Lac* and *Toy Varnish.*

VARNISH (Etching). See *page* 398.

VARNISH (Fat). See *Oil Varnish* (and *page* 1256.)

VARNISH (Flexible). Syn. *Balloon Varnish, Caoutchouc do., &c. Prep.* 1. From *Indian rubber* (cut small), $1\frac{1}{2}$ oz.; *chloroform, ether* (washed), or *bisulphuret of carbon,* 1 pint; digest in the cold until solution is complete. *Dries* as soon as it is laid on. *Pure gutta percha* may be substituted for Indian rubber.

2. *Indian rubber,* in shavings, 1 *oz.; rectified mineral naphtha,* or *benzole,* 1 pint; digest at a gentle heat, in a closed vessel, and strain. *Dries* very badly; and never gets perfectly hard.

3. *Indian rubber,* 1 *oz.; drying oil,* 1 quart; dissolve by heat. Very tough; *dries* in about 48 hours.

4. *Linseed oil,* 1 gall.; *dried white copperas* and *sugar of lead,* of each, 3 *oz.; litharge,* 8 *oz.;* boil, with constant agitation, until it strings well, then cool slowly, and decant the clear portion. If too thick, thin it down with *quick-drying linseed oil.* The above are used for balloons, gas bags, &c. See *Balloons, Caoutchouc, &c.*

VARNISH (Furniture). A solution of *pure white wax,* 1 part; in *rectified oil of turpentine,* 4 parts; frequently passes under this name. See *Body, Carriage,* and *Copal Varnishes, &c.*

VARNISH (Gilder's). *Prep.* (Watin.) *Pale gum-lac in grains, gamboge, dragon's blood,* and *annotta,* of each, $12\frac{1}{2}$ *oz.; saffron,* $3\frac{1}{4}$ *oz.;* dissolve each resin separately in 5 pints of *alcohol of* 90^{0}_{0}; and make two separate tinctures of the *dragon's blood* and *annotta,* with a like quantity of spirit; then mix the solutions in the proper proportions to produce the required shade. *Used* for gilded articles, &c.

VARNISH (Glass). A solution of soluble glass. *Used* to render wood, &c., fireproof.

VARNISH (Gun-barrel). *Prep.* From *shell-lac,* $1\frac{1}{2}$ *oz.; dragon's blood,* 3 dr.; *rectified spirit,* 1 quart. Applied after the barrels are "browned."

VARNISH (Hair). *Prep.* From *hog's bristles* (chopped small), 1 part; *drying oil,* 10 parts; dissolve by heat. *Said* to be *used* to give cotton or linen cloth the appearance of horsehair.

VARNISH (Indian-rubber). See *above.*

VARNISH (Italian). *Prep.* Boil *Scio turpentine* until brittle, powder it, and dissolve this in *oil of turpentine.* *Used* for prints, &c.

VARNISH (Japan). Pale amber or copal varnish. *Used* for japanning tin, papier maché, &c.

VARNISH (Lac). *Prep.* 1. *Pale seed-lac* (or *shell-lac*), 8 *oz.; rectified spirit*, 1 quart; dissolve.

2. Substitute *lac bleached* with *chlorine* for seed lac. Both are very tough, hard, and durable, but quite inflexible. *Wood naphtha* may be substituted for spirit. *Used* for pictures, metal, wood, or leather, and particularly for toys.

VARNISH (Lac, — Aqueous). *Prep.* From *pale shell-lac*, 5 *oz.; borax*, 1 *oz.; water*, 1 pint; digest at nearly the boiling point until dissolved; then strain. Equal to the more costly spirit varnish for many purposes; it is an excellent vehicle for water colours, inks, &c.; when dry it is waterproof.

VARNISH (Lac,—Coloured). Syn. *Lacquer, Brasswork Varnish, &c.* *Prep.* 1. Take of *turmeric* (ground), 1 *lb.; rectified spirit*, 2 gall.; macerate for a week, strain with expression, and add to the tincture, *gamboge*, 1½ *oz.; pale shell-lac*, ¾ *lb.; gum sandarach*, 3½ *lb.;* when dissolved, strain, and further add of *good turpentine varnish*, 1 quart. Gold coloured.

2. *Seed lac*, 3 *oz.; turmeric*, 1 *oz.; dragon's blood*, ¼ *oz.; rectified spirit*, 1 pint; digest for a week, frequently shaking, then decant the clear portion. Deep gold coloured.

3. *Spanish annotta*, 3 *lb.; dragon's blood*, 1 *lb.; gum sandarach*, 3¼ *lb.; rectified spirit*, 2 gall.; *turpentine varnish*, 1 quart; as before. Red coloured.

4. *Gamboge*, 1 *oz.; Cape aloes*, 3 *oz.; pale shell-lac*, 1 *lb.; rectified spirit*, 2 gall.; as before. Pale brass coloured.

5. *Seed lac, dragon's blood, annotta*, and *gamboge*, of each, ¼ *lb.; gum sandarach*, 2 *oz.; saffron*, 1 *oz.; rectified spirit*, 1 gall. Resembles the last.

Obs. Lacquers are used upon polished metals and wood to impart to them the appearance of gold. Articles in brass, tin-plate, and pewter, or which are covered with tinfoil, are more especially so treated. As *lacquers* are required of different depths and shades of colour, it is best to keep a concentrated solution of each of the colouring ingredients ready, so that it may be added, at any time, to produce any desired tint.

VARNISH (Mahogany). *Prep.* From *gum animé* ("sorts"), 8 *lb.; clarified oil*, 3 gall.; *litharge* and *powdered dried sugar of lead*, of each, ¼ *lb.;* proceed as for *body varnish*, and thin with *oil of turpentine*, 5 gall., or q. s.

VARNISH (Mastic). Syn. *Picture Varnish, Turpentine do., Tingry's Essence do.* *Prep.* 1. Take of *pale* and *picked gum mastic*, 5 *lb.; glass* (pounded as small as barley, and well washed and dried), 3 *lb.;* finest *newly rectified oil of turpentine* (lukewarm), 2 gall.; put them into a clean 4 gall. *tin bottle* or *can*, bung down securely, and keep rolling it backwards and forwards pretty smartly on a counter, or any other solid place, for at least 4 hours; when, if the gum is all dissolved, the varnish may be decanted, strained through muslin into another bottle, and allowed to settle; if the solution is still incomplete, the agitation must be continued for some time longer, or a *gentle* warmth applied as well. Very fine.

2. (*Second Quality.*) From *mastic*, 4 *lb.; oil of turpentine*, 2 gall.; dissolve with heat.

Obs. Mastic varnish is much used for pictures, &c.; when good, it is tough, hard, brilliant, and colourless. It greatly improves by age, and, when possible, should never be used before it has been made at least a twelvemonth. Should it get "*chilled*," 1 *lb.* of *well-washed siliceous sand* should be made moderately hot, and added to each gallon, which must then be well agitated for 5 minutes, and afterwards allowed to settle.

The present high price of the best mastic (15*s.* to 16*s.* per *lb.*) almost precludes its use for varnishes.

VARNISH (Oak). Syn. *Wainscot Varnish, Common Turpentine do., &c.* *Prep.* 1. Clear *pale rosin*, 3½ *lb.; oil of turpentine*, 1 gall.; dissolve.

2. To the last add of *Canada balsam*, 1 pint. Both are cheap and excellent common varnishes for wood or metal.

VARNISH (Oil). The finer qualities are noticed under *Amber, Body, Carriage*, and *Copal Varnish;* the following produces the ordinary *oil varnish* of the *shops:*—Take of *good clear rosin*, 3 *lb.; drying oil*, ½ gall.; melt, and thin with *oil of turpentine*, 2 quarts. A good and durable varnish for common work.

VARNISH (Painter's). See *Carriage, Copal, Mahogany, Oak, Oil*, and other varnishes. The selection depending greatly on the colour and quality of the work.

VARNISH (Patent Leather). This is carefully prepared *drying oil.* The *skins* being stretched on a board, and every trace of grease being removed from them by means of a *mixture* of *fuller's earth* and *water*, they are ready to receive the *varnish*, which is then spread upon them, *very thinly*, by means of a species of scraper. The *first-coat varnish* consists of *pale Prussian blue* (that containing some alumina), 5 *oz.; drying oil*, 1 gall.; boiled to the consistence of single size, and when cold, ground with a little *vegetable black;* it is stoved, and afterwards polished with *fine-grained pumice;*—the *second coating* resembles the first, excepting in having a little *pure Prussian blue* mixed with it;—the *third-coat varnish* consists of a similar mixture, but the *oil* is boiled until it strings well, and a *little* more *pure Prussian blue* and *vegetable black*, are added;—the *last-coat varnish*, or *finish*, is the same as the third, but must contain ½ *lb.* of *pure dark-coloured Prussian blue* and ¼ *lb.* of *pure vegetable black* per gall.; to which a little *oil copal* or *amber varnish* is often added; each coat being duly stoved and pumiced before the next is applied. The *heat* of the *stove* or *oven* is commonly 120° Fahr. for "*enamelled skins*," as those of the calf and seal, intended for "*uppers*;" and 175° to 180° for stout "*japan leather;*" the *exposure* in the stove is commonly for 6 to 10 hours. The skins are next *oiled* and *grained*. The "*graining*" of the "*enamelled skins*" is done by holding the skin in one hand, and with a curved board lined with cork (*graining stick*), lightly pressed upon the fleshy side, working it up and down until the proper effect is produced.

VARNISH (Picture). Several varnishes, especially *mastic varnish*, are called by this name. *Pale copal* or *mastic varnish* is generally used for oil paintings, and *crystal, white hard spirit*, or *mastic varnish*, for water colour drawings on paper.

VARNISH (Printer's). See *page* 1071. Diluted with twice its volume of *oil of turpentine* it forms a good common varnish.

VARNISH (Spirit). *Prep.* 1. (*Brown Hard.*)—*a.* From *gum sandarach*, 3 *lb.; pale seed-lac* or *shell-lac*, 2 *lb.; rectified spirit* (65 o. p.), 2 gall.; dissolve, and add of *turpentine varnish*, 1 quart; agitate well, strain (quickly) through gauze, and in a month decant the clear portion from the sediment. Very fine.

b. From *seed-lac* and *yellow resin*, of each, 1½ *lb.; rectified spirit*, 5 quarts; *oil of turpentine*, 1¼ pint; dissolve. Inferior to the last.

2. (*White Hard.*)—*a.* From *gum sandarach* (picked), 5 *lb.; camphor*, 2 *oz.; washed* and *dried coarsely pounded glass*, 3 *lb.; rectified spirit* (65 o. p.), 7 quarts; proceed as in making mastic varnish; when strained add of *pure Canada balsam*, 1 quart. Very pale, durable and brilliant.

b. From *gum sandarach* and *gum mastic*, of each, picked, 4 *oz.; coarsely powdered glass*, 8 *oz.; rectified spirit*, 1 quart; dissolve, and add of *pure Strasburgh turpentine*, 3 *oz.* Very fine.

3. (*Soft Brilliant.*) From *sandarach*, 6 *oz.; elemi* (genuine), 4 *oz.; animé*, 1 *oz.; camphor*, ½ *oz.; rectified spirit*, 1 quart; as before.

4. (*Scented.*) To the preceding add some *gum benzoin, balsam of Peru, balsam of tolu, oil of lavender*, or the *essence of musk* or *ambergris*. The first two can only be employed for dark varnishes.

Obs. The above varnishes are chiefly applied to articles of the toilette, as work-boxes, card-cases, &c.; but are also suitable to other articles, whether of paper, wood, linen, or metal, that require a brilliant and quick drying varnish. They dry almost as soon as applied, and are usually hard enough to polish in 24 hours. They are, however, much less durable, and more liable to crack, than oil varnishes. See *p.* 1256.

VARNISH (Stopping-out). Syn. *Petit Vernis.* From *lampblack* made into a paste with *turpentine. Used* by engravers. See *Etching.*

VARNISH (Tingry's). See *page* 1260.

VARNISH (Toy). Similar to *common spirit varnish*, but using *carefully rectified wood-naphtha* as the solvent. See *Lac Varnish* (and *above*).

VARNISH (Transfer). Syn. *Mordant Varnish, &c. Prep.* From *mastic* (in tears) and *sandarach*, of each, 4 *oz; rectified spirit*, 1½ pint; dissolve, and add of *pure Canada balsam*, ½ pint. *Used* for transferring and fixing engravings or lithographs on wood, and for gilding, silvering, &c. See *Crystal Varnish.*

VARNISH (Turpentine). See *Mastic* and *Oak Varnish.*

VARNISH (Wainscot). See *Oak Varnish.*

VARNISH (Wax). Syn. *Milk of Wax; Emulsio Ceræ Spirituosa*,—Lat. *Prep.* Take of *white wax* (pure), 1 *lb.;* melt it with as gentle a heat as possible, add of *warm rectified spirit*, sp. gr. 0·830 (60 o. p.), 1 pint; mix *perfectly*, and pour the liquid out upon a *cold* porphyry slab; next grind it with a *muller* to a perfectly smooth paste, adding *more spirit*, as required; put the *paste* into a marble mortar, make an emulsion with *water*, 3½ pints, gradually added, and strain it through muslin. *Used* as a varnish for paintings; when dry, a hot iron is passed over it, or heat is otherwise evenly applied, so as to fuse it, and render it transparent, after which, when *quite cold*, it is polished with a clean linen cloth. The most protective of all varnishes.

2. *Wax* (pure), 5 *oz.; oil of turpentine,* 1 quart; dissolve. *Used* for furniture.

VARNISH (White). See *Spirit Varnish,* 2, *a* and *b.*

VARNISHING. To give the *highest degree* of *lustre* to *varnish* after it is laid on, as well as to remove the *marks of the brush,* it undergoes the operation of *polishing.* This is performed by *first* rubbing it with *very finely powdered pumice stone* and *water;* and, afterwards, with an *oiled rag* and *tripoli,* until the required polish is produced. The surface is last of all cleaned with *soft linen cloths,* cleared of all greasiness with *powdered starch,* and then rubbed bright with the palm of the hand.

In *varnishing,* great care must be taken that the surface is *free* from *grease,* or *smoke;* as unless this be the case, the best oil or turpentine varnish in the world will not dry and harden. *Old articles* are usually washed with soap and water, by the painters, before being varnished, to prevent any misadventure of the kind alluded to.

VAUXHALL NECTAR. See *page* 84.

VEAL. "The grain should be close, firm, and white, the fat of a pinkish white, not a dead white, and the kidneys well covered with thick white fat." (Soyer.)

Veal, like pork, requires to be well dressed, to develope its nutritive qualities. It should also be eaten fresh, as a peculiar principle is generated in it when improperly kept, which acts as a malignant poison. See *Roasting, &c.*

VEGETABLE ALKALI. Potassa.

VEGETABLE JUICES. See *below.*

VEGETABLES. *Vegetables* are organic beings, which are distinguished from animals by a number of characteristics, but, like them, are composed of certain proximate principles, or compounds, which possess a high degree of scientific interest, and, in many cases, are invaluable to man. Among the more important of these are—*albumen, fibrin, gluten, gum, lignine, starch, sugar, tannin, wax,* the *fixed* and *volatile oils,* the *resins* and *gum-resins,* the *alkaloids,* and innumerable forms of *extractive matter.* Several of these substances are noticed under their respective names.

The *method* of *propagating plants* from their *seeds,* depending on their simple exposure, at the proper season, to warmth and moisture, under the protection of the soil, is well known; that by "*layers,*" has been briefly referred to at *page* 676; and some points connected with their propagation from "*slips*" and "*cuttings,*" which will doubtless prove interesting to the amateur gardener, are noticed below.

The *choice of* "*slips*" and "*cuttings*" should be made from the side shoots of trees and plants, and, when possible, from such as recline towards the ground, observing, when they are removed by the knife, to leave a little wood of a former year or season's growth attached to them, as such are found to take root more readily than when they are wholly composed of new wood. The *time* to take *slips* or *cuttings* is as soon as the sap gets into full motion. *Before setting them* the latter should be cut across, just below an eye or joint, with as smooth a section as possible, observing not to injure the bud. The superfluous leaves may be removed, but a sufficient number should be left on for the purposes of vegetation. The *common practice* of removing *all* or *nearly all* the *leaves* of cuttings is injudicious. In some cases *leaves alone* will strike root. *When cuttings* are *set in pots* they should be so placed as to reach to the bottom and touch the sides throughout their whole length, when they will seldom fail to become rooted plants. In the case of *tubular-stalked plants,* it is said to be advantageous to insert both ends into the soil, each of which will take root, and may then be divided, when two plants will be produced instead of one. An *equable temperature,* a *moist atmosphere,* a *shady situation,* and a *moderate supply of water,* are the principal *requisites* to induce speedy rooting. Excess of any of these is prejudicial. When the size of the cuttings admit, it is better to place them under a hand or bell-glass, which will preserve a constant degree of heat, and prevent evaporation from the surface of the leaves, which is the most common cause of their dying, especially in hot, dry weather.

Qual. The vegetable kingdom furnishes by far the larger portion of the food of man, and indirectly perhaps the whole of it. The great value of *culinary vegetables* and *fruit* in a mixed diet need not be insisted on, since it is a fact which is almost universally known and appreciated. Indeed, there appears great plausibility in the assertion of a certain modern author, that "the fruits and farinacea are the *proper* food of man," as without doubt they were the original.

In the *choice* of *culinary* vegetables observe, that if they are stiff and break freely and crisply, they are *fresh,* and fit for food; if, on the contrary, they have a flabby appearance, or are soft or discoloured, they are *stale*, and should be rejected.

The *doses* of the generality of vegetable substances that exercise no very marked action on the human frame, is about ½ to 1 dr. of the *powder*, night and morning; or 1 *oz.*, or q. s. to impart a moderately strong taste or colour may be infused, or boiled in 1 pint of *water*, and a wine-glassful or thereabouts, taken 2 or 3 times a day.

VEGETABLE SUBSTANCES. Syn. *Vegetabilia*,— Ph. L. The following *general directions* are given in the London Pharmacopœia for the *collection* and *preservation* of vegetable substances:—

"*Vegetables* are to be *collected* in dry weather, and when neither wet with rain nor dew; they are to be collected annually, and are not to be kept beyond a year.

"*Barks* are to be *collected* at that season in which they can be most easily separated from the wood." Spring is the season here alluded to; as at this time, after the sap begins to ascend, the bark is, in general, very easily separated.

"*Flowers* are to be collected recently blown." The red-rose, however, must be gathered before the buds are expanded.

"*Fruits* and *seeds* are to be collected when ripe.

"*Herbs* and *leaves* are to be gathered *after* the flowers have expanded, and *before* the seeds are mature.

"*Roots* and *rhizomes* (underground stems), for the most part, are to be dug up after the old leaves and stalks have fallen, and before the new ones appear." ("*Roots*, which are required to be preserved fresh, should be buried in dry sand."—Ph. L. 1836.)

"*Seeds* are to be collected when they are ripe, and before they drop from the plant." ("They ought to be preserved in their seed-vessels,"—Ph. L. 1836.)

"The *different parts* of *vegetables* are to be kept *dried* for use, except where we shall otherwise direct. *Expose those* you wish to *dry*, within a short time after they have been gathered, in shallow wicker baskets, to a gentle heat in a dark place, and where there is a current of air. Then, the moisture being driven off, gradually increase the heat to 150° Fahr., in order that they may be dried. Finally, *preserve* the *more delicate parts*, viz., *flowers* and *leaves*, in black glass vessels, well closed; and keep the rest in proper vessels, preventing the access of light and moisture."

Fruits, *culinary vegetables*, and *vegetable juices*, of every class, may be *preserved* for *any length of time* by the system of M. Appert, as practised by Messrs. Donkin and Gamble; as well as by several other methods described under "*Putrefaction.*" On the *small scale* the following method is often adopted:—The *substances to be preserved* are put into *strong glass* or *stone-ware bottles*, with necks of a proper size, which are then *corked* with the greatest care, *tied* or *wired*, and *luted* with a mixture of lime and soft cheese, or with a paste formed of linseed meal and water, spread on rags; or, *tin cases* are employed, and are soldered up instead of being corked. The bottles are then placed in an *oven*, the temperature of which is cautiously raised to fully 212° Fahr.; or, they are inclosed, separately, in *canvass bags*, and put into a *copper of water* to which *some salt* has been added, which is then gradually heated until it boils, and thus kept for 15 or 20 minutes: the whole is next left to cool, when the bottles are taken out and carefully examined before being laid by, lest they should have cracked, or the lute have given way.

Herbs and *flowers* are now generally *preserved* for *distillation* by means of *common salt*. The objection which is raised against the use of fresh aromatic plants is thus obviated, whilst the *odours* of the *distilled products* are rendered *superior* to those obtained from either the *recent* or *dried plant*, *fruit*, or *flower*, without the great loss, inconvenience, or trouble, attending the common methods. Besides, *many aromatic* and *odorous substances almost entirely lose* their properties by drying; whilst *most of them* yield *more oil*, and that of a finer quality in the *fresh*, than in the *dried* state. The *odours of roses*, *elder flowers*, and a *variety of others*, are vastly improved by this treatment, and these flowers may thus be preserved with ease and safety from season to season, or even longer, if required. The *process* simply *consists* in intimately mixing the *flowers*, or *other vegetables*, soon after being gathered, with about ¼th *their weight*, or less, of *good dry salt*, and ramming down the mixture as tightly as possible in strong casks. The casks are then placed in a *cold cellar*, and covered with boards, on which heavy weights are put, to keep the mass tight and close. See *Fruits*, *Putrefaction*, *&c.*

VEGETABLES (Juices of). Syn. *Expressed Vegetable Juices*, *Simple do.; Succi Expressi*,—Lat. These are obtained by bruising the *fresh leaves*, or other *vegetable matter*, in a *marble mortar*, or in a *mill*, and expressing the liquid portion by means of a *powerful screw press*. After defecation for 12 or 14 hours in a cold situation, the *juice* is either decanted or filtered from the feculous sediment, and is next heated for some minutes to about 185° Fahr., to coagulate albuminous matter. The clear portion is subsequently separated as before, and the product preserved for use in well-closed and well-filled bottles, in a cool situation. Some plants, as *borage, cabbage, &c.*, require the addition of $\frac{1}{8}$th of water before being pressed. The *expression* of the *juice of lemons, oranges, quinces, &c.*, is facilitated by previously mixing the *pulp* with clean chopped straw. *Buckthorn berries, mulberries, &c.*, after being crushed between the hands, are commonly left for 3 or 4 days to undergo a slight fermentation, before pressing them.

The *expression* of the *juices* of the *narcotic plants*, and of some *other vegetables*, has lately assumed considerable interest, from these juices being now extensively used in *pharmacy* for the preparation of *extracts* and the *preserved juices* noticed below. It appears that the *juice* of *young plants just coming into flower* yields only $\frac{2}{3}$rds the amount of extract, which may be obtained from the same quantity of *juice* expressed from the *matured plant*, or when the flowers are fully blown, and the strength of the product is also inferior, the case appears to be best met by selecting the plants when more than half the flowers are fully blown. The *leaves* alone should be preferably employed, and should be exclusively of the second year's growth, when the plants are biennials. (Squire.) The *homœopathists* commonly employ the whole flowering herb.

The *inspissated vegetable juices* (*succis spissatis*) are now included among the extracts.

The principal *simple vegetable juices* of *commerce* are—

Buckthorn Juice (*succus rhamni*,—Ph. L.), from the fruit of rhamnus catharticus or buckthorn berries.

Citron Juice (*succus citri, acetositas citras*), chiefly imported from Italy in large casks.

Lemon Juice (*succus limonum*,—Ph. L.), from lemons that spoil before they can be sold; also imported.

Mulberry Juice (*succus mori*,—Ph. L.), from the fruit of morus nigra or mulberry.

Orange Juice (*succus aurantii*), obtained from the same sources as that of lemons.

Concentrated Orange Juice (*succus spissatus aurantii* vel *aurantiorum*) and *Concentrated Lemon Juice* (*succus spissatus limonum*), are prepared by evaporating the fresh juices of oranges and lemons, either alone or mixed with sugar, and are employed as substitutes for the fruit, where the latter cannot be obtained.

VEGETABLES (Juices of,—Medicinal). These are principally prepared from the narcotic plants, and are generally preserved with spirit; or, less frequently, with ether.

Alcoholized Vegetable Juices, Preserved do. do.; Tinctures of Recent Plants; Succi Alcoholati,—Lat. *Alcoolatures*,—Fr. *Prep.* 1. The *juice*, obtained by powerful pressure, in the manner noticed above, is allowed to remain for 24 hours in a *cold place*, when the clear portion is decanted from the feculous matter which has subsided, and is then agitated with *one half* its *volume* of *rectified spirit* (56 o. p.); after another 24 hours the *clear portion* is again decanted, and, if necessary, filtered through *bibulous paper* or *linen*. In this way are now generally prepared the *preserved juices of aconite, belladonna, colchicum* (corms), *hemlock, henbane, foxglove, elaterium, lactuca virosa, taraxacum*, &c., sold in this country.

2. (P. Cod.) To the *fresh leaves*, bruised in a *marble mortar*, is added an equal weight of *rectified spirit*, and after maceration for 15 days, the whole is pressed, and the resulting tincture filtered. In this manner are prepared the *tinctures* of the *fresh leaves* of *aconite* (tinctura aconiti cum foliis recentibus), *belladonna, foxglove, hemlock, henbane, strong-scented lettuce* (lactuca virosa), *stramonium, trailing poison oak* (rhus toxicodendron), *mugwort* (artemisia vulgaris), *colchicum corms, squirting cucumber* (momordica elaterium), *jacobea, white poppy, taraxacum, &c. &c.*, of the Paris Codex.

Obs. These tinctures are much more powerful, and more certain in their operation, than those prepared from the dried plants. The *commencing dose* is from 2 to 5 drops, the effects of which should be carefully watched. The *products* of the *first* of the above formulæ keep as well as the ordinary tinctures, and there is less waste of spirit than with the *second*. That of the P. Cod. is, however, preferred by M. Soubeiran, as affording more uniform products; an opinion which is questionable. Béral orders *equal weights* of *juice* and *spirit;* Mr. Squire recommends $\frac{1}{2}$ part; Messrs. Bentley & Davenport $\frac{1}{4}$ part (both by volume); and M. Gieseke only $\frac{1}{5}$ part (by weight) of *spirit*, to 1 part of the *expressed juice*. The homœopathists generally go with M. Béral. Our own experience, which has been very considerable, and extends over upwards of 16 years, leads us to prefer the proportions given in formula 1, which are similar to those of Mr. Squire. If *less* spirit be employed the product is apt to suffer rapid deterioration when kept in a warm shop or surgery.

Etherized Vegetable Juices; Succi Ætherizati,—Lat. *Ethérolatures, Sucs Ethérés*,—Fr. For these we are indebted to M. Bouchardat. They are prepared as follows:—*Ether* is gradually added to the *depurated freshly expressed juice*, until, after active agitation, a *thin layer* of it rises to the surface on the mixture being allowed to repose for a minute or two; the whole is then set aside for 24 hours, when the supernatant ether is expertly removed by means of a pipette or syringe, and the juice is filtered; lastly, the decanted ether is returned to the filtrate, and the etherized juice is at once put into well-stopped bottles. For *use*, one of the bottles is reversed, and the *dose* taken from the lower part, so that the ether remains behind. We find, in practice, that decantation, carefully conducted, may be substituted for filtration; thus not only rendering the process less costly, but ensuring a more uniform product.

The etherized juices are said to retain their active properties for an indefinite period. The method has been successfully applied to the juices of *aconite, anemone, black hellebore*, and *hemlock*, and is probably applicable to many others; but, we think, not to the *juices* of *all* the narcotic plants, as has been asserted.

VEGETATION (Metallic). This name has been fancifully applied to the following—

Lead Tree; Arbor Saturni. Take of *sugar of lead*, 1 *oz.*; *distilled water*, 1½ pint; *acetic acid*, a few drops; dissolve, place the liquid in a clear white glass bottle, and suspend a *piece of zinc* in it, by means of a *fine thread.*

Silver Tree; Arbor Dianæ. From *nitrate of silver*, 20 gr.; *water*, 1 fl. oz.; dissolve in a phial, and add about ½ dr. of *pure mercury.*

Tin Tree; Arbor Jovis. From *chloride* or *muriate of tin*, 3 dr.; *nitric acid*, 10 to 15 drops; *distilled* or *rain water*, 1 pint; dissolve in a white glass bottle, and hang in it by a thread, a *small rod of zinc.*

Obs. In the above experiments, the metals are precipitated in a very beautiful arborescent form. It is curious to observe the laminæ shoot out as it were from nothing, assuming forms resembling real vegetation. This phenomenon results from galvanic action being set up between the liquid and the metals.

VEGETO-ALKALIES. See *Alkaloids.*

VELLUM is a fine kind of parchment prepared from the *skins* of *calves, kids*, and *lambs.* The skins are *limed, shaved, washed*, and *stretched* in hoops or other frames, where they are *scraped* and *trimmed* with the *currier's fleshing-knife*, and next carefully *rubbed down* with pumice stone; they are, lastly, *polished* with *finely powdered chalk* or *fresh-slaked lime*, and then dried. A GREEN COLOUR is given with a *solution* of *crystallized verdigris* to which a little *cream of tartar* and *nitric acid* has been added; and a BLUE COLOUR, with *solution of indigo.* The surface is often finished off with *white of egg*, and subsequent friction.

The *skins* of *sheep* are commonly used for *parchment;* those of *he-goats* and *wolves*, for *drum-heads;* and those of the *ass*, for *battledores.* The species of vellum used for *church services* by binders is said to be prepared from *pig-skins.* See *Pounce.*

VELVET COLOURS. Syn. *Map Stains, Paper do.; Lacca Fluida*,—Lat. *Prep.* 1. (*Blue.*)—*a.* Dissolve *litmus* in *water*, and add ⅓rd of *spirit of wine.*—*b.* Dilute *Saxon blue* or *sulphate of indigo* with *water.* If required for *delicate work*, neutralize the acid with chalk.—*c.* To an *aqueous infusion of litmus* add a few drops of *vinegar*, until it turns of a *full blue.*

2. (*Green.*)—*a.* Dissolve *crystallized verdigris* in *water.*—*b.* Dissolve *sap green* in *water*, and add a *little alum.*—*c.* Add a *little salt of tartar* to a *blue* or *purple solution of litmus*, until it turns green.—*d.* Dissolve equal parts of *crystallized verdigris* and *cream of tartar* in *water.*

3. (*Purple.*)—*a.* Steep *litmus* in water, and strain the solution.—*b.* Add a *little alum* to a stained *decoction of logwood.*—*c.* Add a *solution of carmine* (red) to a little *blue solution of litmus* or *Saxon blue.*

4. (*Red.*)—*a.* Macerate *ground Brazil-wood* in *vinegar*, boil a few minutes, strain, and add a little *alum* and *gum.*—*b.* Add *vinegar* to an *infusion of litmus* until it turns red.—*c.* Boil or infuse *powdered cochineal* in *water* containing a little *ammonia* or *sal-volatile.*—*d.* Dissolve *carmine* in *liquor of ammonia*, or in *weak carbonate of potash water;* the former is superb.

5. (*Yellow.*)—*a.* Dissolve *gamboge* in *water*, and add a little *alum.*—*b.* Dissolve *gamboge* in equal parts of *proof spirit* and *water.* Golden coloured.—*c.* Steep *French berries* in *boiling water*, strain, and add a little *alum.*—*d.* Steep *turmeric, round zedoary, gamboge*, or *annotta*, in spirits of wine.—*e.* Dissolve *annotta* in a *weak ley of sub-carbonate of soda* or *potash.*

Obs. The preceding, thickened with a *little gum*, are used as *inks* for writing, as *colours* to *tint maps, foils, paper, artificial flowers, &c.*, and to *paint on velvet.* Some of them are very beautiful. Those containing litmus, are, however, fugitive. It must be observed, that those made with *strong spirit* do not mix well with gum water, unless somewhat diluted with water. Any other transparent colours or stains may be employed for *painting on velvet*, as well as the above.

VELVET LEAF. Syn. *Pareira Brava, White do.; Pareira,*—Ph. L. E. & D. "The *root*" of "*cissampelos pareira*" (Ph. L.), *white pareira* or *velvet-leaf.* It is tonic, aperient, and diuretic. *Dose.* 20 to 60 gr.; in chronic and purulent inflammation and extreme irritability of the bladder; in leucorrhœa, dropsy, ulceration of the kidneys, &c.

VENESECTION. Syn. *Phlebotomy.* The abstraction of blood by opening a vein. The operation is now confined to the veins at the bend of the arms, and to the external jugular; but was formerly practised on various others. The method of proceeding is as follows:—"A *band* or *ligature* is to be applied around the *arm* above the point at which the vein is to be opened, so as to obstruct the passage of the blood to the heart; this causes an enlargement and turgidity of the vessel below the ligature. This bandage should never be applied so tightly as to prevent the passage of blood in the arteries of the part. The vein is to be opened by means of a *common* or *thumb-lancet*, or a *spring lancet.* In using the *first*, the *vein* is to be kept from rolling by means of the thumb of the left hand placed a small distance below where the puncture is to be made; but care should be taken not to alter the relative position of the skin and vein, because in resuming their position after the lancet is inserted, the aperture through the skin will no longer correspond with that in the vein, in consequence of which a *thrombus* or *ecchymosis* will form —a very common accident in venesection. The lancet is to be pushed into the vein, and when its point is within the cavity of the vessel, it is to be carried forward a little, so as to enlarge sufficiently the opening. The arm is to be kept extended after the operation until the necessary quantity of blood is taken. If the *blood* should *not flow as freely as is desired*, the patient should exert the muscles of the arm by grasping a stick, or moving the fingers.

"*After* a *sufficient quantity of blood* has been *drawn*, the flow is to be stopped by removing the ligature and placing a finger on the orifice, when any blood that has soiled the arm is to be wiped off, and the edges of the orifice carefully brought together, that they may unite by the first intention. To accomplish this, let the bleeder, with the thumb of that hand which holds the arm, push the skin towards the orifice, while he draws it on the other side to the same point with the compress; thus the skin will be thrown into folds at the wound, over which he is immediately to apply the compress, which should be broad to keep the skin better together, and thick to make the compression more certain.

"The *ligature* for *tying the arm*, so as to obstruct the flow of blood in the veins below it, should be a *soft old ribbon;* and the same may be employed for securing the *pledget over the orifice*, when the flow of the blood is to be stopped. The *pledget*, or *compress*, should be a piece of *linen folded into a square form*, about an inch in diameter, and comprehending three or four thicknesses of the material. It is always proper to use a *graduated basin* for *receiving the blood*, that the exact quantity drawn may be ascertained. If the *invalid* be *bled in bed*, he should *sit erect;* if he be up, he should be placed erect in a chair." (Dr. R. E. Griffith.)

The *common lancet* is usually employed in this country, but the *spring-lancet* is in almost general favour in the United States, and, according to Dr. Physick, of Philadelphia, has the advantages of durability, economy, and safety, greatly on its side. "There is no country in which venesection is more frequently performed than in the United States, and, *perhaps, none where fewer accidents from the operation* have occurred; of these few, I beg leave to state that *all the aneurisms* produced by bleeding, which I have seen, have been in cases where the *common lancet* was used." (*Elem. of Surgery.*)

VENISON. The flesh of several species of deer. That from good land, killed at the proper season, and eaten in a moderately fresh state, is most easily digestible, and, perhaps, the most wholesome of all the *red meats;* but when it is "*high*" or in a state of *incipient putrefaction*, it is far from wholesome, and often poisonous.

VENO BENO (La). See *Tea.*

VENTILATION. The proper ventilation of our habitations, as well as of other buildings in which we pass any considerable portion of our time, is quite as necessary to health as food and clothing. Lavoiser, writing in the middle of the last century, remarks,—"It is certain that mankind degenerate when employed in sedentary manufactures, or living in crowded houses, or in the narrow lanes of large cities; whereas they improve in their nature and constitution in most of the country labours which are carried on in the open air." Yet many persons, by the care which they take to shut out fresh air, and to prevent the escape of that which their own bodies, by pulmonary and surfacial respiration, have contaminated, would seem to hug to themselves the discomfort of breathing over and over again an impure and unrefreshing atmosphere, and to be anxious to finish their career by lingering suicide. The almost universal indifference to the subject, considering its importance, is unaccountable.

The first step towards effecting and maintaining a liberal supply of fresh air, is either by means of ventilators, or by regularly opening the windows for stated periods daily. During the colder portion of the year, when fires are kept burning, and there is an up-current in the chimney, nothing is so simple and effective as the well-known *chimney-valve* of Dr. Arnott; and, indeed, without this, open fires are powerful instruments of ventilation. In cold weather, where expense is not an object, the apartments may be supplied with air that has been previously warmed by passing through a heated chamber, on the principle recommended by Dr. Reid; but care must be taken, that in warming the air, we do not over-heat it, nor contaminate it.

A *sufficient supply of light*, another powerful sanitary agent, is now regarded as nearly as essential as thorough ventilation, and the two are commonly treated of together. According to Palladio, the *openings of windows* should not *exceed* a *fourth*, nor be *less than* a *fifth* of the length of a side of a room, and should be in *height* two and one sixth times the width. Mr. Gwilt, another high authority on this subject, has given as a definite rule, that we should allow 1 *square foot of glass* to every 100 *cubic feet of space* in any apartment or inclosure. A great deal must, however, depend on the shape of the apartment; but, in all cases, care should be taken that the windows are placed at the longest side of the room, and not at the narrowest, or the end of it. A *southern aspect* affords the most light and heat; a *northern one*, the most diffused and least variable light, and, is hence, usually chosen by artists for their studios.

VERATRIA. Syn. *Veratrine*, *Veratrina*, *Sabadilline*; *Veratria*,— Ph. L. & E. A vegetable alkali discovered by Pelletier and Caventou, in the seeds of veratrum sabadilla (*asagræa officinalis*), and in white hellebore.

Prep. 1. (Ph. E.) Digest *sabadilla seeds* (cevadilla) in *boiling water* for 24 hours, then squeeze them, dry them thoroughly by a gentle heat, beat them in a mortar, and separate the seeds from the capsules by agitation in a deep and narrow vessel; next grind the *seeds* in a coffee mill, and exhaust them by percolation with *rectified spirit;* concentrate the *resulting tincture* by distillation so long as no deposit forms, and pour the residuum, whilst still hot, into 12 times its volume of *cold water;* then filter through *calico*, and wash the residuum on the filter as long as the *washings* yield a precipitate with ammonia; unite the *filtered liquid* with the *washings*, add *ammonia* in excess, collect the precipitate on a filter, wash it *slightly* with *cold water*, and dry it first by imbibition with *filtering paper*, and then in the *vapour bath.* "The *product* is not pure, but sufficiently so for medical use. From this *coloured substance* it may be obtained *white*, but at considerable loss, by solution in *very weak hydrochloric acid*, decolorization with *animal charcoal*, and re-precipitation with ammonia."

2. (Ph. L. 1836.) This is the same in principle as the last; a tincture is formed by boiling the *seeds* in *rectified spirit*, which is then evaporated to a *syrup*, dissolved in *very dilute sulphuric acid*, the *veratria* precipitated with *magnesia*, re-dissolved in *very dilute acid*, treated with *animal charcoal*, the filtrate again evaporated to a syrup, and precipitated with *ammonia;* it is, lastly, washed, and dried.

3. By means of *ether*, as noticed under *Alkaloid* and *Aconitine.* This is by far the best method.

Prop. Pure veratria is perfectly white; but as usually met with, it is a yellowish or greenish-white powder; it is highly acrid; uncrystallizable; scarcely soluble in water; soluble in ether; and freely soluble in hot alcohol; heated to about 125° Fahr., it fuses like wax, and solidifies, upon cooling, to a transparent yellow mass. With the dilute acids it forms *salts*, which are either amorphous or difficultly crystallizable. The smallest possible portion of its powder causes violent sneezing.

Tests. 1. Potassa, ammonia, and their carbonates, give flocculent white precipitates, which at first are not crystalline under the microscope, but which, after some minutes, assume the appearance of small scattered clusters of short prismatic crystals; they are insoluble in excess of potassa and its carbonate, and only very slightly so in excess of ammonia.—2. With sulphuric acid it strikes an intense red colour, changing afterwards to crimson, and finally to violet.—3. A dilute acetic solution of veratria is turned to a *superb red* by strong sulphuric acid.

Veratria is *distinguished* from *brucia* and the other alkaloids by its easy fusibility,—by the crystalline form of its precipitate with potassa, and—by its reaction with oil of vitriol.

Uses, &c. "As an external application it has been efficaciously employed by Magendie in France, and by Dr. Turnbull in this country; but the extravagant eulogies of the latter have not tended to confirm the reputation of the remedy." (Dr. A. T. Thomson.) From 6 to 12 gr. dissolved in 1 fl. oz. of *rectified spirit*, as a liniment; or 30 gr. mixed with 1 dr. of *olive oil*, and 1 oz. of *lard*, as an ointment, have been occasionally found very serviceable in neuralgia, and other like painful affections, and in gouty and rheumatic paralysis. As an internal remedy it possesses no advantage, as it merely acts as a violent and depressing cathartic. *Dose.* $\frac{1}{24}$ to $\frac{1}{16}$ gr. In larger doses, it acts as a *powerful irritant poison.* For *antidotes, &c.*, see *Alkaloid.* The *product* varies from 0·1 to 0·2%.

VERATRIC ACID. Syn. *Sabadillic Acid.* A crystallizable, fusible, volatile acid, soluble in alcohol, slightly so in water, and insoluble in ether, found by Merck, in the seeds of sabadilla. It is *obtained* by exhausting the *bruised seed* with a mixture of *alcohol* and *sulphuric acid*, and precipitating the *filtered solution*, with *milk of lime*; *veratrate of lime* remains in solution, and on this salt being decomposed with *hydrochloric acid*, the *veratric acid* crystallizes out.

VERATRUM. See *White Hellebore.*

VERDIGRIS. Syn. *Ærugo*,—Lat. *Vert-de-gris*,—Fr. This is a mixture of binacetate and basic acetate of copper, in variable proportions, obtained in the wine districts of the South of Europe, by the action of *refuse grapes*, from which the juice has been expressed, on thin sheets of copper. When *pure*, it should dissolve, almost entirely, and without effervesence, in dilute sulphuric acid. (See *p.* 289.) It is very *poisonous*; for antidotes, see *Copper.*

An *inferior quality* of *verdigris* is now prepared from *pommage*, or *apple marc*, in the cyder districts of England.

VERDIGRIS. (Distilled). Syn. *Crystallized Verdigris.* This is prepared in the wine districts by dissolving of *ordinary verdigris*, 1 part; in good *distilled vinegar*, 2 parts; the operation being performed in a copper vessel, by the aid of a gentle heat, and agitation; the *solution* is afterwards slowly evaporated until a pellicle begins to form on the surface, when it is transferred into glazed earthen pans (*oulas*), in each of which is placed 2 or 3 cleft sticks, and it is then left in a warm apartment for 14 or 15 days, to crystallize.

A *spurious article* is often *prepared* by adding a *solution* of *sulphate of copper*, 12½ *lb.*; to a *solution* of *sugar of lead*, 19 *lb.*, or q. s.; and filtering, evaporating, and crystallizing the mixture.

"There is a *triple acetate of copper and lime*, which *resembles distilled verdigris* in colour. It was manufactured pretty extensively in Scotland some years ago, and fetched a high price, till I published an analysis of it in the *Edin. Phil. Trans.* It is much inferior, for all uses in the arts, to the proper binacetate." (Ure.)

Pure distilled verdigris is *entirely soluble* in water and is not precipitated on the addition of sulphuric acid, or of ammonia in excess. (See *p.* 289.)

VERDIGRIS (English). *Prep. Blue vitriol*, 24 *lb.*; *white vitriol*, 16 *lb.*; *sugar of lead*, 12 *lb.*; *alum*, 2 *lb.*; all coarsely powdered; mix, and heat them in a pot over the fire until they unite into a mass. Sold by fraudulent dealers for foreign verdigris.

VERDITER. Syn. *Blue Verditer*, *Refiners' Verditer*; *Cendres Bleues.* A blue pigment obtained by adding *chalk*, *whiting*, or *milk of lime* to a *solution of copper in aquafortis*; or, by triturating *recently precipitated* and still moist *carbonate* or *oxide of copper* with *hydrate of lime.*

Prep. A quantity of *whiting* or *milk of lime* is put into a tub, and upon this the *solution of copper* is poured; the *mixture* is stirred every day for some hours together, until the liquor loses its colour; it is then poured off, and *more solution of copper* added; this is repeated until the *whiting* or *lime* has acquired the proper colour; the whole is then washed with *water*, drained, spread on *chalk stones*, and dried in the sun.

Obs. The cupreous solution employed in the above process, is made by neutralizing the *nitric solution* obtained from the refiners of gold and silver, by heating it along with *metallic copper.* For the *finer qualities* of *verditer* the *lime* should be of the purest kind; and the cupreous precipitate should be carefully triturated with it, after it is nearly dry, by which a fine velvety appearance is produced. The *cendres bleues en pâtes* of the French differs from the above mainly in a solution of *chloride of copper* being employed, and in the resulting *green precipitate* being turned *blue* by the action of *carbonate of potash.* Verditer is made into crayons whilst moist, or dried into a powder, or it is used as a water colour in the moist state.

VERDITER (Green). Syn. *Bremen Green.* The process for *refiners' verditer* frequently miscarries, and a *green colour* is produced, instead of a *blue one.* It may also be obtained directly by omitting the "*blueing up*" with *potash,* mentioned above.

VERJUICE. Syn. *Agresta, Omphacium,*—Lat. The *expressed juice* of *unripe grapes.* The term is also often extended to the *expressed juice* of the *wild* or *crab apple.* It was formerly used as an astringent and refrigerant in medicine; but is now principally employed as an ingredient in sauces, ragouts, &c.

VERMICELLI. This, like *macaroni,* is prepared from a stiff paste made of a peculiar fine kind of *granular wheat flour,* called *semoule,* which is mixed up with *hot water,* and after being well kneaded, is formed into small ribands, cylinders, or tubes, by being placed in a vertical cylinder press, the bottom of which is filled with proper shaped holes, through which it is driven by an *iron plate* or "*follower*" being forced down by means of a powerful screw. The pieces that protrude are broken off, twisted into any desired shape upon paper, and dried. Those in the form of *fillets* or *ribands* are called "*lazagnes.*" See *Macaroni.*

VERMIFUGES. Syn. *Anthelmintica, Helminthagoga, Vermifuga,*—Lat. See *Anthelmintics* and *Worms.*

VERMILION. Syn. *Factitious Cinnabar, Red Sulphuret of Mercury.* This article may be prepared both in the *moist* and *dry way;* that of *commerce* is almost entirely obtained by the latter.

Prep. 1. By *Sublimation.* Take of *pure mercury,* 202 parts; *pure sulphur,* 33 parts; fuse them together by a gentle heat, observing not to allow the mass to take fire; when fused cover over the vessel, and when the whole has become cold, powder the mass, and sublime it in a closed vessel, so placed in a furnace that the flame may freely circulate and play upon it to about half its height; the heat being at first gradually applied, and afterwards augmented until the lower part of the subliming vessel becomes red hot; the *cold sublimate* is broken into pieces, ground along with water to a fine powder, elutriated, passed through a sieve, and dried. *Prod.* Fully 112% of the *weight* of the *mercury* employed.

2. In the *Humid way.* (Brunner.) Take of *pure quicksilver,* 300 parts; *pure sublimed sulphur,* 114 parts; triturate them together for several hours until a *perfect ethiops* is formed, add gradually of *caustic potassa,* 75 parts; (dissolved in) *water,* 450 parts; continue the trituration for some time longer, then gently heat the mixture in an *iron vessel,* at first, constantly stirring, but *afterwards,* only from time to time, observing to keep the heat at about 113°, or, at all events, under 122° Fahr., and to add *fresh water,* to compensate for the portion evaporated. When the colour begins to redden, great caution is requisite to preserve the mixture at the lower temperature, and to keep the sulphuret of mercury perfectly pulverulent; as soon as the colour becomes nearly "*fine,*" the process must be conducted with increased caution, and at a lower heat for some hours, or until a rich colour is produced, when the *newly formed vermilion* must be *elutriated with water,* to separate any particles of metallic mercury, and carefully dried. *Prod.* 332 parts of *vermilion* equal in brilliancy to the finest Chinese.

Obs. It has been said that the rich tone of Chinese vermilion may be imitated by adding to the materials 1% of *sulphuret of antimony,* and by digesting the ground sublimate, first in a solution of sulphuret of potassium, and next in diluted hydrochloric acid, after which it must be well edulcorated with water, and dried. Our own belief is, that the finer qualities of vermilion owe their superiority of shade more to the *care* bestowed on their *sublimation,* and the extent to which their *division* is carried, than to anything else.

Vermilion is a beautiful and permanent red pigment, and works and covers well both in oil and water.

VERTIGO. Dizziness and swimming of the head. In its more serious forms there is more or less mental confusion, the objects around the patient appear in motion, the ears are oppressed with strange sounds, and visual illusions are experienced, whether the eyes be closed or open, and in darkness as well as in the light. The *causes,* are fulness of the vessels of the head, nervous derangement, general debility, hæmorrhage, the use of narcotics, an overloaded stomach, and, in some cases, an empty one. It is also frequently symptomatic of fevers and inflammations, and of a condition threatening apoplexy. The *treatment* must be varied according to the cause, and the peculiar habit or condition of the patient.

VESICANTS. Syn. *Epispastics; Epispastica, Vesicantia.* Substances which vesicate or raise blisters. Among these are the *cantharis* or *blistering fly*, *mezereon*, *croton oil*, *boiling water*, *&c.;* the first only of which is now in common use in England.

"It is a principle sufficiently established with regard to the living system, that where a morbid action exists, it may often be removed by inducing an action of a different kind, in the same or a neighbouring part. On this principle is explained the utility of blisters in local inflammation and spasmodic action, and it regulates their application in pneumonia, gastritis, hepatitis, phrenitis, angina, rheumatism, colic, and spasmodic affections of the stomach; diseases in which they are employed with the most marked advantage. A similar principle exists with respect to pain; exciting one pain often relieves another. Hence blisters often give relief in toothache, and some other painful affections. Lastly, blisters, by their operation, communicate a stimulus to the whole system, and raise the vigour of the circulation. Hence, in part, their utility in fevers of the typhoid kind, though in such cases they are used with still more advantage to obviate or remove local inflammation." (*Med. Lex.*)

Blisters are *commonly prepared* with *cantharides plaster*, or with some other *preparation of cantharides;* and, in the former case, are usually lightly covered with the *powdered fly.* In order to *prevent* the *action* of the *cantharides* upon the mucous membrane of the *bladder*, blistering plasters are often sprinkled with a little *powdered camphor*, or better still, are moistened with camphorated ether, which leaves a thin layer of camphor. In all these cases the layer should not be too thick, for in that case the plaster would not take effect.

When it is not wished to maintain a discharge from the blistered part, it is sufficient to make a puncture in the vesicle, to let out the fluid; but when the case requires the *blister* to be "*kept open*," as it is called, the whole of the detached cuticle is carefully removed with a pair of scissors, and the part is dressed with either the *ointment of cantharides* or of *savine*, at first, more or less diluted with *lard* or *simple ointment*, with an occasional dressing of resin cerate. According to Mr. Crowther, the blistered surface is best kept clean, by daily fomentation with warm water.

Of late years, to obviate the unpleasant effects occasionally arising from the common blister, various compounds having cantharides for their base have been brought before the public. Among these the following may be noticed:—

1. Take of *cantharides*, in fine powder, 2 parts; *spermaceti*, 2 parts; *olive oil*, 4 parts; *white wax*, 8 parts; *water*, 10 parts; simmer, with constant agitation for 2 hours, strain through flannel, separate the plaster from the water, gently remelt it with *common turpentine*, 1 part, and spread the mass whilst still fluid. This nearly resembles the form recommended by MM. Henry and Guibourt.

2. (P. Cod.) Distil off the *ether* from a *concentrated ethereal tincture of cantharides*, melt the *oily residue* with twice its weight of *white wax*, and spread the mixture on *thin oiled silk*, or on *cloth* prepared with *wax plaster*.

3. (Oettinger.) *Cantharidal ether* (prepared from cantharides, 1 part; ether, 2 parts), and *sulphuric ether*, of each, 10 dr.; *turpentine* and *black resin*, of each, 2½ dr.; mix, dissolve, and apply it to the surface of *stretched silk* or *taffeta* which has been previously prepared with *two coatings of a solution of isinglass.*

Obs. The above compounds are spread on *leather*, *linen*, *paper*, *silk*, *oiled silk*, *taffeta*, *&c.*, and then form the numerous compounds vended under the names of—*Blistering tissue*, *Charta* (paper) *epispastica*, *Pannus* (cloth) *vesicatorius*, *Papier epispastique*, *Sparadrapum vesicatorium*, *Taffetas vesicans*, *Tela* (tissue) *vesicatoria*, *&c.*

Acetic extract of cantharides, *croton oil*, or *extract of mezereon*, is sometimes substituted for the ethereal extract ordered in the above formulæ.

The *Papier epispastique*, de Vée, is prepared of three strengths, which are respectively distinguished by the colours, *white*, *green*, and *red.* The *composition* is made by boiling *powdered cantharides*, for an hour with *water*, *lard*, and *green ointment*, or with *lard coloured with alkanet root*, adding *white wax* to the *strained fats*, and spreading the mixture whilst fluid;—No. 1, is made with 10 oz. of *cantharides*, to 4 ℔ of *lard;*—No. 2, of 1 ℔ of *cantharides*, to 8 ℔ of *green ointment;* and—No. 3, of 1½ ℔ of *flies*, to 8 ℔ of *reddened lard.* To each are added 2 ℔ of *white wax.*—(Dorvault.)

The *Magistral blister*, of M. Valleix, is a revival of the *vesicating epithem* noticed at *page* 377.

VESICATION. The *formation* of a *blis-*

ter is a vital process, and its success may be taken as a proof of the presence of life. Hence, a French physician, Dr. Mandl, has suggested such a stimulation of the skin as would ordinarily cause a blister as a test of life, in those cases of *long-continued trance* which we occasionally hear of, where all the functions of life seem to be extinct. Dr. Mandl's plan is to apply a *stick of lunar caustic.* The application of a little strong vinegar of cantharides or other *cantharidal blister* of the size of a sixpenny piece, or of two or three spoonfuls of *boiling water* by means of a bent tube of like diameter, is, however, more certain and satisfactory.

VESICATORINE. Syn. *Cantharidine, Cantharidina, Cantharides-camphor.* The blistering principle of Spanish flies, discovered by M. Robiquet.

Prep. 1. (P. Cod.) Exhaust *powdered cantharides* with *concentrated alcohol,* by percolation; distil off the *spirit* from the *filtered tincture,* and leave the residuum to deposit crystals; these may be purified by dissolving them in *boiling alcohol,* digestion with *animal charcoal,* filtration whilst hot, and crystallizing by refrigeration.

2. (Thierry.) Macerate *cantharides* (in coarse powder) for several days in *ether,* in a closed displacement apparatus; then, after the whole of the soluble matter has been extracted by the addition of fresh portions of ether, pour on sufficient *water* to displace the retained ether; next distil off the ether, dissolve the remaining extract in *boiling alcohol,* filter while hot, and abandon the filtrate to spontaneous evaporation. *Prod.* 0·5%.

3. Digest the *aqueous extract of cantharides* in *hot alcohol,* filter, evaporate to dryness, digest the *residuum* in *sulphuric ether,* evaporate, and slightly wash the resulting crystals with cold alcohol.

Prop., &c. Micaceous plates resembling spermaceti; fusible; vaporizable; insoluble in water; soluble in ether, oils, acetic acid, and hot alcohol; powerfully *vesicant* and *poisonous.* Its vapour, even at ordinary temperatures, frequently produces temporary blindness. The 1-100th part of a grain, placed on a piece of paper, and applied to the edge of the lower lip, caused small blisters in 15 minutes, which, when rubbed with a little simple cerate, extended over a large surface, and covered both lips with blisters. (Robiquet.)

VETCH. The common generic name of various leguminous plants with herbaceous stems, and (generally) twining tendrils. The *common vetch* (*vetches, tares*) is the *vicia sativa* (Linn.), now much cultivated as green fodder for milch cows and working stock. The *seeds* (tares) were formerly reputed detersive and astringent. Those of "the Canadian variety make good bread." (Lindley.)

VETERINARY MEDICINES. The common form of medicine for HORSES, is that popularly known as *horse balls.* They are usually *prepared* by mixing the *dry ingredients,* in the state of powder, with a sufficient quantity of *treacle,* or *syrup bottoms,* to give the mass a proper consistence for rolling into balls; adding, when necessary, *linseed meal,* or any other simple powder, to increase the bulk. The usual practice among the *farrier's druggists* is to keep a compound known in the trade as "*ball-mass,*" or "*common mass,*" ready prepared to give form and bulk to more active ingredients. This is usually made of about equal parts of *linseed meal* and *treacle,* together with a little *palm oil* or *lard,* thoroughly incorporated by kneading with the hands; and, it is kept in a cool situation, tied over to prevent it drying and hardening. For *use,* the ball-masses are either rolled or moulded into small cylinders of about 1½ to 1¾ *oz.* in *weight;* and in *size,* from 2 to 2¾ inches long, and from about ½ to ⅞th of an inch in diameter; and they are *wrapped* in soft paper which is administered with them. Those for DOGS are commonly formed into large boluses or nut-like pieces. The common practice, in some houses, of adding a little *salt of tartar* or *acetate of potash* to ball-masses kept in stock, for the purpose of preserving them in a soft state, is not to be commended; since these articles decompose many of the saline and mineral compounds which are subsequently added to them.

Medicines for NEAT CATTLE are *always* administered in a liquid form, popularly called *drenches,* which are noticed at *page* 339. A similar plan is adopted with *small cattle,* as SHEEP and GOATS. For these, however, the quantity should seldom exceed ¼ pint. In all cases, *drenches* should be *very slowly* administered.

The *following* are a few *useful horse-balls:—*

Alterative Balls.—1. *Levigated sulphuret of antimony, sulphur,* and *linseed meal,* of each, 3 *oz.; nitre,* 4 *oz.; palm oil,* q. s. to form a mass; for 12 balls. One to be taken every day, or every other day.

2. (J. Bell & Co.) *Sulphuret of antimony, nitre, sulphur,* and *ethiop's mineral,* of each, 3 oz.; *soft soap,* 10 oz.; *oil of juniper,* ½ oz.; for 12 balls. As the last.

3. (White.) *Sulphuret of antimony, ca-*

raways, and *treacle*, of each, ½ oz.; for one ball. As the last.

Cordial Balls.—1. (Blaine.) *Coriander seed*, *caraway*, and *gentian*, of each, 8 oz.; *ginger*, 4 oz.; *oil of aniseed*, ½ oz.; *honey* or *palm oil*, q. s. to form a mass. Cordial, warming, and stomachic. *Dose.* 1½ oz.

2. (Hill.) *Anise*, *caraway*, and *cumin seed*, of each, 4 ℔; *ginger*, 2 ℔; *treacle*, q. s.; divide into 1¾ oz. balls. *Prod.* 21 ℔.

Cough Balls.—1. (Blaine.) *Ipecacuanha*, 1 dr.; *camphor*, 2 dr.; *honey*, q. s. to form a ball. One night and morning.

2. (B. Clarke.) *Emetic tartar* and *benzoin*, of each, 2 dr.; *squills*, 4 dr.; *spermaceti* and *balsam* of *copaiba*, of each, 1 oz.; *elecampane* and *sulphur*, of each, 2 oz.; *syrup of poppies*, q. s. to mix; for 8 balls. As the last.

Diuretic Balls.—1. (Bracy Clark.) *Nitre* and *common turpentine*, of each, 1 ℔; *Castile soap*, ½ ℔; *barley meal*, 2½ ℔, or q. s. For common-sized balls.

2. (Morton.) *Digitalis*, 1 oz.; *aloes*, 2 oz.; *liquorice*, 13 oz.; *honey* or *Barbadoes tar*, q. s. to mix; for 1 oz. balls. One, twice a day, with care.

Physic Balls, *Purging do.*, *Cathartic do.*—1. *Aloes* and *hard soap*, of each, 5 *oz.*; *salt of tartar*, and *cayenne pepper*, of each, 1 *oz.*; melt together. For 8 balls.

2. (Vet. Coll.)—*a.* (Common Physic ball.) *Aloes*, 8 oz.; *treacle*, 3 oz.; *olive oil*, 1 oz.; melted together. *Dose.* 1 to 1½ oz.

b. (Stronger ball.) To each dose of the last, add of *croton oil*, 4 to 8 drops.

Obs. The *dose* of the above, is 1 ball, fasting in the morning, preceded by a *bran mash*, on one or two successive nights, and followed by *gentle* exercise until the ball begins to operate.

Worm Balls.—1. *Barbadoes aloes*, 5 dr.; *calomel* and *ginger*, of each, 2 dr.; *oil of cloves*, 12 drops; *treacle*, q. s. for a ball.

2. (J. Bell & Co.) *Barbadoes aloes*, 5 to 8 dr.; *powdered tin*, *ethiop's mineral*, and *ginger*, of each, 2 dr.; *oils of aniseed* and *savine*, of each, 20 drops; *treacle*, q. s. for a ball.

3. (Clater.) *Sulphur* and *emetic tartar*, of each, 1 dr.; *linseed meal*, 4 dr.; *palm oil*, q. s. to form a ball. One every morning, having prepared the animal with a *physic ball* containing 1 dr. of *calomel*.

VINE. See *Grapes* and *Vinous Fermentation*.

VINEGAR. Syn. *Acetum*,—Lat. *Vinaigre*,—Fr. Dilute acetic acid, more or less contaminated with gum, sugar, and vegetable matter.

1. *Vinegar*, *Malt do.*, *British do.*; *Acetum* (Britannicum),—Ph. L. & E. This is the ordinary coloured vinegar consumed in this country, and is correctly described in the Ph. L. as "impure (dilute) acetic acid, prepared by fermentation from an infusion of malt (malt-wort)."

In the *manufacture* of *malt vinegar* a *mixture* of *malt* and *barley*, is mashed with *hot water*, and the resulting *wort* is fermented, as in the common process of brewing. The *liquor* is then run into barrels, placed endways, tied over with coarse canvass, and arranged side by side in darkened chambers, moderately heated by a stove, and freely supplied with air. Here it remains till the acetous fermentation is nearly complete, which usually occupies several weeks, or even months. The *newly formed vinegar* is next run off into two large tuns, furnished with false bottoms, on which some "*rape*" (the pressed cake from making domestic wines, or the green twigs or cuttings of vines,) is placed. One of these vessels is wholly, and the other only about 3-4ths filled. The fermentation recommences and the *acetification* proceeds more rapidly in the latter than in the former tun, and the liquor it contains consequently matures the sooner. When fit for sale, a portion of the vinegar is withdrawn from the smaller quantity, and its place supplied with a like quantity from the full tun, and this in its turn is refilled from the barrels before noticed. This process is carried on with a number of tuns at once, which are all worked in pairs.

Formerly, *malt vinegar* was wholly made by placing the wort in casks, loosely covering the bung-holes with tiles, and exposing them to the joint action of sun and air for several months, or until the acetification was complete.

Prop., *&c.* The general *properties* of *malt vinegar* are well known. Its pleasant and refreshing odour is chiefly derived from acetic acid and acetic ether. Its strength is distinguished by the makers as Nos. 18, 20, 22, and 24; the last of which, also called "*proof vinegar*," is the strongest, and usually contains about 4·6% of *real*, or about 5% of *glacial acetic acid*. Its density varies according to the quantity of foreign matter which it contains. Sp. gr. 1·006 to 1·019,—Ph. E.; 1·019,—Ph. L.; 1·0135 to 1·0251,—Thomson. This vinegar usually contains a small quantity of sulphuric acid. The presence of 1-1000th part of this acid is allowed by law.

Pur. "Brownish; of a peculiar odour. Its sp. gr. is 1·019. 1 fl. oz. of the acid is saturated by 1 dr. of the crystals of carbonate of soda. If, after 10 minims of solution of chloride of barium have been added to the same quantity, more of the chloride be poured into the filtered acid, nothing further is thrown down. The colour is not changed by the addition of hydrosulphuric acid." (Ph. L.) "Solution of chloride of barium being added to 1 fl. oz. of this vinegar, the precipitated sulphate of baryta does not exceed in weight 1·14 gr." (Ph. L. 1836.)

2. *Wine Vinegar*, *French do.*; *Vinaigre d'Orleans*; *Acetum Gallicum*,—Ph. E. & D. *Acetum Vini*,—Ph. D. 1826. This is prepared, in wine countries, from *grape-juice* and *inferior new wines*, worked up with wine-lees, by a nearly similar process to that adopted for malt vinegar. That prepared from white wine (*white wine vinegar*) is the most esteemed. It is purer and pleasanter than malt vinegar. Sp. gr. 1·014 to 1·022, —Ph. E.; 1·016,—Phillips. It usually contains from 5 to 6% of acetic acid. "100 parts of *good Orleans vinegar* should require 10 parts of *dry carbonate of potassa* for saturation." (Soubeiran.)

3. *German*, or *Quick-method of making Vinegar*; *Process of Ham*. This method is based upon the fact, that acetification is the mere oxidation of alcohol in contact with organic matter. Hence, by employing dilute alcohol, or liquors containing it, and by vastly enlarging the surface of the liquid exposed to the air, at a proper temperature, we may reduce the period occupied in acetification from weeks to as many hours. In *practice* this is *effected* by causing the *dilute spirit* previously mixed with 1-1000th part of *sugar* or *malt extract*, or the *fermented* and *clarified malt-wort*, to *slowly trickle* down through a *mass* of *beech shavings* steeped in *vinegar*, and contained in a vessel called a *vinegar generator* (essigbilder), or *graduation vessel*. This is an *oaken tub*, narrower at the bottom than at the top, furnished with a *loose lid* or *cover*, below which is a *perforated shelf* (colander or false bottom), having a number of small holes, which are loosely filled with *packthread* about 6 inches long, and prevented from falling through by a knot at the upper end. The *shelf* is also perforated with four *open glass tubes*, as air vents, each having its ends projecting above and below the shelf. This arrangement is repeated a *second*, and a *third* time, or even oftener, according to the size of the vessel. The *tub* or *graduator* at its lower part is pierced with a horizontal row of eight equidistant round holes, to admit atmospheric air. One inch above the bottom is a *syphon-formed discharge pipe*, whose upper curvature stands one inch below the level of the air-holes in the side of the tub. The *floors* or *partitions* of the *tub* or *generator* being covered with *birch twigs* or *beech chips* to the depth of a few inches, the *alcoholic liquor* (first heated to between 75° and 83° Fahr.) is introduced at the upper part of the apparatus. This immediately commences trickling slowly down through the holes by means of the packthreads, diffuses itself over the chips or twigs forming the respective strata, slowly collects at the bottom of the tub, and then runs off by the syphon pipe. The air enters by the circumferential holes, circulates freely through the tub, and escapes by the glass tubes. As the acetification proceeds, the temperature of the liquid rises to 100° or 105° Fahr., and remains stationary at that point while the action goes on favorably. The *alcoholic solution* or *wort* requires to be passed three or four times through the cask before acetification is complete, which is, in general, effected in from 24 to 36 hours.

Obs. For the *production* of a *superior vinegar* by this process, it is necessary that the *spirit* employed be sufficiently pure not to contaminate the product with its flavour or odour; and that the *malt-wort* should be fermented and treated with all the care usually employed in the production of beer. Messrs. Evans, Hill, & Co., who now produce the purest, finest flavoured, and best-keeping vinegars of any English manufacturers, are in the habit of *filtering* or *clarifying* their *fermented wash*, and also of *storing* it away for several months ere they subject it to *acetification* in the *graduator*. The most *favorable temperature* for the process is about 90° Fahr., and this should be preserved, as much as possible, by artificial means. *Prod.* A *malt-wort* of the sp. gr. 1·072, or "in technical language, weighing about 26 *lb.* per barrel, afforded a *vinegar* containing 5·4% of *pure acetic acid*, and a *residuary extract* of 10 *lb.* from 36 gall. The *former* of these would indicate 35 *lb.* of *sugar*, or 13·7 *lb.* per barrel of gravity; whilst the *latter* shows 3·8 *lb.* per barrel; the two united being only 17·5 *lb.*, instead of 26, the original weight. The loss, therefore, has been 8·5 *lb.*, or from a sp. gr. of 1·072 to less than 1·050." (Ure.) Thus, about one-third of all the extractive matter of the malt is lost or dissipated during the processes of fermentation and acetification. According to Knopp, a mixture of about 80 gall. of *water*, 9 gall. of *spirit* of from 44 to 45% Tralles (18 or 20 u. p.), and 3 gall. of *vinegar* containing 3·5% of real acid, forming together 92 gall., yield, on an average, an almost equal quantity of vinegar, or about from 90 to 91 gall. of the above-stated strength.

4. *Wood Vinegar.* See *Pyroligneous Acid.*

5. *Other Varieties of Vinegar,* of minor importance; chiefly domestic, and commonly "worked" as malt vinegar.—*Ale Vinegar, alegar; acetum cerevisiæ.* From strong pale ale, which has soured.—*Argol Vinegar; acetum ex tartaro.* From white argol or cream of tartar, 1 *lb.;* dissolved in boiling water, 2 gall.; with the addition, when cold, of proof spirit or whiskey, 3 pints.—*Crystal Vinegar.* Pickling vinegar decoloured with fresh burnt animal charcoal.—*Cyder Vinegar.* From cyder, worked as malt vinegar.—*German household Vinegar.* From soft water, 7½ gall.; honey or brown sugar, 2 *lb.;* cream of tartar, 2 *oz.; corn spirit* or whiskey, 1 gall.—*Gooseberry Vinegar.* From bruised gooseberries and brown sugar, of each, 1¼ *lb.;* water, 1 gall. *Other fruits* may be substituted for gooseberries.—*Pickling Vinegar.* The strongest pale malt-vinegar.—*Raisin Vinegar.* From the marc left from making raisin wine, 1 cwt. to every 12 or 15 gall. of water, along with a little yeast.—*Sugar Vinegar.* From brown sugar, 4 *lb.* to each gallon of water.—*Whiskey Vinegar.* From whiskey, 1 pint; *sugar,* 2 *oz.;* yeast, a dessert-spoonful.

Pur., Tests, & Assay. These are, for the most part, rather fully noticed under *Acetic acid, Acetimetry, Pyroligneous acid,* and *above.* The following additional *tests, &c.,* may, however, be useful:—1. Paper written on, or smeared with *pure vinegar,* is *not charred* when strongly warmed before the fire; if it is, the sample examined contains fully 2% of OIL OF VITRIOL.—2. A small porcelain capsule, or china cup, dipped into a solution of sugar in 30 times its weight of water, and then heated to a temperature equal to that of boiling water, is *not* materially *discoloured* when a drop of pure vinegar is poured on it; but a spot of an *intensely brown* or *black colour* is formed if the sample contain only 1-300th part of SULPHURIC ACID; if it contains only 1-1000th part, the spot is *olive green;* and if a less quantity, then only of a *pale green colour.*—3. The heavy white precipitate given with chloride of barium (see *above*) shows the presence of *oil of vitriol;* each grain after being dried, and gently ignited, represents 0·344 gr. of DRY SULPHURIC ACID. If the precipitate from 1000 gr. of the vinegar exceeds 2½ gr., it contains an illegal quantity of this acid.—4. If a solution of nitrate of silver gives a *cloudy white precipitate,* HYDROCHLORIC ACID (*spirit of salt*) is present.—5. If, after the addition of 2 or 3 gr. of carbonate of potash, and evaporation of the sample to dryness, the residuum *deflagrates* when ignited, the sample under examination contains NITRIC ACID (*aquafortis*).—6. If the vinegar be *blackened* by sulphuretted hydrogen or hydrosulphuret of ammonia, it contains either *lead* or *copper.* If it gives a *yellow precipitate* with iodide of potassium or chromate of potash, the metal is LEAD. If ferrocyanide of potassium gives a *bronze-brown* coloured precipitate, or a little olive oil when agitated with some of the vinegar be turned *green,* the metal is COPPER.—7. If a small sample gently evaporated to dryness leaves more than 1% of residuum, and this has a sweet taste, it is UNDECOMPOSED SUGAR.—8. The presence of ACRID SUBSTANCES, as *capsicum, chillies, grains of paradise, mustard-seed, pellitory of Spain, pepper, &c.,* may be detected by neutralizing the acidity of the vinegar with carbonate of soda, when the acrid taste of the adulterant will be readily perceived.

VINEGAR (Aromatic). Syn. *Acetum Aromaticum,*—Lat. *Prep.* 1. *Glacial acetic acid,* 1 *lb.; oil of cloves,* 1½ dr.; *oil of rosemary,* 1 dr.; *oils of bergamot, cinnamon, pimento,* and *lavender,* of each, ½ dr.; *neroli,* 20 drops; *camphor,* 2½ *oz.; rectified spirit,* 2 fl. oz.; mix. Very fine.

2. (P. Cod.) *Camphor,* 2 oz.; *oil of lavender,* 10 gr.; *oil of cinnamon,* 20 gr.; *oil of cloves,* 30 gr.; *concentrated acetic acid,* 1 pint.

3. (*Henry's.*) From *glacial acetic acid* strongly scented with the *oils of cloves, lavender, rosemary,* and *calamus aromaticus,* to which the usual quantity of *camphor* is added. This is the formula adopted at *Apothecaries' Hall.*

4. (*Extemporaneous.*) From *acetate of potash* (dry), 1 dr.; *oil of vitriol,* 20 drops; *oils of lemon* and *cloves,* of each, 3 drops.

Obs. Aromatic vinegar is used as a pungent and refreshing perfume, in faintness, &c. For this purpose it is generally dropped on a small piece of sponge placed in a stoppered bottle or a vinaigrette. It is highly corrosive, and should therefore be kept from contact with the skin and clothes. (See *p.* 11-12.)

VINEGAR (Camp.) *Prep.* Take of *sliced garlic,* 8 *oz.; Cayenne pepper, soy,* and *walnut ketchup,* of each, 4 *oz.;* 36 *chopped anchovies; vinegar,* 1 gall.; *powdered cochineal,* ½ *oz.;* macerate for a month, strain, and bottle.

VINEGAR (Camphorated). See *page* 12.

VINEGAR (Cantharides). Syn. *Blister-*

ing Vinegar; Acetum Cantharidis,—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Cantharides*, in powder, 2 oz.; *acetic acid*, 1 pint; macerate, with agitation, for 8 days, then press, and strain.

2. (Ph. E.) *Cantharides*, 3 oz.; *euphorbium*, ½ oz.; *acetic acid*, 5 fl. oz.; *pyroligneous acid*, 15 fl. oz.; macerate a week.

3. (Ph. D.) *Spanish flies*, 4 *oz.; strong acetic acid*, 4 fl. oz.; *commercial acetic acid* (sp. gr. 1·044), 16 fl. oz.; macerate, as before, for 14 days.

Uses, &c. As a counter-irritant, and to raise blisters. For the last purpose, it is applied on a piece of lint, evaporation being prevented with a piece of oiled silk or thin sheet gutta percha. The last is the best, and, indeed, the only effective form; the others being too weak. "If the acetic acid be strong, a blister will be as rapidly raised *without* the cantharides as with them." (Dr. A. T. Thomson.)

VINEGAR (Currie). *Prep.* From *currie powder*, ½ *lb.; vinegar*, 1 gall.; infuse for a week. *Used* as a flavouring. Other *like vinegar* may be made in the same way.

VINEGAR (Colchicum). Syn. *Acetum Colchici,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Dried corms of colchicum* or *meadow saffron*, 3½ dr.; *dilute acetic acid*, 1 pint; macerate for 3 days, then press out the liquor, and after defecation, add to the strained liquid, *proof spirit*, 1½ fl. oz.

2. (Ph. E.) *Fresh colchicum bulbs* (dried), 1 oz.; *distilled vinegar*, 16 fl. oz.; *proof spirit*, 1 fl. oz.

3. (Ph. D.) *Dried colchicum bulbs*, 1 *oz.; acetic acid* (1·044), 4 fl. oz.; *distilled water*, 12 fl. oz.; as before, but prolonging the maceration for 7 days.

Obs. Vinegar of colchicum is chiefly used in gout. *Dose.* 20 drops to 1 fl. dr. The Dublin preparation is about *three times as strong* as the others, and the dose must therefore be proportionately less.

VINEGAR (Distilled). Syn. *Acetum Destillatum,*—Ph. L. & E., & Ph. D. 1826. *Prep.* 1. (Ph. L.) *Vinegar*, 1 gall.; distil in a sand bath, 7 pints. Sp. gr. 1·0065.

2. (Ph. E.) *Vinegar* (preferably French), 8 parts; distil over with a gentle heat, 7 parts; and dilute the product, if necessary, with *distilled water*, until the sp. gr. is 1·005.

Pur., &c. "1 fl. oz. is saturated by 57 gr. of crystallized carbonate of soda." (Ph. L.) 100 gr. are saturated by 13 gr. of crystallized carbonate of soda. It contains about 4·6% of real acetic acid. If a pewter worm is used, a portion of lead is dissolved, and the product becomes cloudy and poisonous. *Distilled vinegar* is more agreeable than pure dilute acetic acid of the same strength.

VINEGAR (Marseilles). Syn. *Vinegar of the Four Thieves, Prophylactic Vinegar; Acetum Prophylacticum, A. Antisepticum, A. Theriacale, A. Quatuor Furum,*—Lat. *Vinaigre des Quatre Voleurs,*—Fr. *Prep.* Take of the *summits of rosemary* and *flowers of sage* (dried), of each, 4 oz.; *dried lavender flowers*, 2 oz.; *cloves*, 1 dr.; *distilled vinegar*, 1 gall.; digest for 7 days, press, and filter. *Used* as a corrector of bad smells, and formerly as a prophylactic against the plague, and other contagious diseases. It is said to have been a favorite preventive with Cardinal Wolsey, who always carried some with him. The *original formula* also contained of *garlic*, ¼ oz.; *fresh rue*, 1½ oz.; and *camphor* dissolved in spirit, 1 oz.

VINEGAR (Opium). Syn. *Acetum Opii,*—Ph. E. & D. *Prep.* 1. (Ph. E.) *Opium*, sliced, 4 oz.; *distilled vinegar*, 16 fl. oz.; macerate for 7 days, press, and filter. *Dose.* 5 to 20 drops.

2. (Ph. D.) *Opium*, in coarse powder, 1½ *oz.; dilute acetic acid*, 1 pint; macerate for 7 days. *Dose.* 10 or 12 to 60 drops.

Obs. These were intended to supersede the old "*black drop*," which they closely resemble in their action.

VINEGAR (Raspberry). Syn. *Acetum Rubi Idæi,*—Lat. *Vinaigre Framboise,*—Fr. *Prep.* 1. *Bruised ripe raspberries* and *white wine vinegar*, of each, 3 pints; macerate for 3 days, press, strain, and to each pint add of *white sugar*, 1 *lb.;* boil, skim, cool, and at once bottle. Some persons add 2 fl. oz. of *brandy* to each pint.

2. (P. Cod.) *Fresh raspberries*, picked from their calices, 3 ℔ (1 ℔,—Ph. Bor.); *good vinegar*, 2 ℔; macerate, in glass, for a fortnight, then strain without pressure.

Obs. In a similar manner may be made *cherry vinegar, strawberry do.*, and the *vinegars* of *all other like fruits.*

VINEGAR (Squill). Syn. *Acetum Scillæ,*—Ph. L. E. & D. *Acetum Scilliticum,*—Ph. L. 1746. *Prep.* 1. (Ph. L.) Take of *squills*, recently dried and bruised, 2½ oz.; *dilute acetic acid*, 1 pint; macerate with a gentle heat, in a covered vessel, for 3 days, then press out the liquor, and, after defecation, add to the strained liquid, *proof spirit*, 1½ fl. oz. The Edinburgh & Dublin Colleges direct cold maceration for 7 days in a glass vessel; and the Dublin *omits* the spirit.

2. (*Wholesale.*) From *squills*, 7 *lb.; distilled vinegar*, 6 gall.; macerate in the cold for 10 days, press, and filter. Expectorant and diuretic. *Dose.* ½ to 1½ fl. dr.; in chronic pulmonary affections, dropsies, &c.

VINEGARS (Culinary). *Prep.* 1.—*Black Pepper Vinegar,—Caper do.,—Capsicum do.,—Celery-seed do.,—Chillie do.,—Cress-seed do.,—Garlic do.,—Ginger do.,—Horse-radish do.,—Onion do.,—Red rose do.,—Seville-orange Peel do.,—Shallot do.,—Truffle do.,—White Pepper do.,*—with several others of a like kind, are made by steeping about an *oz.* of the *respective articles* in a *pint* of *good vinegar* for 14 days, and straining.

2. *Basil Vinegar,—Burnet do.,—Celery do.,—Cherville do.,—Elder-flower do.,—Green-mint do.,—Tarragon do.,*—with several others from like substances, are prepared from 2 to 3 *oz.* of the *leaves* to each pint of *vinegar;* the whole being frequently shaken for 14 days, then strained and bottled. They are used in cookery. The *culinary vinegars* may also be prepared in the same manner as the "*culinary spirits*" and "*tinctures,*" by simply substituting strong *pickling vinegar* for the spirit.

VINEGARS (Perfumed). Syn. *Aceta Odorifera,*—Lat. *Prep.* From the *dried flowers,* 1 to 2 *oz.;* or, the *fresh flowers,* 2 to 4 *oz.; strongest distilled vinegar,* 1 pint; digest for a week, strain with pressure, and repeat the process with *fresh flowers,* if necessary. They may also be made by adding 15 to 20 drops, or q. s. of the respective *essential oils* to the *vinegar.* In a similar way are *prepared* the *vinegars* of—*Clove-gilly flowers, elder-flowers, lavender do.* (vinaigre distillé de lavande), *musk roses, orange-flowers* (fresh), *Provins roses, red-roses* (vinaigre de rose; acetum rosatum), *rosemary flowers* (vinaigre de rosmarin; acetum anthosatum), *tarragon flowers, &c., &c. Another excellent plan is to add* 1 fl. oz. of *glacial acetic acid* to each pint of the *respective perfumed spirits.* This answers admirably for *acetic eau de Cologne* and like perfumes.

VINOUS FERMENTATION. Syn. *Alcoholic Fermentation.* The peculiar change by which *sugar,* in solution, is converted into *carbonic acid,* which is eliminated, and into *alcohol,* which remains in solution in the fermented liquor.

The *presence* of a *ferment* is essential to excite the vinous fermentation; as a solution of absolutely pure sugar remains unaltered, even though exposed to the conditions most favorable to its accession. In the *juices* of the *sweet fruits,* and in those *vegetable solutions* that *spontaneously* run into a state of fermentation, the *ferment* is supplied by nature, and is intimately associated with the saccharine matter. In the juice of those grapes which produce the more perfect wines, the relative proportions of the exciters of fermentation and the sugar, are so accurately apportioned, that the whole of the *former* are decomposed, and nearly the whole of the *latter* is converted into *alcohol;* so that the liquid (*wine*) is left in a state but little liable to future change. An *infusion of malt,* however, in which the nitrogenized matters (*gluten, gliadine, vegetable albumen, &c.*) are absent, or at least present in too small quantities to vigorously excite the vinous fermentation, undergoes a mixed species of decomposition with the production of products widely different from those that result from the *true* vinous fermentation; or, in other words, the liquid becomes *spoiled.* But if a *ferment* (yeast) be added to this infusion of malt under the above circumstances, and in the proper proportion to the sugar present, the true vinous fermentation speedily commences, and the liquid becomes converted into *beer.* This is what actually takes place in the process of brewing, and the scientific brewer endeavours to employ a proper quantity of ferment to decompose the whole of the saccharine matter of his wort; but, at the same time, as equally endeavours to avoid the use ofan *excess.*

The *chief product* of the *vinous fermentation* is *alcohol,* but there are other substances simultaneously produced, and which remain associated with the fermented liquor. Among the principal of these are *œnanthic acid, œnanthic ether, fusel oil,* (oil of potato spirit, oil of grain,) *&c.;* none of which exist previously to fermentation, and are generally supposed to result from the action of the nitrogenized matters of the solution on the sugar. Under certain circumstances these extraneous products are formed in much larger quantities than under others, and as these substances injure the value of the alcohol with which they are associated, a knowledge of the peculiar circumstances favorable and unfavorable to their production, is a desideratum to the brewer and distiller.

According to MM. Colin and Thénard, Frémy, Rousseau, and others, the essential condition of a *ferment,* to be able to excite the pure vinous fermentation, is to be *sufficiently acidulous* to act on coloured test paper; and this acidity should arise from the presence of certain vegetable acids and salts, capable of conversion into carbonic acid and carbonates by their spontaneous decomposition. Those acids and salts which are found to pre-exist in fermentable fruits and liquors, as the tartaric, citric, malic, and lactic acids, and their salts, should be chosen for this purpose; preference being given to the *bitartrate of potassa*, on account of its presence in the grape. The addition of any of these substances to a saccharine solution renders its fermentation both more active and complete. The favorable influence of cream of tartar on fermentation was first pointed out by Thénard and Colin, and the addition of a little of this article has been adopted in practice, with manifest advantage, by the manufacturers of British wine. When the acidity caused by these acids, or their acidulous salts, in a ferment, is considerable, the animal and mineral poisons, the essential oils, and various other substances, cease to modify the fermentation; while, at the same time, the resulting alcohol is obtained in a purer state, as the extraneous products which we have just mentioned, are either not formed at all, or only in small and unimportant quantities. The contrary takes place when the ferment is rendered neutral by washing it with water, or, when, owing to partial spontaneous decomposition, it exercises an *alkaline reaction* on test paper. It then *ceases* to *excite* the *alcoholic fermentation* in solutions of cane-sugar, and instead thereof, induces the development of *lactine* (sugar of milk), *lactic acid, &c.:* in this respect exercising a similar action on solutions of sugar to that of caseine, diastase, and animal membrane.

There is good reason for supposing that *each variety of sugar* which is susceptible of the alcoholic fermentation, is first converted into *grape* sugar, by contact with the ferment, and that this variety of sugar, is alone capable of yielding carbonic acid and alcohol. (Liebig.) During this conversion of *grape sugar*, it is presumed that one of its atoms, (represented, in the crystallized state, by C_{12} H_{14} O_{14}), *loses* two atoms of water, and yields (according to theory) 44·84% of *carbonic acid*, 47·12% (49·38, Thénard,) of *alcohol*, and 9·04% of *water*, which nearly agrees with the experiments of Guerin-Varry. According to Gay-Lussac, 45 *lb.* of *sugar* are converted into 23 *lb.* of *alcohol*, and 22 *lb.* of *carbonic acid.* This explanation will be simplified by reference to the following diagram:—

$$\begin{array}{llccc}
4 \text{ atoms of } \textit{carbonic acid} & = C_4 & . & O_8 \\
2 \quad ,, \quad \textit{alcohol} & = C_8 & H_{12} & O_4 \\
\hline
1 \quad ,, \quad \textit{grape sugar,} \text{ dried at } 212^\circ \; = & C_{12} & H_{12} & O_{12}
\end{array}$$

From the above it will be readily seen, that by a new grouping of the elements of grape-sugar, alcohol and carbonic acid are produced, without the elements of the body which excites the fermentation taking any part in the conversion.

The circumstances most favorable to this fermentation, are—*a certain degree of warmth—a sufficient quantity of active ferment*, and its *due distribution through the liquor.* The temperature of from 68° to 77° Fahr. is usually regarded as the most propitious for the commencement and progress of fermentation; but it has been ably shown by Liebig, that, at this temperature, the newly formed alcohol slowly undergoes the acetous fermentation, forming *vinegar*, by which the vinous character of the liquor is lessened. This conversion of alcohol into vinegar proceeds most rapidly at a temperature of 95° Fahr., and gradually becomes more languid, until, at about 46° to 50° Fahr. (8 to 10 Cent.), it ceases altogether, while the tendency of the nitrogenous substances to absorb oxygen at this low temperature is scarcely diminished in a perceptible degree. "It is therefore evident, that if wort (or any other saccharine solution), is fermented in wide, open, shallow vessels, as is done in Bavaria, which afford free and unlimited access to the atmospheric oxygen, and this in a situation where the temperature does not exceed 46° to 50° Fahr., a separation of the nitrogenous constituents, *i. e.*, the *exciters of acidification*, takes place simultaneously on the surface, and within the whole body of the liquid." (Liebig.) By this method wine or beer is obtained, which is invariably far superior in quality to that fermented in the usual manner.

The *symptoms* of a *perfect fermentation* of *malt wort*, according to the usual English system with top yeast (*oberhefe*), have been thus described by a well-known practical writer on brewing.—1. A *cream-like substance* forms round the edges of the *gyle tun*, which gradually extends itself, and ultimately covers the whole surface of the liquor.—2. A fine *curly*, or *cauliflower-head*, in a similar way extends itself over the surface, and indicates to the experienced brewer the probable quality of the fermentation.—3. The "*stomach*," or *vinous odour*, is next evolved, and continues to increase with the attenuation of the wort. The peculiar nature of this odour is also an indication of the state of the fermentation.—4. The *cauliflower-head* changes, or rises to a fine "*rocky*" or "*yeasty*" *head*, and ultimately falls down.—5. In this stage the head assumes a peculiar *yeasty appearance*, called by brewers "*close-yeasty*," and the gas is evolved in sufficient quantity to blow up little "*bells*" or "*bladders*," which immediately burst, and are followed by others, at intervals depending on the activity and forwardness of the fermentation. These *bells* should be bright and clear; as, if they appear opaque or dirty, there is something the matter with the wort. (Black.)

It is *often* of the *utmost importance* to *brewers, wine-merchants, sugar-refiners, druggists, &c.*, to be able to *lessen* the *activity* of the *vinous fermentation*, or to *stop it altogether*, or to *prevent its accession* to *syrups* and other *saccharine* and *vegetable solutions.* Whatever will still the motion of the molecules of the nitrogenous matter forming the ferment will render them inoperative as exciters of fermentation. Among the simplest means of effecting this object, and such as admit of easy practical application, may be mentioned *exposure* to either *cold* or *heat.* At a temperature below about 50° Fahr., the *acetous fermentation* is suspended, and the *alcoholic fermentation* proceeds with diminished activity as the temperature falls, until at about 38° Fahr. it ceases altogether. In like manner, the *rapid increase of the temperature* of a *fermenting liquid* arrests its fermentation, and is preferable to the action of cold, as it is of easier application, and perfectly precipitates the ferment in an inert state. For this purpose, a heat of about 180° Fahr. is sufficient; but even that of *boiling water* may be employed with advantage. In *practice*, fluids are commonly raised to their boiling point for this purpose, or they are submitted to the heat of a water bath (207½° Fahr.) In this way the fermentation of *syrups* and *vegetable solutions* and *juices* is commonly arrested in the pharmaceutical laboratory.

Among *substances* that may be added to *liquids* to *arrest fermentation*, the most active are—the *volatile oil of mustard, coarsely powdered mustard seed* or *pure flour of mustard, sulphurous acid* or the *fumes of burning sulphur, sulphuric acid, sulphite of lime, tincture of catechu, strong spirit, strong acetic acid, chlorate of potassa, sugar of milk, bruised horseradish, garlic,* and *cloves,* and their *essential oils,* and all the *other volatile oils* that contain *sulphur,* and *most of the salts* that *readily part with their oxygen.* These substances arrest fermentation by rendering the *yeast inoperative;* and they possess this power nearly in the order in which they stand above. In practice, *mustard,* the *fumes of burning sulphur, sulphite of lime,* and *chlorate of potassa,* are those most adapted for *beer, cider, wines, syrups, &c.;* but some of the others are occasionally used, though less active. For arresting or preventing the fermentation of the vegetable juices and solutions, and the *medicated syrups* employed in pharmacy, *mustard seed,* either alone, or combined with a *little bruised cloves,* may be safely used, as the addition of acids or salts would lead to the decomposition of their active principles. For this reason such liquids should be kept in a sufficiently low temperature to prevent fermentation, and should they pass into that state, it should be preferably arrested by the application of heat or cold, as above explained. *Sugar of milk* is also very effective for certain syrups, if not all of them.

To *prevent,* or rather to *lessen* the *production* of *fusel oil,* it has been proposed to add a certain quantity of *tartaric acid* or *bitartrate of potassa* to the *wort;* or, to *arrest* the *fermentative process* somewhat before the liquid has reached its *utmost degree of attenuation.* The best means of *depriving* the *spirit* of this and other substances of a similar nature, is to largely dilute it with water, and to redistil it at a gentle heat. *Agitation* with *olive oil, decantation, dilution* with a large quantity of *water,* and *redistillation,* have also been recommended. An *excellent method* is *filtration* through *newly burnt* and *coarsely powdered charcoal.* This plan succeeds perfectly with moderately diluted spirit. On the Continent, the addition of about 10% of *common vinegar,* and a *very little sulphuric acid,* followed by agitation, repose for a few days, and redistillation, is a favorite method. A *solution of chloride of lime* is also employed for the same purpose, and in the same way. In both these cases a species of ether is formed, which possesses a very agreeable odour. In the *first,* acetate of oxide of amyle (*essence of Jargonelle*) is produced; and in the other, *chloride of amyle,* which also possesses a pleasant ethereal smell and taste. The affinity of the hydrated oxide of amyle (*fuselöl*) for acetic acid is so great, that they readily unite without the intervention of a mineral acid. (Doebereiner.) Thus, the oil of vitriol mentioned above, though always used in practice, might be omitted without any disadvantage.

According to Messrs. Bowerbank, the distillers, quoted by Dr. Pereira, 500 gall. of *corn-spirit* yield about one gall. of *corn-spirit oil.* See *Acetification, Alcohol, Brewing, Distillation, Fermentation, Fusel Oil, Spirit, Vinegar, Viscous Fermentation, Yeast, &c.*

VIOLET. Syn. *Purple Violet, Sweet do.; Viola,*—Ph. L. & E. "The *recent petals* of *viola odorata,* Linn," (Ph. L.) It is chiefly used on account of its colour. See *Syrups.*

VIOLET DYE. Violet, like purple, is produced by a mixture of *red* and *blue* colouring matter, applied either together, or in succession. A *good violet* may be given to SILK or WOOL by passing it first through a *solution of verdigris,* then through a *decoction of logwood,* and, lastly, through *alum water.* A *fast violet* may be given by first dying the goods a *crimson* with *cochineal,* without alum or tartar, and, after rinsing, passing them through the *indigo vat.*—LINENS and COTTONS are first *galled* with about 18% of *gall-nuts,* next passed through a *mixed mordant* of *alum, iron liquor,* and *sulphate of copper,* working them well, then through a *madder bath* made with an equal weight of root, and, lastly, *brightened* with soap or soda. *Another good method* is to pass cloth, previously dyed *Turkey red,* through the *blue vat.* WOOL, SILK, COTTON, or LINEN *mordanted* with *alum* and *dyed* in a *logwood bath,* or a *mixed bath* of *archil* and *Brazil,* takes a pretty, but false violet.

VIOLINE. Syn. *Violina; Emetique Indigène.* A white, pulverulent, bitter, acrid substance extracted from the *roots, leaves, flowers,* and *seeds,* of the *viola odorata.* It is soluble in alcohol, sparingly soluble in water, and insoluble in ether. Its operation resembles that of emetine, for which it was at first mistaken.

VIRGINEIC ACID. The name applied by Quevenne to one of the acid principles contained in the *root* of *polygala senega* (Linn.), or *rattle-snake root.*

VISCOUS FERMENTATION. Syn. *Mucilaginous Fermentation, Mucous do.* The peculiar change by which sugar, in solution, is converted into gummy matters, and other products, instead of into alcohol.

When the *expressed juice of the beet* is exposed to a temperature of 90° to 100° Fahr., for a considerable time, the sugar it contains suffers this peculiar kind of fermentation. Gases are evolved which are rich in hydrogen, instead of being exclusively carbonic acid, and when the sugar has, for the most part, disappeared, mere traces of alcohol are found in the liquid, but, in place of that substance, a quantity of lactic acid, mannite, and a *mucilaginous substance* resembling gum-Arabic, and said to be identical with gum in composition. By boiling *yeast* or the *gluten of wheat* in *water,* dissolving sugar in the filtered solution, and exposing it to a tolerably high temperature, the viscous fermentation is set up, and a large quantity of the gummy principle generated, along with a *ferment* of a globular texture, like that of yeast, but which is capable of producing *only* the viscous fermentation in saccharine solutions.

The peculiar cloudy, stringy, oily appearance of wine and beer, called by the French "*graisse,*" and the English "*ropiness,*" depends on the accession of the viscous fermentation. The mineral acids and astringent substances, especially the *sulphuric* and *sulphurous acids,* and *tannin,* precipitate the viscous ferment, and are, hence, the best cures for this malady of fermented liquors. It is the large amount of tannic acid in the red wines and well-hopped beer, which is the cause of their never being attacked with "*graisse*" or "*ropiness.*" See *Wines* (and *above*).

VISION. The following means of *preserving* and *restoring* the sight, which has been going the round of the periodical press, being really based upon scientific principles, may be appropriately inserted here:—

For *Near-sightedness.*—Close the eyes and press the fingers *very gently,* from the nose *outward,* across the eyes. This flattens the pupil, and thus lengthens or extends the angle of vision. This should be done several times a day, or at least always after washing the face, until short-sightedness is overcome.

For *Loss of Sight* by *Age,* such as require magnifying glasses, pass the fingers or towel from the *outer corner* of the eyes *inwardly,* above and below the eye-balls, pressing *very gently* against them. This rounds them up, and preserves or restores the sight.

It is *said* that many persons, by this last means, have preserved their sight so as to read fine print at 80 years of age; others, whose sight had been impaired by age, by carefully manipulating the eyes with their fingers, from their external angles inwardly, have restored their sight, and been able to dispense with glasses, and have since preserved it by a continuance of the practice. To be successful, or safe, these practices must be applied with great gentleness and caution. Many persons seriously damage their eyes by forcibly rubbing them when drowsy, especially on awaking in the morning.

The *Lancet* remarks, that "there is good reason to believe that *chicory* (the *coffee* of the Londoners), from its narcotic character, exerts an injurious effect on the nervous system. So convinced of this is Professor Beer, of Vienna, a most celebrated German oculist, that he has enumerated *chicoried-coffee* among the causes of *amaurotic blindness.*"

To *strengthen* the *eyes,* to relieve them when *swollen* or *congested*, and to remove *chronic ophthalmia, purulent discharges, &c.*, nothing is equal to frequently *bathing* them with *water*, at *first tepid*, but afterwards lowered in temperature to absolute *coldness*. The *Eye-douche* of Mr. Heather Bigg, of Leicester Square, is an admirable invention for this purpose.

VITAROBORANT (Palmer's). Resembles *ervalenta*.

VITRIFIABLE PIGMENTS. See *Enamels*.

VITRIFICATION. See *Glass*.

VITRIOL or *Green vitriol*. Commercial sulphate of iron.

VITRIOL (Blue). Commercial sulphate of copper.

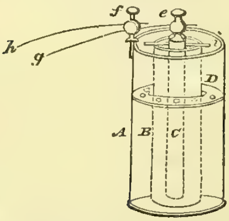
VITRIOL (Roman). As the last.

VITRIOL (White). Commercial sulphate of zinc.

VITTIE VAYR. Syn. *Vetiver*. The Tamool name of the odorous and fibrous *roots* of the *andropogon muricatum* (anthoxanthum muricatus,—Linn.), recently sold by the perfumers.

VOLTAIC BATTERY. Syn. *Galvanic Battery*. An instrument or apparatus for the production of an electrical current by chemical decomposition.

One of the most useful forms of the galvanic battery is that proposed by Professor Daniell, and commonly known by his name. Its peculiar advantages arise from its action continuing without interruption, for a long time, hence the name of "*constant battery*" that has been applied to it. The following figure will explain its construction and application:—



A. A *copper cylinder* filled with a *saturated solution of sulphate of copper*.

B. A smaller *porous cylinder* or *membrane*, containing a mixture of 1 part of *oil of vitriol*, and about 7 of *water*.

C. A *rod of zinc* supported in the smaller cylinder by the cross piece (*i*).

D. A *shelf* full of small holes, for supporting *crystals of sulphate of copper*, to keep up the strength of the solution.

e and *f*. *Screws* and *caps* to connect the wires *g* and *h* with the battery.

g. The *positive wire*.

h. The *negative wire*.

One of these batteries is sufficient for electrotyping; *six* of them form a circle of considerable power, and about 20, produce one sufficiently strong for most experiments of demonstration and research.

In arranging these, as well as other batteries, when *intensity*, or *travelling power*, is desired, the metallic communication is made between the *opposite* metals; but when simple *quantity* without intensity is required, the zinc of one battery is united with the zinc of the other, and the copper of the one with the copper of the other, an effect which is equally attainable with a single battery of enlarged dimensions.

VOLTAIC BRASSING. An actual deposit of copper and zinc in the state of alloy forming brass, may be obtained by employing the following solution for the decomposition cell:—*Sesquicarbonate of ammonia* and *cyanide of potassium*, of each, 1 *lb.*; *cyanide of copper*, 2 *oz.*; *cyanide of zinc*, 1 *oz.*; *water*, 1 gall.; dissolve. If the deposit be *too red*, add some more ammonia; if *too pale*, add more cyanide of potassium. See *Volatype*.

VOLTAIC COPPERING. A *solution of the sulphate of copper* for the decomposition cell; or, for *fine work*, a liquid formed by dissolving *black oxide of copper* or *ferrocyanide of copper* in a *solution of cyanide of potassium*, the solution being neutralized, from time to time, with a little *caustic potassa*. See *Voltatype*.

VOLTAIC GILDING. Various solutions have been recommended by different authorities for the decomposition cell. M. De la Rive employs a *solution of neutral terchloride of gold*; M. Dumas, a solution formed of 31 grammes and 25 centigrammes of *gold converted into oxide*; 5 hectogrammes of *cyanuret of potassium*; and *water*, 4 litres; boiled for half an hour in glass or porcelain; used with a constant battery (gilds very quickly, especially when boiling); M. Louyet, a *strong solution of bisulphuret of gold* in *cyanide of potassium*, with a powerful electric current; M. Ruolz, a *solution* of *cyanide, chloride*, or *potassio-chloride of gold*, in *cyanide of potassium* or *red* or *yellow prussiate of potash*, a *solution of sodio-chloride of gold* in *carbonate of soda*, or of *sulphuret of gold* in *neutral cyanide* or *sulphuret of potassium*; Messrs. Elkington (under patent dated March, 1840), employ a *solution of cyanide of gold* in *cyanide of potassium*, formed by either directly dissolving the former in the latter, or by subjecting the *metallic gold* to the joint action of a *solution of cyanide of potassium* and *electricity*. In 1841, Mr.

C. V. Walker called the attention of the *Electrical Society* to the fact, that hitherto *voltaic gilding* and *silvering* had been accomplished by the use of a *single cell*, and, therefore, at the expense of a salt of gold or silver. These salts, as he correctly stated, are troublesome to prepare, and are expensive; and, therefore, if the *anions* would combine with *gold* and *silver anodes*, the *operations of plating* and *gilding* might be rendered more simple, more sure, and more economical. This, he showed, might be effected by dissolving the *neutral oxides of silver* and *of gold*, or the *chloride of gold*, each in a *solution of cyanide of potassium*, and *electrolizing* the *solutions* respectively with a *silver* and a *gold anode*. In this case, the cyanogen, released at the anode, combines with it, whether it be silver or gold, and destroys a portion, equivalent to that deposited at the cathode; and thus the *strength* of the *solution* is maintained, and the expense of the operation is reduced to a minimum. The deposition is most conveniently effected in *glass cells*, so that the eye can detect the regularity of the process. The *anodes* are *gold* and *silver wire*, or *plate*, which are suspended in the *decomposition cell*, and connected with the positive element of the battery, like the pieces of copper (*d*, *d*) in the *engr.* at *page* 1282. The *solutions of gold* recommended by other authorities, may also be employed with gold anodes, and will thus be rendered more constant and convenient. In the above way *copper*, *brass*, *bronze*, *silver*, *iron*, *lead*, *tin*, *steel*, and *platinum*, may be perfectly gilded.

Obs. It is absolutely necessary that the metallic surfaces be entirely free from dirt, grease, or oxide. For this purpose they should be boiled in a caustic lye, then carefully scoured with sand-and-water, next dipped into acidulated water, and, lastly, rinsed in pure water. After immersion for a minute or two, the article to be gilt is withdrawn, wiped dry with a fine linen cloth, rubbed a little, and again immersed. This should be repeated a second and a third time. To *render* the *gilding perfect*, the *power of the battery* should be proportioned to the *extent of surface to be gilded*, and the *intensity of the current* to the *density* of the gilding solution. The power of the electric current may be moderated at will, by immersing more or less of the zinc plate, so that no hydrogen may be disengaged, and in this case the gold solution is alone decomposed. Messrs. Elkington employ their *gilding* solution at about 135° Fahr.; and state, that the more *intense* the electric current, the denser and harder the deposit. M. Becquerel amalgamates the pieces, by which the best effects of gilding, with respect to durability and solidity, are produced. The articles are simply immersed in a *weak solution of protonitrate of mercury*, then washed with a large quantity of water, and rubbed with leather, in order to diffuse the mercury. The immersions are repeated until the metal is equally diffused over the surface. If it be slightly spread without rubbing, the surface remains tarnished; but if it be brushed it assumes a brilliant appearance. If the pieces thus prepared be steeped in the usual *bath of cyanide of gold and potassium*, at a temperature of 77° to 86° Fahr., and connected with a constant battery in operation, in less than a quarter of an hour they will be *gilded*, either dead (*matt*) or shining, but of a *matt* equal to that of clocks, a quality difficult to obtain by the ordinary process. After the pieces are gilded they are "*put in colour*," by which their lustre and beauty are brought out. See *Voltatype.*

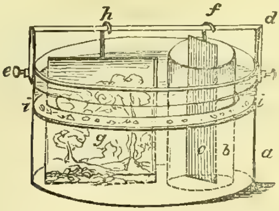
VOLTAIC PLATINIZING. By proceeding in a similar way to the last, but substituting *platinum* or *its compounds* for gold. A solution of *potassio-chloride of potassium* in *caustic potassa* has also been highly recommended. Manufacturing and operative chemists will find, in this process, a means of procuring large capsules of platinized brass, which combine cheapness with the necessary resistance to saline or acid solutions. 1 milligramme of *platinum* is capable of perfectly covering 50 square millimètres, which corresponds to a thickness of 1-100,000th of a millimètre. Platinum, thus applied, may be obtained from the crude solution of platinum ore, as the metals which accompany it do not injure the effect. (Dumas.)

VOLTAIC SILVERING. From *silver* and *its compounds* as noticed under *Voltaic Gilding.*

VOLTAIC ZINCING. From like solutions to those employed for *voltaic coppering.* See *Voltatype* and *Zincing.*

VOLTATYPE. Syn. *Electrotype*, *Electro-metallurgy.* The art of working in metals by means of voltaic electricity.

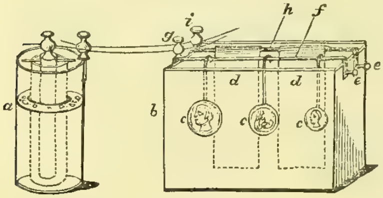
The *most simple* and *easily managed electrotype apparatus*, is formed in a similar manner to the common constant battery, but instead of employing a plate of copper for the negative element, a *mould of the object to be copied*, the face of which has been covered with *plumbago*, is substituted. An *electrograph* of this kind may be made of any well glazed earthen jar or vessel, and the following arrangement will be found convenient for most of the purposes to which this art is applied by the amateur; viz., *copying medals, multiplying plates, &c.*



a. An *oval vessel* of salt glazed earthenware or wood, nearly filled with a *concentrated solution of sulphate of copper.*
b. A *porous diaphragm*, containing the *cylinder* or *plate of zinc* (*c*), and filled with *dilute sulphuric acid.*
d. A *small bar of brass* or *copper*, fastened to the vessel by the *binding screws* (*e*, *e*), and supporting the cylinder of zinc (*c*), by the *hook of copper wire* (*f*), and the *mould* (*g*), by the *hook* (*h*).
i. A *small shelf* or *partition* to support *crystals of sulphate of copper*, to keep up the strength of the solution.

Another method is to employ a separate *trough* or *decomposition cell* connected with a *constant battery*, by which means several moulds may be coated at once.

This arrangement will be understood by reference to the annexed engr. :—



a. A *constant battery.* (See *above.*)
b. *Decomposition cell;* a cubical vessel made of wood, or earthenware, and filled with a *mixture* of 1 part of *dilute sulphuric acid*, and 2 parts of *concentrated solution of sulphate of copper.*
c, c, c. *Moulds* suspended to the *brass rod* (*f*), and connected with the *copper* or *negative element* of the battery (*a*), by means of the *screw* (*g*).
d, d. *Pieces of sheet copper* suspended on the *brass rod* (*h*), and connected with the *zinc end* of the battery, by means of the *screw* (*i*), employed to keep up the strength of the cupreous solution in the decomposition cell.

When it is desired to *copy* any *object* by either of these apparatuses, an *exact mould* of it must be first obtained. Supposing the article to be a *medal*, for instance, a *hoop of paper* is commonly placed round it, and *white wax*, or any similar substance, poured on it in a melted state, and then allowed to cool; when cold it is removed, a small piece of *copper wire* to suspend it by is attached, and its face brushed over with *finely powdered plumbago*, by means of a camel-hair pencil; the excess and loose portion being carefully removed. The *mould so prepared* is next suspended in the apparatus, to receive a deposit of metal on its surface.

After the *mould* has *received a sufficiently thick metallic deposit*, the latter is separated, washed in a little *clean water*, and *bronzed* by any of the methods mentioned under "*Bronzing.*"

Concluding remarks. Some persons experience considerable difficulty in procuring moulds *free* from *air bubbles;* but this inconvenience is readily avoided, by removing with a camel-hair pencil any that may be observed on the surface of the medal, after the melted wax is poured on, and while it remains liquid and transparent. The *tyro* in *electrotype manipulation* also frequently experiences much annoyance, from the metal being deposited on the surface of the mould under the form of a powder, or in a very friable or brittle state. This generally arises from the battery being in too active a condition, or not proportioned to the strength of the metallic solution. It is found that the slower the deposit is formed, the tougher and more solid it generally is; but there are numerous exceptions which may be learned by practice. *Air-bubbles* may be avoided by brushing them off the face of the mould, after immersion in the decomposition cell, and by properly regulating the action of the battery. The *dilute sulphuric acid* employed to excite the zinc end of the battery, should never be stronger than 1 part of *concentrated acid* to 7 or 8 parts of water. *Iron* may be substituted for zinc, and is more economical. *Stearine, hard tallow, gutta percha, shell-lac, rosin* softened with a *little* oil, *plaster of Paris, sealing wax, fusible metal,* and numerous other substances, besides wax, are employed as materials for moulds. When *plaster of Paris* is used, it is necessary to embue its surface with melted wax, to enable it to retain the plumbago. *Fusible metal* requires no preparation. Messrs. Elkington make their moulds with *wax* combined with a *little phosphorus*, which reduces upon their surface a *thin film* of *gold* or *silver* from solutions of these metals, which acts better than a face of plumbago for receiving the electro-deposit.

In *gilding*, *silvering*, or *platinizing* the common metals by electricity, *solutions of* *gold*, *silver*, or *platinum*, are placed in the decomposition cell, and plates of *these metals*, instead of copper, suspended in the solution; care being taken so to shape the cell that the *greatest possible extent of surface* shall be obtained with the *least possible quantity* of *solution*. (See *above*.)

VOMICINA. See *Brucine*.

VOMITING. See *Sickness*.

VULCANIZATION. See *Caoutchouc*.

WACAKA. See *Wikana*.

WADE'S DROPS. Compound tincture of benzoin.

WAFER PAPER. See *below*.

WAFERS. Thin adhesive discs used for securing letters or sticking papers together.

Prep. 1. *Wafers, Flour do.* The finest *wheaten flour* is mixed with *water*, either *pure* or *coloured*, to a smooth pap or batter, which, after being passed through a *sieve*, to remove clots or lumps, is poured into the "*wafer-irons*" (previously warmed and greased with butter or olive oil), and in this state exposed to the heat of a clear charcoal fire; the whole is then allowed to cool, when the irons are opened, and the *thin cake*, which has become hard and brittle, is cut into *wafers* by means of sharp annular steel punches, made exclusively for the purpose.

2. *Gelatine Wafers, Transparent do.* Good *gelatine* or *glue* is dissolved, by the heat of a *water bath*, in just sufficient *water* to form a consistent mass on cooling; it is then poured, whilst hot, upon the surface of a *warm plate* of *mirror glass*, slightly oiled, and surrounded with a border of *card paper* (laid flat); a *similar plate*, also warmed and oiled, is next laid upon the gelatine, and the two plates pressed into as close contact as is permitted by the card paper; when quite cold, the *thin sheet of gelatine* is removed, and cut into wafers with punches, as before. 1 to 2 *oz.* of *sugar* is commonly added to each *lb.* of *gelatine*.

3. *Medallion Wafers.* A *sheet* of *metal* or *glass* having designs sunk in it corresponding to the raised part of seals, being provided, the hollows are filled up with a mixture formed of any appropriate *coloured powder*, made into a paste with *gum-water* or *size*, leaving the flat part clear; melted coloured glue is then poured on the plate, and the process is otherwise conducted as before. For *use*, the *paper* is wetted where the wafer is to be applied.

Obs. Care must be taken that no poisonous colours be employed. For gelatine wafers transparent colours only can be used. Those noticed under *Liqueurs* and *Stains* (Confectioner's) are appropriate. To these may be added *plumbago*, *sesquioxide of iron* (crocus martis), *smalts*, *levigated vegetable charcoal*, and *vermilion*.

WAFERS. (In Cookery.) *Prep.* Make *fine flour*, dried and sifted, into a smooth thin batter with good *milk*, or a little *cream-and-water;* add about as much *white wine* as will make it thick enough for pancakes, sweeten it with a little *loaf-sugar*, and flavour it with *powdered cinnamon*. When thus prepared, have the *wafer-irons* made ready by being heated over a charcoal fire; rub them with a piece of linen cloth dipped in *butter;* then pour a spoonful of the batter upon them, and close them almost immediately; turn them upon the fire, and pare the edges with a knife, if any of the batter oozes out. A short time will bake them, when the irons are properly heated. The wafers must be curled round whilst warm when they are for ornaments. "*Wafer Paper*" is prepared in a similar way to the above; but when intended to be kept for some time, the milk must be omitted. *Used* by cooks, &c.; and, recently, as an envelope for nauseous medicines.

WAFERS (Da Silva's). Of these well-bepuffed nostrums, to which their proprietors have impudently affixed the name of Dr. Locock, there are three varieties, which are said to be prepared as follows:—

1. *Aperient* or *Antibilious Wafers.* From *sugar* and *extract of liquorice* (Spanish juice), equal parts; *senna* and *jalap*, of each, in fine powder, about ½ dr. to every *oz.* of sugar employed; made into a mass with a *concentrated infusion of senna*, and divided into 12-gr. lozenges or squares with the corners rounded off.

2. *Female Wafers.* From *sugar*, *horehound candy* (or *honey*), and *aperient wafer mass*, equal parts; beaten to a proper consistence with *weak gum-water*, to which a little *orange-flower water* has been added, and divided into 8-gr. tabellæ, as before.

3. *Pulmonic Wafers.* From *lump sugar* and *starch*, of each, in powder, 2 parts; *powdered gum*, 1 part; made into a lozenge-mass with *vinegar of squills*, *oxymel of squills*, and *ipecacuanha wine*, equal parts, gently evaporated to 1-6th their weight, with the addition of *lactucarium* in the proportion of 25 to 30 gr. to every *oz.* of the dry powders; the mass being divided into half-inch squares, weighing about 7½ gr. each (when dry), as before.

Obs. For an exposition of the Da Silva quackery, with Dr. Locock's letter on the subject, see the *Anat. of Quackery*, or the *Med. Circ.*, ii, 106-126.

WALNUT. The *juglans regia* (Linn.), a tree of the natural order *juglandeæ* (De Cand.) The *sap* yields sugar; the *fruit* is walnuts; the *kernels* of the latter are eaten and pressed for their oil; the *peel* or *husks* are used for "rooting" or dyeing brown; the *unripe fruit* is pickled, and its *juice* is used as a hair dye; the *leaves* are reputed diaphoretic and antisyphilitic; and the *wood* is esteemed for cabinet work.

WARBURG'S FEVER DROPS. See *Tinctures.*

WARD'S RED DROP. A strong solution of *emetic tartar* in *wine.*

WARTS. Syn. *Verrucæ*,—Lat. These chiefly attack the hands, and may be removed by the daily use of a little *nitrate of silver*, *nitric acid*, or *aromatic vinegar*, as directed under *Corns.* The *first* of the above applications produces a black stain, and the *second* a yellow one; both of which, however, wear off after the lapse of some days. *Acetic acid* scarcely discolours the skin. Erasmus Wilson, the eminent surgeon and talented author of several works on the skin, mentions the case of a gentleman who removed an entire crop of warts from his knuckles and fingers by subjecting them to a succession of sparks from one of the poles of an electrical machine. "He was in the habit, as is usual, of trying the amount of electric fluid collected in his machine by placing his knuckle near the brass knob, and receiving a spark. Observing that an odd sensation was produced whenever the spark struck a wart, he was tempted for amusement to give them a round of discharges. When his attention was next directed to his hands, he found to his surprise and satisfaction that all the warts had disappeared." Dr. Peez, of Wiesbaden, "confirms the statement made by several German practitioners, of the rapid curative agency which attends the internal use of carbonate of magnesia in cases of warts." (*Brit. & For. Med. & Chir. Review.*)

The *papular eruption* which covers the hands of some persons, and which is occasionally called "*soft warts*," is best removed by the daily use of *Gowland's lotion.*

WASH. The fermented wort of the distiller.

WASH-BALLS. See *Savonettes.*

WASHERWOMAN'S SCALL. See *p.* 1076.

WASHES. The familiar name of lotions, more especially of those employed as cosmetics.

WASHES (Cosmetic). See *Freckles, Kalydor, Lotions, Milk of Roses, Skin Cosmetics, &c.* (and *below*).

WASHES (Hair). *Prep.* 1. From *rosemary tops*, 2 *oz.; boiling water*, 1 pint; infused together in a tea-pot or jug, either with or without the addition of *rectified spirit*, 1 fl. oz. (or *rum*, 2 fl. oz.), to the cold strained liquor.

2. *Box leaves*, a small handful; *boiling water*, 1 pint; digest for an hour, simmer 10 minutes, and strain. Both are used to improve the growth and to strengthen the hair.

3. To clean the "partings,"—remove scurf, &c.—*a.* (*Antipityrienne.*) From *sesquicarbonate of ammonia*, 1 *oz.; spirit of rosemary*, ½ pint; *rose*, or *elder-flower water*, 1½ pint.

b. (*Detergent Essence.*) From *honey*, 2 *oz.; borax*, 1 *oz.; cochineal* (bruised), ¼ *oz.; camphor*, 1 dr.; (dissolved in) *rectified spirit*, 2 fl. oz.; *soft water*, ¾ pint; *oil of rosemary*, 20 drops.

c. (*Vegetable Extract.*) Take of *salt of tartar*, 1 *oz.; rosemary water*, 1 pint; *burnt sugar*, q. s. to tinge it brown; dissolve, filter, and add of *essence of musk*, 10 drops.

4. To darken the hair.—*a.* From *pyrogallic acid*, ¼ *oz.; distilled water, orange-flower water*, and *rectified spirit*, of each, 1¼ fl. oz.

b. (*La Forest's Cosmetic Lotion* or *Liquid Hair Dye.*) Boil, for a few minutes, *chloride of sodium*, 1 dr.; and *sulphate of iron*, 2 dr.; in *red wine*, 1 ℔; then add of *verdigris*, 1 dr.; in 2 or 3 minutes remove it from the fire, and further add of *powdered galls*, 2 dr.; the next day filter. For *use*, moisten the hair with the liquid; in a few minutes dry it with a cloth, and afterwards wash the skin with water.

5. To prevent the hair falling off.—*a.* (*American Shampoo Liquid.*) Take of *carbonate of ammonia*, ½ *oz.; carbonate of potash*, 1 *oz.; water*, 1 pint; dissolve, and add the solution to a mixture of *tincture of cantharides*, 5 fl. oz.; *rectified spirit*, 1 pint; *good rum*, 3 quarts. *Used* to strengthen the hair and to remove *dandruff*, by moistening it with the mixture, rubbing, so as to form a lather, and then washing with cold water.

b. (*Balm of Colombia.*) As the last, *omitting* the potash, *quadrupling* the *carbonate of ammonia*, and *adding* some *perfume.*

c. (Eras. Wilson.) *Eau de Cologne* (strongest), 8 fl. oz.; *tincture of cantharides*, 1 fl. oz.; *oils of rosemary* and *lavender*, of each, ½ fl. dr.

d. (*Dr. Locock's Lotion.*) From *expressed oil of mace* (nutmeg), 1 *oz.; liquefied*, at a gentle heat, with *olive oil*, ½ *oz.;* and when cold, formed into an emulsion by agitation with *rose water*, ¼ pint; *spirit of rosemary*, 2½ fl. oz.; *stronger liquor of ammonia*, 1½ fl. dr. For other formulæ, see *Baldness, Hair Dyes, Lotions, &c.*

WASHES (Medicinal). See *Lotions, &c.*

WASHES (Mouth). Syn. *Collutoria*,—Lat. *Prep.* 1. Take of *camphor* (cut small), ¼ *oz.; rectified spirit*, 2 fl. oz.; dissolve. A few drops to be added to a wine-glassful of water, to sweeten the breath and preserve the teeth.

2. *Chloride of lime*, ½ *oz.; water*, 2 fl. oz.; agitate well together in a phial for ½ an hour, filter, and add of *rectified spirit*, 2 fl. oz.; *rose* or *orange-flower water*, 1 fl. oz. *Used*, highly diluted with water, as the last, by smokers and persons having a foul breath.

3. *Mastic* (in powder), 2 dr.; *balsam of Peru*, ½ dr.; *gum*, 2 dr.; or q. s.; *orange-flower water*, 6 fl. oz.; *tincture of myrrh*, 2 fl. dr.; for an emulsion. In loose teeth, &c.

4. *Tannin*, ½ dr.; *tincture of tolu*, 2 fl. dr.; *tincture of myrrh*, 6 fl. dr.; *spirit of horse-radish*, 2 fl. oz.; mix. In spongy gums, scurvy, &c.; diluted with tepid water.

5. (Swediaur.) *Borax*, ¼ oz.; *water* and *tincture of myrrh*, of each, 1 fl. oz.; *honey of roses*, 2 oz. In tender or ulcerated gums.

6. *Balsam of Peru*, 2 dr.; *camphor*, ½ dr.; *essence of musk* and *liquor of ammonia*, of each, ½ fl. dr.; *tincture of myrrh*, 3 fl. dr.; *spirit of horse-radish*, 1½ fl. oz. To sweeten and perfume the breath; a tea-spoonful in ½ wine-glassful of tepid water to rinse the mouth with.

WASHES (Tooth). See *above.*

WASHING FLUIDS. *Solutions of soda* rendered caustic with quick-lime.

WASHING POWDERS. (See *p.* 1064.)

WATCHFULNESS. Syn. *Sleeplessness; Agrypnia.* The *common causes* of *watchfulness* are thoughtfulness or grief, disordered stomach or bowels, heavy and late suppers, and a deficiency of out-door exercise. The *best treatment*, in ordinary cases, simply consists in an attention to these points. The *method* of *producing sleep* recommended by a late *celebrated Hypnotist*, consists in merely adopting an easy recumbent position, inclining the head towards the chest, shutting the eyes, and taking several deep inspirations with the mouth closed. *Another method*, recommended by an eminent surgeon, and which appears infallible if *persevered in with proper confidence*, and which is suitable either to the sitting or recumbent posture, consists in tying a decanter cork with a bright metallic top, a pencil-case, or any other *bright object*, on the forehead, in such a position that the eyes must be distorted or strained to be capable of seeing it. By resolutely gazing in this way for a short time, *without winking*, with the mind fully absorbed in the effort, the muscles of the eyes gradually relax, and the experimenter falls asleep. Gazing in a similar manner on an *imaginary* bright spot in the dark, as at night, exerts a like effect. A tumblerful of *cold spring water*, either with or without a few grains of *bicarbonate of potash* in it, taken just before lying down, will frequently succeed with the *dyspeptic* and *nervous*, when all other means fail. See *Supper, &c.*

WATER. Syn. *Oxide of Hydrogen, Protoxide of do.; Aqua*,—Lat. *Eau*,—Fr. *Wasser*,—Germ. The ancients regarded water as a simple substance, and as convertible into various mineral and organic products. Earth, air, fire, and water, were at one time conceived to be the elementary principles or essences of matter, from which all form and substance derived their existence. The true constitution of water was not discovered until about the year 1781, when Mr. Cavendish and Mr. James Watt, independently and nearly simultaneously, showed it to be a compound of hydrogen and oxygen. Five years, however, before this time (1776), the celebrated Macquer, assisted by Sigaud de la Fond, obtained pure water by the combustion of hydrogen in the air. It has since been satisfactorily demonstrated that hydrogen and oxygen exist in water in the proportion of 1 to 8 by *weight*, or 2 to 1 by *volume;* the sp. gr. of hydrogen being to that of oxygen as 1 to 16. By the union of these gases, there is a condensation of nearly 2000 volumes into 1, thus showing the wonderful effects of chemical combination. One *cubic inch* of *perfectly pure water* at 62° Fahr., and 30 inches of the barometer, weighs 252·458 gr.; by which it will be seen that it is 815 times heavier than atmospheric air. Its sp. gr. is 1·0, it being made the standard by which the densities of all solid and liquid bodies are estimated. The sp. gr. of *frozen water* (ice) is 0·95; that of *aqueous vapour* 0·6252, air being 1·0. Water changes its volume with the temperature; its greatest density is at about 39½° Fahr., and its sp. gr. decreases from that point, either way. By the enormous pressure of 30,000 *lb.* on the square inch, 14 volumes of water are *condensed* into 13 volumes. Water *evaporates* at all temperatures, but at 212° this takes place so rapidly, that it boils, and is converted into vapour (*steam*), whose bulk is nearly 1700 times greater than that of water. The general properties and uses of water are too well known to require notice.

Var. Of these the following are the principal:—

Distilled Water; Aqua Destillata,—Ph. L. E. & D. Obtained by the distillation of common water, observing to reject the first and last portions that come over. The still employed for this operation should be used for no other purpose; and when great nicety is required, the distillation should be performed in glass or earthenware. "It remains limpid on the addition of lime-water, chloride of barium, nitrate of silver, oxalate of ammonia, or hydrosulphuric acid." (Ph. L.) It is the *only kind of water* that should be employed in chemical and pharmaceutical operations. When distilled water is not at hand, *clean filtered* or *clarified rain water* is the only kind that can be successfully substituted.

Rain Water; Aqua Pluvia, A. Pluvialis, A. Imbrium,—Lat. A nearly pure kind of natural water; but it contains minute quantities of air, carbonic and nitric acid, carbonate of ammonia, &c.

Snow Water; Aqua Nivalis, A. ex Nive,—Lat. The purest of all natural waters.

Spring Water; Aqua,—Ph. E. *Aqua Fontana,*—Ph. D. Rain water which has percolated through the earth almost always contains mineral impurities. "For pharmaceutical use, spring water must be so far free of saline matter, as not to possess the quality of hardness, or contain above 1-6000th part of solid matter." (Ph. E.)

River Water; Aqua Fluvialis, A. ex Flumine,—Lat. Less pure than good spring water. Thames water contains about 1-3500th part of fixed impurities, chiefly carbonate of lime; or from 16 to 24 gr. of solid matter per gallon, independently of gaseous matter and mechanical impurities. The average of six analyses gave us 21·5 gr. per gall. (*Med. Circ.*, i. 260.)

Well Water, Pump Water; Aqua Puteana, A. ex Puteo,—Lat. Less pure than either of the preceding. Usually contains a large quantity of carbonate and sulphate of lime. Hence its "*hardness*" and property of curdling soap. When this arises from the first-named substance it is called "*temporary hardness,*" since it is, for the most part, removed by boiling and exposure; but when it arises from sulphate of lime it is called "*permanent hardness,*" since it cannot be so easily remedied.

Marsh Water (*Aqua ex Palude*) and *Lake Water* (*Aqua ex Lacu*) resemble river water, but contain more organic matter in a state of decomposition, and are hence deemed unwholesome.

Sea Water; Aqua Marina, A. Maris,—Lat. The characteristic of this variety is its saltness. Its density is about 1·0274, and the average quantity of saline matter which it contains is about $3\frac{1}{2}$ per cent., of which about $\frac{27}{35}$ths are *chloride of sodium,* and the remainder chiefly *chloride of magnesium* and *sulphate of magnesia.*

Analysis of Sea Water (British Channel), by Dr. Schweitzer, of Brighton.

1000 *grains contained*	*grains.*
Water	964·745
Chloride of sodium	27·059
„ of potassium	0·766
„ of magnesium	3·666
Bromide of magnesium	0·029
Sulphate of magnesia	2·296
„ of lime	1·406
Carbonate of lime	0·033
Traces of iodine and ammoniacal salt	
	1000·

Pur. Pure water is perfectly transparent, odourless, and colourless, and evaporates without residue, or even leaving a stain behind. The purest natural water is that obtained by melting snow or frozen rain, that has fallen at some distance from any town. Absolutely pure water can only be obtained by the union of its gaseous constituents; but very pure water, sufficiently so for all chemical and philosophical purposes, may be procured by the careful distillation of common water.

Tests. 1. If a precipitate is formed, or a fur or crust deposited on the vessel during *ebullition,* it indicates the presence of CARBONATE OF LIME.—2. The reiduum, if any, of *evaporation,* is *impurity;* if it be ORGANIC MATTER, smoke and a peculiar odour will be evolved, as the residue becomes dry and charred.—3. If a *solution of protosulphate of iron* when added to the water contained in a stoppered phial, occasions a reddish brown precipitate after a few days, the presence of OXYGEN is indicated.—4. Neither *litmus, syrup of violets,* nor *turmeric,* are discoloured or affected when moistened with pure water; if the *first two* are *reddened,* it indicates an ACID; if the *last* is turned *brown,* an ALKALI.—5. If a milkiness follows the addition of *lime water before* and *not after* the water has been boiled, it contains CARBONIC ACID.—6. *Chloride of barium* occasions a white precipitate, insoluble in nitric acid, in water containing SULPHURIC ACID (usually in the state of sulphate of lime).—7. *Oxalate of ammonia* produces a white precipitate in water, containing CARBONATE or SULPHATE OF LIME.—8. *Nitrate of silver* occasions a cloudy white precipitate, insoluble in nitric acid, but soluble in ammonia, in water containing CHLORINE or CHLORIDES.—9. *Phosphate of soda and ammonia* (microcosmic salt) added to water that has been boiled, and precipitated by oxalic acid (if required) produces, in a few hours, a white precipitate, if the water contains MAGNESIA.—10. *Tincture* or *infusion of galls* turns water containing IRON *black;* when this takes place, both *before* and *after* the water has been boiled, the metal is present under the form of SULPHATE OF IRON; but if it only occurs *before* boiling, then CARBONATE OF IRON may be suspected, and will be precipitated as a reddish powder by exposure and heat.—11. *Ferrocyanide of potassium* gives a *blue* precipitate in water containing a SESQUISALT OF IRON, and a *white* one, *turning blue* by exposure to the air, in water containing a PROTOSALT OF IRON.—12. *Sulphuretted hydrogen* and the *hydrosulphurets* give a *brown* or *black* precipitate in water containing COPPER, IRON, or LEAD; and a *yellow* precipitate in water containing ARSENIC, or its compounds.—13. *Soap,* or a *solution of soap* in *proof spirit,* mixes easily and perfectly with pure water, but is curdled and precipitated in water containing CARBONATES, CHLORIDES, or SULPHATES.—14. (*Prof. Clark's Soap Test.*) Take of the *finest white soap,* 1 dr.; *proof spirit,* 1 pint; dissolve, and so adjust the strength (if not already so) that exactly 32 measures are required to be added to 100 *measures* of the *standard solution of chloride of calcium* (see below), before a lather can be produced. *Every measure* of this *test solution* required to produce this effect on 100 *measures* of any *sample of water* under examination, represents ½ gr. of CARBONATE OF LIME, or ½° of "*hardness*"; 2 measures equal 1° of "*hardness,*" or 1 gr. of carbonate per gall.—The "*standard solution of chloride of calcium*" is formed by carefully dissolving 2 gr. of *pure carbonate of lime* in a little *pure hydrochloric acid,* evaporating the solution to dryness, and dissolving the *residuum* in 1 pint of *pure water.* This forms the standard solution of 16 degrees of hardness. 1 measure of this solution, mixed with 15 measures of distilled water, constitutes a solution of 1° of hardness; and so on up to 16°. See *Alkalimetry.*

Purif. Pure water is incapable of putrefaction, but ordinary water contains a small quantity of organic matter in solution, which speedily undergoes decomposition, even in closed vessels. This is especially the case with water kept in wooden casks, or in open cisterns into which leaves and insects are driven by the wind. Putrescent water is highly unwholesome as a beverage; and it is a fact, clearly demonstrated by the returns of the Registrar-General, that the recent visitations of cholera corresponded in severity to the impurity of the water supplied to the respective districts.

Among the methods adopted for purifying foul water are the following:—1. *Filtration* through, or *agitation* with coarsely powdered *freshly burnt charcoal,* either animal or vegetable; but preferably the former. This removes both mechanically suspended matter, and the calcareous and gaseous impurities held in solution.—2. *Free exposure* to the *action of the air,* by which the organic matters become oxidized and insoluble, and speedily subside. This may be easily effected by agitating the water in contact with fresh air, or by forcing air through it by means of bellows.—3. The addition of a little *sulphuric acid* has a like effect; 15 or 20 drops are usually sufficient for a gallon. This addition may be advantageously made to water intended for filtration through charcoal, by which plan at least ⅔ of the latter may be saved. (Lowitz.) — 4. An ounce of *powdered alum* (dissolved) well agitated with a hogshead or more of foul water, will purify it in the course of a few hours, when the clear portion may be decanted. When the water is very putrid, about ½ *dr.* (or even 1 *dr.* per gall.) may be employed; any alum that may be left in solution may be precipitated by the cautious addition of an equiv. proportion of carbonate of soda.—5. A solution of *red sulphate* or *sesquisulphate of iron* acts in the same way as alum: a few drops are sufficient for a gallon.—6. Agitation with about the ½ to 1% of finely powdered black oxide of manganese, has a similar effect to the last.—7. The addition of a *little aqueous chlorine,* or *chlorine gas,* to foul water, cleanses it immediately. This method has the advantage of the water being perfectly freed from any excess of the precipitant by heat.—8. *Sea water* may be rendered fit for washing by the addition of a *solution of carbonate of soda* or *salt of tartar,* as long as it turns milky. After repose, the clear portion must be decanted.—9. *Sea water* may be rendered fit for use as a beverage by distillation. The waste heat of the cook's galley is amply sufficient for this purpose. (There are several patent contrivances for the distillation of water on shipboard.)—10. *Hard water* may be softened in the same way as sea water.—11.

Hard water may be both aerated and softened by the addition of a few grains of bicarbonate of potash per gallon, followed by half as much *lemon juice* or *tartaric acid* as is sufficient to saturate the alkali in the carbonate thus added.—12. The *hardness* of *water* depending on the presence of carbonate of lime ("*temporary hardness*"), including that of most rivers and many springs, may be nearly removed by ebullition; or, as recommended by Prof. Clark, by mixing the *hard water* with *lime water* in the proper proportions, when both the dissolved carbonate and the dissolved lime, which thus becomes carbonated, are precipitated. This method has been successfully adopted by several of the great water-companies.—13. *Another method* is to precipitate the lime by the addition of *oxalate of ammonia* in atomic proportion, carefully avoiding excess, and then to agitate the water with a little *binoxide of manganese*, in fine powder.—14. "*Permanently hard*" water may be softened by substituting *hydrate of baryta*, or *baryta water*, for the lime in No. 12.

Pres. Water is usually preserved on shipboard in *iron tanks*, or in *casks* well *charred* on the inside. It cannot be safely kept in copper or leaden vessels, and receives a calcareous impregnation by contact with lime, mortar, stucco, or stone containing lime. The *addition* to water of about ½ to 1$\frac{0}{0}$ of *finely powdered black oxide of manganese*, materially promotes its preservation, especially at sea, where the motion of the vessel, and the consequent agitation of the water, increases the points of contact. *Water never putrefies* in *iron vessels*, or when some *fragments* of *metallic iron* are immersed in it. *Distilled water* should be preserved in stoppered glass-bottles or carboys.

WATER (Barèges). *Prep.* Take of *alum*, *carbonate of lime*, and *hard Spanish soap*, of each, 2 gr.; *common salt*, 4 gr.; *dried carbonate of soda*, 20 gr.; *sulphuret of potassium*, 16 gr.; *water*, 1 quart; boil them together until the fumes of sulphuretted hydrogen begin to be evolved, then add enough water to make up 1 gallon. *Used* as a medicated lotion or bath in cutaneous diseases, from the slightest eruption to the most obstinate cases of leprosy. 60 times the above quantity formed the medicated warm bath employed by the Emperor Napoleon.

WATER (Carrara). Syn. *Carbonated Lime-water; Aqua Calcis Supercarbonatis*,—Lat. *Prep.* From *lime-water* (professedly prepared from lime made by calcining Carrara marble) supersaturated, by strong pressure, with *carbonic acid;* so that the carbonate of lime at first thrown down is redissolved. Each ½ pint bottle contains 8 to 10 gr. of *carbonate of lime.*

WATER (Chalybeated). Syn. *Aqua Chalybeata*,—Lat. *Prep.* (Ure.) *Protosulphate of iron*, 3 gr.; *bicarbonate of potassa*, 61 gr.; *cold rain* or *distilled water*, 1 quart; mix and agitate in a corked bottle. Possesses equal tonic powers to that of the springs; but it may be rendered pleasanter by forcing in a little carbonic acid gas.

WATER (Fly). *Prep.* From *white arsenic*, 1 dr.; *boiling water*, 1 pint; dissolve, and sweeten the mixture with treacle. *Used* to kill flies. A *dangerous method*, and one that should never be adopted where there are children.

WATER (Lime). See *Solutions.*

WATER (Lithia). From the *freshly precipitated carbonate*, as *solution of magnesia.* Antacid and antilithic.

WATER (Oxygenated). See *page* 582.

WATER (Potash). See *Solutions.*

WATER (Rose). See *Distilled Waters.*

WATER (Seidlitz). See *Powders* and *Mineral Waters.*

WATER (Soda). Each bottle of this liquid should contain at least 15 gr. of *carbonate of soda*, but that of the shops is now nothing else but *distilled water* highly charged with *carbonic acid gas.* Not a particle of soda ever enters into its composition, on which account it cannot be substituted for the preparation of the pharmacopœias.

To *produce* a *superior article* of *soda water* the possession of a powerful *aerating* and *bottling machine* is absolutely necessary. The *water* employed must also be of the *purest quality*, the *carbonic acid* well washed with water, and the *corks* so prepared that they will not impart their peculiar flavour to the beverage. See *Powders, Solutions*, and *Wines.*

WATER (Tar). See *Infusions.*

WATERS (Distilled). Syn. *Aromatic Waters, Odoriferous do., Perfumed do.; Aquæ*,—Ph. L. *Aquæ Destillatæ*,—Ph. E. & D., & Ph. L. 1836. Pure water charged, by distillation, with the volatile, odorous, and aromatic principles of plants.

Prep. 1. (Ph. L.) *a.* 2 gall. of *water* are put into the still along with the *vegetable matter* (bruised, if necessary), but only 1 gall. is drawn over. In the Ph. L. 1836, 7 fl. oz. of *proof spirit* were added before distillation.

b. Take of the *essential oil of the plant*, 2 fl. dr.; *powdered silex*, 2 dr.; triturate them diligently together, and then with *dis-*

tilled water, 1 gall., gradually added; lastly, (after briskly agitating the whole for some time) strain the solution.

2. (Ph. E.) As 1, *a*, but adding of *rectified spirit*, 3 fl. oz., before distillation.

3. (Ph. D.) From the *respective essences* (Ph. D.), 1 fl. oz.; *distilled water*, 2 quarts; agitated well together, and then filtered through paper.

The following are the *aquæ destillatæ* of the British Colleges, with some others, the quantities referring to a product of 1 gall., to be prepared as above when not otherwise directed:—

Angelica Water; Aqua Angelicæ,—P. Cod. *Bruised seed*, 3 ℔.

Aniseed Water; Aqua Anisi,—Ph. D.

Balm Water; Aqua Melissæ,—P. Cod. *Fresh tops*, 12 ℔.

Bitter Almond Water; Aqua Amygdalæ Amaræ; Aqua Amygdalarum Amararum,—P. Cod. *Bitter-almond cake* (from which the oil has been expressed), 5 ℔; macerate for 24 hours, and filter the distilled product through *paper previously wetted* with pure distilled water. Poisonous. *Dose.* 10 to 60 drops, as a substitute for hydrocyanic acid.

Borage Water; Aqua Boraginis,—P. Cod. *Fresh leaves*, 12 ℔.

Caraway Water; Aqua Carui,—Ph. L. & D.

Cascarilla Water; Aqua Corticis Cascarillæ,—P. Cod. *Cascarilla*, bruised, 3 ℔.

Cassia Water; Aqua Cassiæ,—Ph. E. *Cassia*, bruised, 1½ ℔.

Castor Water; Aqua Castorei,—Ph. L. 1746. *Castor*, 6 oz.

Cherry-laurel Water; Aqua Lauro-cerasi,—Ph. E. & D. 1. (Ph. E.) *Fresh leaves*, chopped, 10 ℔ (10 *lb.*,—Ph. D.) To the product add of *compound spirit of lavender*, 8 fl. oz.; agitate well, and if milky, filter it (through *wet paper*,—Ph. D. & P. Cod.) *Dose.* 10 to 60 drops, as a substitute for hydrocyanic acid. It is commonly imitated in trade, by dissolving 75 drops (minims) of the *oil of bitter almonds* in 2½ fl. oz. of *rectified spirit*, agitating the mixture with *warm distilled water*, 1 gall., and filtering.

Cinnamon Water; Aqua Cinnamomi,—Ph. L. E. & D. *Cinnamon*, bruised, 18 oz.; or *oil*, 2 fl. dr.

Clove Water; Aqua Caryophilli,—P. Cod. *Cloves*, bruised, 3 ℔.

Dill Water; Aqua Anethi,—Ph. L. & E. *Bruised seed*, 1½ ℔; or, *essential oil*, 2 fl. dr.

Elder-flower Water; Aqua Sambuci,—Ph. L. & E. *Fresh elder-flowers*, 10 ℔.

Fennel Water; Aqua Fœniculi,—Ph. E. & D., and Ph. L. 1836. As *dill water.*

Hyssop Water; Aqua Hyssopi,—P. Cod. *Fresh tops*, 12 ℔.

Juniper Water; Aqua Baccæ Juniperi,—P. Cod. *Berries*, bruised, 3 ℔.

Lavender Water; Aqua Lavendulæ,—P. Cod. *Flowering tops*, 3 ℔.

Lettuce Water; Aqua Lactucæ,—P. Cod. *Fresh lettuces*, bruised, 12 ℔.

Melilot Water; Aqua Meliloti,—P. Cod. *Dried flowers*, 3 ℔.

Mint Water, Spearmint do.; Aqua Menthæ Viridis,—Ph. L. E. & D. *Dried herb*, 2 ℔; or *fresh herb*, 4 ℔; or *essential oil*, 2 fl. dr.

Orange-flower Water; Aqua Aurantii Floris,—Ph. L. *Aq. Florum Aurantii*,—Ph. L. 1836. "Water distilled from the flowers of *citrus bigaradia*, Risso, and *citrus aurantium*, D. C." (Ph. L.) *Orange flowers*, 10 ℔; *proof spirit*, 7 fl. oz. (Ph. L. 1836.)

Orange-peel Water; Aqua Corticis Aurantii,—Ph. L. 1746. *Yellow rind*, 5 oz.

Origanum Water; Aqua Origani,—P. Cod. *Dried flowers*, 3 ℔.

Peach Water; Aqua Persicæ,—P. Cod. *Fresh leaves*, chopped small, 12 ℔; as *cherry-laurel water.*

Pennyroyal Water; Aqua Pulegii,—Ph. L. & E. *Aqua Menthæ Pulegii*,—Ph. D., & Ph. L. 1836. As *mint water* (above).

Peppermint Water; Aqua Menthæ Piperitæ,—Ph. L. E. & D. As *mint water* (above).

Pimento Water; Aqua Pimentæ,—Ph. L. E. & D. *Pimento*, bruised, 1 ℔; or *oil*, 2 fl. dr.

Rose Water; Aqua Rosæ,—Ph. L. E. & D. *Damask* or *hundred-leaved rose*, 10 ℔. (Ph. L. & E.) *Otto*, 40 drops. (Ph. D.)

Sage Water; Aqua Salviæ,—P. Cod. As *lavender water* (above).

Sassafras Water; Aqua Ligni Sassafras,—P. Cod. *Sassafras chips*, 3 ℔.

Spearmint Water. See *Mint Water.*

Tansy Water; Aqua Tanaceti,—P. Cod. *Flowering tops*, 6 ℔.

Thyme Water; Aqua Thymi,—P. Cod. As the last.

Valerian Water; Aqua Valerianæ, Aq. Radicis V.,—P. Cod. *Root*, bruised, 3 ℔.

Vanilla Water; Aqua Vanillæ,—Lat. *Vanilla*, coarsely powdered, 1 *lb.*; *salt*, 5 *lb.*; *water*, 2½ gall.; macerate for 24 hours in a covered vessel, then distil 1 gall.

Uses, &c. Distilled waters are mostly employed as vehicles or perfumes. A few, as *bitter almond, cherry laurel*, and *peach water*, are poisonous in doses larger than a few drops. The *dose* of the aromatic or carminative waters, as those of dill, caraway, peppermint, pennyroyal, &c., is a wine-glassful, ad libitum.

Concluding Remarks. In the *preparation* of *distilled waters* for *medicinal purposes*, the utmost care should be taken to prevent contamination from contact with either copper, lead, or zinc, since these metals are gradually oxidized and dissolved by them. In *preparing* them from the *essential oils*, silica, in impalpable powder, is the best substance that can be employed to promote the division and diffusion of the oil, as directed in the Ph. L. *Magnesia* and *sugar*, formerly used for the purpose, are objectionable; as the *first* not only decomposes a portion of the oil, but the water is apt to dissolve a little of it, and is hence rendered unfit to be used as a solvent for metallic salts, more especially for bichloride of mercury and nitrate of silver; whilst the *other*, causes the water to ferment and acetify.

In the *distillation of waters* intended for *perfumery*, the utmost care is requisite to produce a highly fragrant article. The still should be furnished with a high and narrow neck, and the heat of steam, or a salt-water bath, should alone be employed. The first 2 or 3 fl. oz. of the runnings should be rejected, except when spirit is used, and the remainder collected until the proper quantity be obtained, when the whole product should be mixed together; as distilled waters progressively decrease in strength the longer the process is continued. When a very superior article is desired, the waters may be redistilled by a gentle heat, the first two thirds only being preserved. The *herbaceous odour* of *recently distilled waters* is removed by keeping them for some months, loosely covered, in a cold cellar.

When *distilled waters* have been *carefully prepared*, so that none of the liquor in the still has "spirted" over into the condensing worm, they keep well, and are not liable to change; but when the reverse is the case, they frequently become ropy and viscid. The *best remedy* for this is to *re-distil* them. *Waters* which have acquired a *burnt smell* in the "stilling," loose it by freezing. *Distilled waters* may be *prevented* from *turning sour* by adding a little calcined magnesia to them; and *those* which *have begun* to *spoil*, may be recovered by adding 1 gr. each of *borax* and *alum* to the pint. This doctoring is not, however, to be recommended, and should never be adopted for those used in medicine. A drop of *solution of terchloride of gold* added to these waters shows whether they contain any *uncombined essential oil*, by forming, in that case, a fine metallic film on the surface. After distilled waters have acquired their full odour, they should be carefully preserved in well-stopped bottles. Some houses keep a separate still for each of the more delicate perfumed waters, as it is extremely difficult to remove any odour that adheres to the body of the still and worm. The addition of the small quantity of spirit ordered in the Ph. E., & Ph. L. 1836, in the preparation of their waters, in no way tends to promote their preservation.

In general, the *druggists* draw off 2 gall., or more, of *water* from the quantities of the *herbs, barks, seeds,* or *flowers* ordered in the Pharmacopœias; hence the inferior quality of the *waters of the shops.* They do, however, very well for vehicles. The *perfumers,* on the contrary, use an excess of flowers, or at least reserve only the first and stronger portion of the water that distils over, the remainder being collected and used for a second distillation of fresh flowers.

The most beautiful distilled waters are those prepared in the South of France, and which are imported into England under the French names. Thus *eau de rose, eau de fleurs d'oranges, &c.*, are immensely superior to the *best* English rose or orange-flower water, &c. The water that distils over in the preparation of the essential oils is usually of the strongest and finest class. See *Essences, Oils* (Volatile), *Vegetables* (for distillation), *&c.*

WATERS (Eye). Syn. *Collyria,*—Lat. *Prep.* 1. From *distilled vinegar*, 1 fl. oz.; *distilled water*, ½ pint. ½ fl. oz. of *rectified spirit*, or 1 fl. oz. of *brandy* is often added. In simple chronic ophthalmia, blear eyes, &c.; also to remove particles of lime from the eyes.

2. *Sugar of lead,* 10 gr.; *pure vinegar,* ½ tea-spoonful; *distilled water,* ½ pint. In ophthalmia, as soon as active inflammation ceases; also as the last.

3. *Wine of opium,* 2 fl. dr.; *sulphate of zinc,* 20 gr.; *distilled water,* ½ pint. Astringent and anodyne; in painful ophthalmia, and extreme irritability.

4. *Opium,* 15 gr.; *boiling water,* 8 fl. oz.; when cold, add of *solution of acetate of ammonia,* 2½ fl. oz.; and filter. As the last.

5. *Sulphate of zinc,* 20 gr.; *distilled water,* ½ pint; dissolve. An excellent astringent water in chronic ophthalmia, weak and irritable eyes, &c.

6. *Sulphate of copper,* 10 gr.; *camphor mixture* (julep), ½ pint; dissolve. In the purulent ophthalmia of infants.

7. *Camphor julep,* 5 fl. oz.; *solution of acetate of ammonia* and *rose water,* of each,

2½ fl. oz.; mix. For weak or swollen eyes, particularly after ophthalmia.

8. *Chloride of barium*, 30 gr.; *distilled water*, ½ pint. In the ophthalmia of scrofulous and syphilitic habits.

9. (*Bate's.*) From *blue vitriol*, 15 gr.; *camphor*, 4 gr.; *hot water*, ¼ pint; agitate in a corked bottle, and when cold make it up to 4 pints, and filter. In purulent ophthalmia, and blear eyes.

10. (*Goulard's.*) From *solution of diacetate of lead*, 16 drops; *distilled water*, ½ pint; mix. As No. 2.

11. (Krimer.) *Hydrochloric acid*, 20 drops; *mucilage*, 1 dr.; *water*, 2 fl. oz. To remove particles of iron or lime from the eye.

12. (P. Cod.) *Extract of opium*, 4 gr.; *rose water*, 4 fl. oz.; dissolve. In painful ophthalmia.

WATERS (Medicated). See *Lotions, Solutions, Distilled Waters, Eye do., &c.*

WATERS (Mineral). Syn. *Saline Waters; Aquæ Minerales*,—Lat. Our space will not permit a description of these individually. The *tables* given below, exhibiting their composition, will however enable the reader, with a little attention, to produce *artificial waters* more closely resembling the natural ones, than can be done by adopting any of the numerous formulæ published for the purpose. The "*aerated waters*" are charged with 5 or 6 times their volume of *carbonic acid gas* by means of the apparatus employed by the soda-water manufacturers. On the *small scale*, the gas is often produced by the reaction of the ingredients on each other, in which case, on the introduction of the latter, the bottle must be instantly closed, and inverted. *Distilled water*, or *filtered rain water*, should alone be employed in their composition; and for the *chalybeated* and *sulphuretted waters*, it should be first boiled, and allowed to cool out of contact with the air.

In addition to the tables, it may be remarked that traces of IODINE have been found in the water of *Cheltenham* (old well), traces of BROMINE in the water of *Epsom*, and traces of both BROMINE and IODINE in that of *Leamington* (royal pump). MANGANESE has been found in the waters of *Tunbridge, Carlsbad, Spa, Pyrmont, Marienbad, Saidschüts, &c.* Traces of PHOSPHORIC and FLUORIC ACID have also been found in some mineral waters. It is the opinion of many high authorities that the medicinal virtues of these waters, depend more on the minute quantities of the above substances, and the high state of dilution in which they are held, than on their more abundant saline ingredients.

WATERS (Perfumed). Syn. *Aquæ Odoriferæ*,—Lat. The *simple distilled waters* of the perfumer have been already noticed. (See *p.* 1288-90.) They may be prepared from any substance which imparts its fragrance to water by distillation. The *compound waters* (eaux) employed as perfumes consist of very pure rectified spirit, holding in solution essential oils, or other odorous matter, and resemble the *esprits, essences, and spirits*, before noticed. They differ from *extraits* in being mostly colourless, or nearly so, and in being generally prepared by distillation, or by the addition of the pure essential oils or essences to carefully rectified and perfectly scentless spirit; whereas the *extraits* are mostly and preferably prepared by macerating the flowers, &c. in the spirit, or by digesting the spirit with the oils, in the manner noticed at *pages* 1175-6. *Extraits* are preferred to *eaux* and *esprits* as the basis of good perfumery, where the colour is not objectionable.

The following are a few additional formulæ and remarks:—

Angel Water, Portugal do. From *orange-flower* and *rose water*, of each, 1 pint; *myrtle water*, ½ pint; *essence of ambergris*, ½ fl. oz.; *essence of musk*, ¼ fl. oz.; shake them well together for some hours, then filter the mixture through paper.

Eau d'Ange; Aqua Myrti. From *myrtle flowers*, 3½ *lb.*; *water*, 2 gall.; distil a gallon. A pleasant perfume.

Eau d'Ange bouillée. From *rose water* and *orange-flower water*, of each, 3 pints; *benzoin*, ½ *lb.*; *storax*, ¼ *lb.*; *cinnamon*, 1 *oz.*; *cloves*, ½ *oz.*; 3 *fresh-emptied musk-bags*; digest in a securely covered vessel at nearly the boiling heat for 2 hours, then allow it to cool; strain off the clear, press the remainder, and filter for use. Very fragrant.

Eau d'Ange distillée. From *benzoin*, 4 *oz.*; *storax*, 2 *oz.*; *cloves*, ½ *oz.*; *calamus* and *cinnamon*, of each, ¼ *oz.*; *coriander seeds*, 1 dr.; all bruised; *water*, 3 quarts; distil 2 quarts. *Eau d'Ange distillée et musquée*, is made by adding a little *essence of musk* to the distilled product. Both are highly fragrant.

Eau de Naphre, Eau de Naphe; Aqua Naphæ; Double distilled Orange-flower Water. This article is distilled in Languedoc from the leaves of the *bigarade* or *bitter orange tree*, but the preparation sold in England under this name is often prepared as follows:—*Orange flowers*, 7 *lb.*; *fresh yellow peel of the bigarade* or *Seville orange*, ½ *lb.*; *water*, 2 gall.; macerate 24 hours, and distil 1 gall. In many cases,

I. TABLE *exhibiting the Composition of several of the more celebrated* MINERAL WATERS.

16 fl. oz. contain the following Ingredients:—

WATERS.	Nitrogen in cubic inches.	Carbonic Acid in cubic inches.	Sulphuretted Hydrogen in cubic inches.	Carbonate of Soda in grains.	Carbonate of Magnesia in grains.	Carbonate of Lime in grains.	Sulphate of Soda in grains.	Sulphate of Magnesia in grains.	Sulphate of Lime in grains.	Chloride of Sodium in grains.	Chloride of Magnesium in grains.	Chloride of Calcium in grains.	Oxide of Iron.	Silica.	Temperature.	Total of Saline Contents	AUTHORITY.
CARBONATED.																	
Seltzer	..	17·	..	4·	5·	3·	..	..	..	17·	..	..	..	..	Cold	29·	Bergman.
Pyrmont	..	26·	..	..	10·	4·5	..	5·5	8·5	1·5	..	..	0·6	..	do.	30·6	Ditto.
Spa	..	13·	..	1·5	4·5	1·5	..	..	..	0·2	..	..	0·6	..	do.	8·3	Ditto.
Carlsbad	..	5·	..	5·	..	1·5	8·5	..	..	4·5	..	..	a trace	0·3	165°	19·8	Klaproth.
Pouges	..	30·	..	10·	1·2	12·	..	..	..	2·2	..	..	2·5	0·5	Cold	28·4	Hassenfratz.
Saint Parize	..	22·	..	..	0·5	11·5	..	..	13·	..	..	..	..	..	do.	25·	Ditto.
CHALYBEATE.																	
Tunbridge	0·59	1·	{trace of oxygen}	..	..	0·03	..	..	0·17	0·30	0·03	0·05	0·28	..	do.	0·56	Scudamore.
Cheltenham Chalybeate	..	2·5	..	0·5	..	..	22·7	6·	2·5	41·3	..	..	0·8	..	do.	73·8	Parkes & Brande.
Brighton	..	2·2	..	..	..	..	..	..	4·	3·	0·75	..	1·4	0·14	do.	9·29	Marcet.
SALINE.																	
Seidlitz	..	..	..	..	2·5	0·8	..	180·	5·	..	4·5	..	..	..	do.	192·8	Bergman.
Cheltenham Pure Saline	..	..	..	..	..	..	15·	11·	4·5	50·	..	..	..	..	do.	80·5	Parkes & Brande.
Bristol	..	3·5	..	..	..	1·5	1·5	..	1·5	0·5	1·	..	..	..	74°	6·	Carrick.
Buxton	0·2	..	..	..	..	1·3	..	..	0·3	0·2	..	..	0·03	..	82°	1·83	Pearson.
Bath	..	1·2	..	..	..	0·8	1·5	..	9·	3·3	..	..	a trace	0·2	116°	14·6	Phillips.
Scarborough	..	..	..	..	..	a trace	20·	..	9·	..	..	..	ditto	..	Cold	2·9	Saunders.
Barège	..	..	uncertain	2·5	..	ditto	..	..	a trace	0·5	..	..	..	..	120°	3·	Ditto.
Plombières	..	..	..	2·2	..	0·3	2·3	..	..	1·5	..	..	..	0·3	?	66·	Vauquelin.
Kilburn	..	3·5	8·5 ?	..	0·5	1·	12·	37·	5·5	2·5	5·5	0·2	a trace	..	Cold	64·2	Schmeisser.
Leamington New Bath	0·4	a trace	a trace	..	..	..	19·	..	14·	53·	1·5	..	0·8	..	do.	88·3	Lambe.
Leamington Old Bath	0·3	..	ditto	..	..	..	7·5	7·	18·	41·	..	..	..	..	do.	73·5	Ditto.
SULPHUROUS.																	
Harrogate	0·8	1·	2·3	..	0·7	2·5	..	1·3	..	77·	11·	1·5	..	..	do.	94·	Garnet.
Moffat	0·5	0·6	1·2	..	..	..	..	..	..	4·5	..	..	..	..	do.	4·5	Ditto.
Aix-la-Chapelle	..	..	5·5	12·	..	4·2	..	..	..	5·	..	..	..	..	143°	21·2	Bergman.
Cheltenham Sulphur Spring	..	..	1·5	..	..	..	23·5	5·	1·2	35·	..	..	0·3	..	Cold	65·	Parkes & Brande.

II. TABLE *exhibiting the Composition of the principal* MINERAL WATERS *of* GERMANY, *and of the* SARATOGA CONGRESS SPRING *of* AMERICA, *re-arranged expressly for this work.*

Grains of *Anhydrous Ingredients* in One Pound Troy.	Adelheids-Quelle.	Auschowitz. Ferdinands-Brunnen.	Carlsbad.	Eger. Franzens-Brunnen.	Ems.	Fachingen.	Kissingen. Ragozi.	Kreuznach. Elizen-Brunnen.	Marienbad. Kreutbr.	Püllna.	Pyrmont.	Saratoga Congress Spring.	Schlesischer. Obersalz-Brunnen.	Seidschütz.	Selters.	Spa Pouhon.
Carbonate of Soda . .	5·2443	4·5976	7·2712	3·8914	8·0625	12·3328	. .	. .	5·3499	. .	. .	0·8261	7·6211	. .	4·6162	0·5531
„ Lithia . .	0·0902	0·0507	0·0150	0·0282	0·0405	. .	. .	. .	0·0858	. .	. .	. .	. .	. .	. .	. .
„ Baryta . .	0·0024	. .	. .	. .	0·0022	. .	. .	. .	. .	. .	. .	. .	. .	. .	0·0014	. .
„ Strontia .	0·0387	0·0040	0·0055	0·0023	0·0080	. .	0·0592	. .	0·0028	. .	. .	0·0672	0·0170	. .	0·0144	. .
„ Lime . .	0·4703	3·0085	1·7775	1·3501	0·8555	1·8667	4·8180	0·2058	2·9509	0·5775	4·7781	5·8531	1·5464	5·1045	1·4004	0·7387
„ Magnesia .	0·2980	2·2867	1·0275	0·5040	0·5915	1·2983	1·3185	1·1812	2·0390	4·8045	. .	4·1155	1·5496	0·8235	1·5000	0·8421
„ (Proto) Manganese	0·0012	0·0692	0·0048	0·0322	0·0028	. .	0·0121	0·0072	2·0288	. .	0·0364	0·0202	0·0026	0·0032	. .	0·0389
„ (Proto) Iron .	0·0121	0·2995	0·0208	0·1762	0·0120	. .	0·1397	0·1495	0·1319	. .	0·3213	0·0173	0·0356	0·0095	. .	0·2813
Sub-Phos. of Lime . .	. .	. .	0·0012	0·0172	. .	0·0061	. .	. .	. .	0·0026	. .	. .	. .	0·0117	0·0007	0·0102
„ Alumina .	. .	0·0040	0·0019	0·0092	0·0014	. .	. .	. .	. .	. .	0·0110	. .	. .	0·0088	0·0020	0·0064
Sulphate of Potassa . .	0·0066	. .	. .	. .	0·4050	. .	1·2540	. .	. .	3·6000	0·0314	0·1379	0·3160	3·6705	0·2978	0·0593
„ Soda . .	. .	16·9022	14·9019	18·3785	. .	0·1267	. .	. .	28·5868	92·8500	1·6092	. .	2·5106	17·6220	. .	0·0281
„ Lithia . .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	0·0067	. .	. .	. .	. .	. .
„ Lime . .	. .	. .	. .	. .	. .	. .	5·5485	. .	. .	1·9500	5·0265	. .	. .	1·1287	. .	. .
„ Strontia .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	0·0154	. .	. .	0·0347	. .	. .
„ Magnesia .	. .	. .	. .	. .	. .	. .	. .	. .	. .	69·8145	2·3684	. .	. .	62·3535	. .	. .
Nitr. of Magnesia . .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	0·1004	. .	5·9302	. .	. .
Chlor. of Ammonium .	. .	. .	. .	. .	. .	. .	0·0364	. .	. .	. .	. .	0·0326	0·0164	. .	. .	. .
„ Potassium . .	0·1845	. .	. .	. .	0·0338	. .	. .	0·7287	. .	. .	. .	1·6256	. .	. .	0·2685	. .
„ Sodium . .	28·4608	6·7472	5·9820	6·9229	5·7255	3·2337	39·3733	54·6917	10·1727	. .	. .	19·6653	0·8682	. .	12·9690	0·3371
„ Lithium . .	. .	. .	. .	. .	. .	. .	. .	0·0562	. .	. .	. .	. .	. .	. .	. .	. .
„ Calcium . .	. .	. .	. .	. .	. .	. .	. .	9·7358	. .	. .	. .	. .	. .	. .	. .	. .
„ Magnesium .	. .	. .	. .	. .	. .	. .	3·6599	. .	. .	14·7495	0·8450	. .	. .	1·2225	. .	. .
„ Barium . .	. .	. .	. .	. .	. .	. .	. .	0·2366	. .	. .	. .	. .	. .	. .	. .	. .
„ Strontium . .	. .	. .	. .	. .	. .	. .	. .	0·5494	. .	. .	. .	. .	. .	. .	. .	. .
Bromide of Sodium . .	0·3060	. .	. .	. .	. .	. .	0·3331	0·2304	. .	. .	. .	0·1613	0·0051	. .	. .	. .
Iodide of Sodium . .	0·1500	. .	. .	. .	. .	. .	. .	0·0024	. .	. .	. .	0·0046	. .	. .	. .	. .
Fluoride of Calcium . .	. .	. .	0·0184	. .	0·0014	. .	. .	. .	. .	. .	. .	. .	. .	. .	0·0013	. .
Alumina	0·0166	. .	. .	. .	. .	. .	. .	0·0086	0·0023	. .	. .	0·0069	. .	. .	. .	. .
Silica	0·1922	0·5023	0·4329	0·3548	0·3104	0·0657	0·1609	0·2355	0·2908	0·1320	0·3727	0·1112	0·2423	0·0900	0·2265	0·3739
Total Saline contents .	35·4739	34·4719	31·4606	31·6670	16·0525	18·9300	56·7136	68·0190	51·6417	188·4806	15·4221	32·7452	14·7309	98·0133	21·2982	3·2691
Carbonic Acid Gas in 100 cubic inches .	10	146	58	154	51	135	96	12	105	7	160	114	98	20	126	136
Temperature, Fahr. .	58°	49°	Spru. 165° Neub. 138° Mühl. 128° Ther. 122°	54°	Kess. 117° Krän. 84°	50°	53°	47°	53°	58°	56°	50°	58°	58°	58°	50°
Authorities . . .	Struve.	Steinm.	Berzelius.	Berzelius.	Struve.	Bischoff.	Struve.	Struve.	Berzelius.	Struve.	Struve.	Schweitz.	Struve.	Struve.	Struve.	Struve.

ordinary orange-flower water is sold for *eau de naphe.*

Rose Water. From *otto of roses,* 3 dr.; *rectified spirit* (warm), 1 pint; dissolve, add of *hot water,* 10 gall.; mix in a 12-gallon carboy, cork, and well agitate the whole until quite cold. This makes the ordinary rose water of the shops, and is really excellent; but it is better for distillation. See *Distilled Waters.*

Unparalleled Water; Eau Incomparable. From *oil of lemon,* 4 dr.; *oil of bergamot,* 2½ dr.; *oil of cedrat,* 2 dr.; *rectified spirit,* 3½ pints; *Hungary water,* ½ pint; mix, and distil all but 9 oz. (Guibourt.)

WATERS (Perfumed,—Ammoniated). See *p.* 960.

WATERS (Saline). See *page* 1291.

WATER BRASH. See *Pyrosis.*

WATER-COLOUR CAKES. These are *prepared* from any of the *ordinary pigments* that work well in water, made into a *stiff* and *perfectly smooth paste* with *gum water,* or *isinglass size,* or a *mixture* of the two, and then compressed in polished steel moulds, and dried. See *Destemper,* and the *respective pigments.*

WATER CRESS. The *nasturtium officinale* (sisymbrium nasturtium,—Linn.), a well-known plant of the natural order *cruciferæ.* It is alterative and antiscorbutic, and was formerly used in medicine, but now chiefly as a salad, or a refreshing relish at breakfast.

WATER-POX. See *Chicken-pox.*

WATERPROOFING. Cloth is "waterproofed" as follows:—

1. Moisten the *cloth,* on the *wrong side,* first with a *weak solution of isinglass,* and, when dry, with an *infusion of nut-galls.*

2. As the last, but substitute a *solution of soap* for isinglass, and another of *alum* for galls.

3. (*Hancock's Patent.*) By spreading the *liquid juice* of the *caoutchouc tree* upon the *inner surface* of the goods, and allowing them to dry in the air. Absolutely chimerical.

4. (*Potter's Patent.*) The *cloth* is first embued on the *wrong side* with a *solution of isinglass, alum,* and *soap,* by means of a brush; when dry, it is brushed on the same side against the grain, and then gone over with a brush dipped in *water.* Impervious to water, but not to air.

5. (*Siever's Patent.*) By applying first a solution of *Indian rubber in oil of turpentine,* and afterwards *another Indian rubber varnish,* rendered very drying by the use of driers. On this, wool or other material of which the fabric is made, cut into proper lengths, is spread, and the whole passed through a press, whereby the surface acquires a nap or pile.

6. A simple method of rendering cloth waterproof *without* being *airproof,* is to spread it on any smooth surface, and to rub the *wrong side* with a *lump* of *bees' wax* (perfectly pure and free from grease), until it presents a slight, but even white or grayish appearance; a *hot iron* is then to be passed over it, and the cloth being brushed whilst warm, the process is complete. When the operation has been skilfully peformed, a candle may be blown out through the cloth, if coarse, and yet a piece of the same, placed across an inverted hat, may have several glassfuls of water poured into the hollow formed by it, without any of the liquid passing through. Pressure or friction will alone make it do so. During the last 20 years we have shown this to numerous cloth-manufacturers, waterproofers, tailors, and others, several of whom have adopted the method very extensively, and with perfect success.

WATERPROOF LIQUID. *Prep.* 1. *Indian rubber,* in fragments, 1 *oz.; boiled oil,* 1 pint; dissolve by heat, carefully applied, then stir in of *hot boiled oil,* 1 pint; and remove the vessel from the fire.

2. *Boiled oil,* 1 pint; *bees' wax* and *yellow rosin,* of each, 2 *oz.;* melt them together.

3. *Salad oil,* 1 pint; *mutton suet,* ¼ *lb.; white wax* and *spermaceti,* of each, 1 *oz.;* as the last. For "ladies' work."

Obs. The above are used for boots, shoes, harness, leather straps, leather trunks, &c., applied warm before the fire.

WAX. Syn. *Bees' Wax, Yellow do.; Cera,*—Ph. L. *Cera Flava,*—Ph. E. & D. The substance which forms the cells of bees; obtained by melting the comb in water, after the honey has been removed, straining the liquid mass, remelting the defecated portion, and casting it into cakes.

Pure bees' wax has a pleasant ceraceous odour, a pale yellowish brown colour, and the sp. gr. 0·960 to 0·965. It is brittle at 32°, softens and becomes plastic at 88 or 90°, and melts at 154 to 155° Fahr. It is *very frequently adulterated* with *farina, rosin,* and *mutton suet* or *stearine.* Dr. Normandy met with a sample containing 28% of effloresced *sulphate of soda.* The *first* may be detected by oil of turpentine, which dissolves only the wax,—the *second,* by its solubility in cold alcohol, and by its terebinthinate taste,—the *third* and *fourth,* even when forming less than 2% of the wax, may be detected by it affording sebacic acid on distillation. When greasy matter is present in any considerable quantity, it *may* also be detected by the suspected sample having an *unctuous* feel, and a disagreeable taste. *Saline matter* may be detected by the loss of weight, when a weighed quantity of the wax is boiled in water. *Heavy substances*, as *chalk, plaster of Paris, white lead, oxide of zinc, &c.*, may also be thus separated, since they subside, owing to their superior gravity, to the bottom of the vessel. The fracture of wax containing *rosin*, or any *fatty matter*, is smooth instead of granular; and, when the first of these is present, it burns with a smoky, instead of a clear white flame.

Factitious Wax; Cera Flava Factitia,—Lat. A spurious compound sold by the farrier's druggists for veterinary purposes.—1. From *yellow rosin*, 16 *lb.; hard mutton suet* or *stearine*, 8 *lb.; palm oil*, 2½ *lb.;* melted together.

2. As last, but substituting *turmeric*, 1 *lb.*, for the palm oil.

3. *Best annotta*, 6 *oz.* or q. s.; *water*, 1 gall.; boil, add of *hard mutton suet* or *stearine*, 35 *lb.; yellow rosin*, 70 *lb.;* again boil with constant agitation until perfectly mixed and of a proper colour, and as soon as it begins to thicken, pour it out into basins to cool. When cold rub each cake over with a little *potato starch.*

WAX (Bleached). See *White Wax.*

WAX (Etching). See *Etching* and *Varnishes.*

WAX (Gilder's). See *page* 519.

WAX (Grave). See *Adipocere.*

WAX (Modeling). *Prep.* Take of *bees' wax, lead plaster, olive oil*, and *yellow rosin*, equal parts; *whiting*, q. s. to form a paste; mix well, and roll it into sticks. Colours may be added at will.

WAX (Refined). *Crude wax*, especially that imported, is generally loaded with dirt, bees, and other foreign matter. To free it from these substances, it undergoes the operation of "*refining.*" This is done by melting *the wax* along with about 4 or 5% of *water* in a *bright copper* or *stone-ware boiler*, preferably heated by steam, and after the whole is perfectly liquid, and has boiled for some minutes, withdrawing the heat, and sprinkling over its surface a little *oil of vitriol*, in the proportion of about 5 or 6 fl. oz. to every *cwt.* of *wax.* This operation should be conducted with great care and circumspection; as, when done carelessly, the melted wax froths up, and boils over the sides of the pan. The acid should also be *well scattered* over the *whole surface.* The melted wax is next covered over, and left for some hours to settle, or until it becomes sufficiently cool to be drawn off for "*moulding.*" It is then *very gently* skimmed with a *hot ladle*, baled or decanted into *hot tin* "*jacks*," and by means of these poured into basins, where it is left to cool. Great care must be taken not to disturb the sediment. When no more clear wax can be drawn off, the remainder in the melting pan is allowed to cool, and the cake, or "*foot*" as it is called, is taken out, and the impurities (mostly bees) scraped from its under surface. The scraped cake is usually reserved for a second operation; but if required, it may be at once remelted, and strained through canvass into a mould.

Much of the *foreign wax* has a *pale dirty colour*, which renders it, no matter however pure, objectionable to the retail purchaser. Such wax undergoes the operation of "*colouring*" as well as "*refining.*" A small quantity of the *best roll annotta*, cut into slices, (¼ ℔ more or less, to wax 1 cwt., depending on the paleness of the latter,) is put into a clean boiler with about a gallon of *water*, and boiled for some time, or until it is perfectly dissolved, when a few ladlefuls of the *melted wax* are added, and the boiling continued until the wax has taken up all the colour, or until the water is mostly evaporated. The *portion of wax* thus treated has now a deep orange colour, and is added, in quantity as required, to the *remainder* of the *melted wax* in the larger boiler until the proper shade of colour is produced when cold; the whole being well mixed, and a sample of it cooled now and then, to ascertain when enough has been added. The copper is next brought to a boil, and treated with *oil of vitriol, &c.*, as before. Some persons add *palm oil* (bright) to the *wax* until it gets sufficient colour; but this plan is objectionable from the quantity required for the purpose being often so large as to injure the quality of the product; besides which the colour produced is inferior, and less transparent and permanent than that given by annotta.

Another method of *refining crude wax*, and which produces a *very bright* article, is to melt it in a large *earthen* or *stoneware vessel*, heated by steam or a salt-water bath, then to cautiously add to it about 1% of *concentrated nitric acid*, and to continue the boiling until *nitrous fumes* cease to be evolved, after which the whole is allowed to settle, and is treated as before.

Obs. The great art in the above process is to produce a wax which shall at once be "*bright*," or semi-translucent in thin pieces, and *good coloured.* The former is best ensured by allowing the melted mass to settle well, and by carefully skimming and decanting the clear portion without disturbing the sediment. It should also not be poured into the moulds too warm, as, in that case, it is apt to "*separate*," and the resulting cakes to be "*streaky*," or of different shades of colour. It should also be allowed to cool *very slowly*. When cooled *rapidly*, especially if a current of air fall upon its surface, it is apt to crack, and to form cakes full of fissures. *Some persons* who are very nice about their wax, have the cakes polished with a stiff brush when quite cold and hard. It is absolutely necessary that the "*jacks*" or *cans*, *ladles*, and *skimmers* used in the above process, be kept *pretty hot*, as without this precaution the wax cools, and accumulates upon them in such quantity as to render them inconvenient, and *often* quite useless, without being constantly scraped out.

WAX (Sealing). *Prep.* 1. (*Red.*)—*a.* Take of *shell-lac* (very pale), 4 *oz.;* cautiously melt it in a bright copper pan over a clear charcoal fire, and when fused add of *Venice turpentine*, 1¼ *oz.;* mix, and further add of *vermilion*, 3 *oz.;* remove the pan from the fire, cool a little, weigh it into pieces, and roll them into circular sticks on a *warm marble slab* by means of a *polished wooden block;* or it may be poured into moulds whilst in a state of fusion. Some persons polish the sticks with a rag until quite cold.

b. From *shell-lac*, 3 *lb.; Venice turpentine*, 1¼ *lb.; finest cinnabar*, 2 *lb.;* mix as before. Both the above are "*fine*."

c. As the last, but using ½ *less* of *vermilion*. Inferior.

d. Rosin, 4 *lb.; shell-lac*, 2 *lb.; Venice turpentine* and *red lead*, of each, 1½ *lb.;* as before. Common.

2. (*Black.*)—*a.* From *shell-lac*, 60 parts; *finest ivory-black*, reduced to an impalpable powder, 30 parts; *Venice turpentine*, 20 parts. Fine.

b. Rosin, 6 *lb.; shell-lac* and *Venice turpentine*, of each, 2 *lb.; lampblack*, q. s. Inferior.

3. (*Gold-coloured.*) By stirring *gold-coloured mica spangles* or *talc*, or *aurum musivum*, into the melted resins just before they begin to cool. Fine.

4. (*Marbled.*) By mixing 2 or 3 different coloured kinds just as they begin to grow solid.

5. (*Soft.*)—*a.* (*Red.*) Take of *bees' wax*, 8 parts; *olive oil*, 5 parts; melt, and add of *Venice turpentine*, 15 parts; *red lead*, to colour.—*b.* (*Green.*) As the last, but substituting *powdered verdigris* for red lead. Both are used for sealing official documents kept in tin boxes; also as a cement.

6. (*Bottle Wax.*)—*a.* (*Black.*) From *black rosin*, 6½ *lb.; bees' wax*, ½ *lb.; finely powdered ivory-black*, 1½ *lb.;* melted together.—*b.* (*Red.*) As the last, but substitute *Venetian red* or *red lead* for ivory-black.

Obs. All the above forms for "*fine*" wax produce "*superfine*," by employing the best qualities of the ingredients; and "*extra-superfine*" or "*scented*," by adding 1% of *balsam of Peru* or *liquid storax* to the ingredients when considerably cooled. The "*variegated*" and "*fancy-coloured kinds*" are commonly *scented* with a little *essence of musk* or *ambergris*, or any of the more fragrant essential oils. The addition of a *little camphor*, or *spirit of wine*, makes sealing-wax burn easier. Sealing-wax containing rosin, or too much turpentine, runs into thin drops at the flame of a candle.

WAX (White). Syn. *Bleached Wax; Cera Alba*,—Ph. L. E. & D. *Prep.* From *pure bees' wax*, by exposing it in thin flakes to the action of the sun, wind, and rain, frequently changing the surface thus exposed, by remelting it, and reducing it again to thin flakes. *Used* in making candles, and in white ointments, pommades, &c., for the sake of its colour. *Block White-wax* (*cera alba in massis*) is the above when cast into blocks; the best foreign is always in this form. *Virgin Wax* (*Cake white wax; cera alba in offis*) should be the last made into round flat cakes; but this is seldom the case, the mixture sold under the name generally containing from 1-3rd to 1-2nd its weight of spermaceti. The white wax (?) supplied by certain wholesale druggists to their customers, is often totally unfit for the purposes to which it is applied. The presence of spermaceti in wax is shown by its reduced melting point, by its bending before it breaks, and by its flavour when chewed. The *pela*, or natural white wax of the Chinese, is an animal wax, produced by the *cicada limbata*, a species of *coccus*, to protect its larva.

WEIGHT. The quantity of a body determined by means of a balance, and expressed in terms having reference to some known standard; the measure of the force of gravity, from which the relative quantity of a body is inferred. The *relation* between the *weight* and *volume* of a body, compared to a given standard taken as unity, constitutes its *specific gravity*.

For the *purpose of weighing*, a *balance* or *lever* is required, which, when accurately suspended in a state of equilibrium, will be affected, in precisely an equal manner, by like weights applied to its extremities. Hence, the construction of such an instrument is not more difficult than its application is important in chemical and philosophical research. A balance, made by Ramsden, turning on points instead of edges, was sensibly affected by the 1-1600th of a gr. when loaded with 5 oz. This is 1-1,384,000th part of the weight; so that by means of this beam the weight of any substance might be determined to 5 places of decimals, besides a sixth figure, which might be estimated. (*Phil. Trans.*, vol. 75.) A balance in possession of the Royal Society, made by the same artist, is capable of weighing 10 *lb.*, and is said to turn with the 1-100th of a gr., which is only the 1-7,000,000th part of the load. A *balance* with *arms of unequal length* or *weight*, will weigh as accurately as another of the same workmanship with *equal arms*, provided the substance weighed be removed, and standard weights placed in the same scale until the equilibrium be again restored, when the weights so employed being exactly in the same condition as the substance previously occupying the scale, will, of course, indicate its proper weight. A knowledge of this fact is useful, as it enables any one to *weigh correctly* with *unequal scales*, or with *any suspended lever.*

Small weights may be made of thin leaf brass. *Jewellers' foil* is a good material for weights below 1-10th of a grain as low as to the 1-100th of a grain; but *aluminium*, from its small sp. gr., is better for this purpose than any other metal. Quantities below the 100th of a gr. may be either estimated by the position of the index, or shown by actually counting rings of wire, the value of which has been previously determined. The *readiest* way to *subdivide small weights*, consists in weighing a certain quantity of *very fine wire*, and afterwards cutting it into such parts, by measure, as are desired; or the wire may be wrapped close round two pins, and then cut asunder with a knife. By this means it will be divided into a great number of equal lengths, or small rings.

The following Tables represent the values and relative proportions of the principal weights employed in Commerce and the Arts.

I. ENGLISH WEIGHTS.

1. *Imperial Avoirdupois Weight.*

Old Drachms	New Drachm of the Ph. D. *dr.*	Ounces. *oz.*	Pounds. *lb.*	Quarters *qr.*	Hundred weight. *cwt.*	Ton.	Equiv. in Grains. (*Troy*).	Equiv. in French grammes	Equiv. in Minims or measured drops.
1·	·5	·0625	·0039	.	.	.	27·34375	1·7714	·
2·	1·	·125	·0078	.	.	.	54·6875	3·5428	60·
16·	8·	1·	·0625	.	.	.	437·50	28·3424	480·
256·	128·	16·	1·	.	.	.	7000·	453·4784	7680·
7168·	3584·	448·	28·	1·	·25	.	196,000·		
28672·	14336·	1792·	112·	4·	1·	·05	784.000·		
573440·	286720·	35840·	2240·	80·	20·	1·	15,680,000·		

⁂ The *standard* in *avoirdupois weight* is the same as in troy weight. The *old avoirdupois drachm* is now never used except in weighing silk; whenever a drachm is mentioned in commerce, the 1-8th of the *avoird. oz.* is intended, which, together with other divisions, is now adopted in the Ph. D. The *stone* of *butcher's meat* is 8 *lb.*, and of other commodities 14 *lb.*, in London.

Avoird.
1 *lb.* = 1·21577 ℔, or 1 ℔ 2 oz. 4 dr. 40 gr. Troy.
1 *oz.* = ·9114583 oz., or 7 dr. 17·5 gr. „

1 *lb. distilled water* (therm. 62°, barom. 30 in.) = 27·72740 cubic inches.
1 *oz.* „ „ = 1·73296 „
1 *dr.* „ „ = ·21662 „

†‡† AVOIRDUPOIS WEIGHT is *distinguished* in this *work* by the *abbreviations* referring to it being printed in ITALICS.

2. *Imperial Troy Weight.*

Grains. gr.	Pennyweights. dwt.	Ounces. oz.	Pound. lb. or ℔.
24	1		
480	20	1	
5760	240	12	1

⁎ The *standard* of the *above measure* is 1 cubic inch of *distilled water*, which at 62° Fahr., and 30 inches of the barometer, weighs 252·458 troy grains

The *carat* used in weighing diamonds is 3⅙ grains (nearly). Troy weight is employed in weighing *gold, silver, jewellery, &c.*, and, under a somewhat modified form, in medicine and philosophical experiments. (See *below.*)

3. *Apothecaries' Weight.*

(Modified Troy Weight.)

Grains (*Troy*). gr.	Scruples. ℈	Drachms ʒ	Ounces. ℥	Pounds. ℔	Equiv. in French grammes.	Equiv. in Minims or measured drops.	Equiv. in cubic inches.	Equiv. in Avoirdupois weight.
1·	·05	·01666	·002083	·0001736	·06475	1·09	·003961055	1· gr.
20·	1·	·3333	·0416	·003472	1·295	21·94	·07922109	20· ,,
60·	3·	1·	·1250	·0104166	3·885	65·82	·23766329	60· ,,
480·	24·	8·	1·	·0833333	31·08	526·62	1·90130635	1 *oz.* 42 5 ,,
5760·	288·	96·	12·	1·	372·96	6319·54	22·81567609	13 ,, 72·5 ,,

⁎ Apothecaries' weight is employed in prescriptions and dispensing, and is the one recognised in the British pharmacopœias, with the exception of the new Ph. D., in which avoirdupois weight, as modified above, is ordered.

†‡† The same *abbreviations* being commonly used to represent both the *avoirdupois* and the *troy* or *apothecaries'* pound, it is necessary to observe, that the *former* is indicated when this sign is *preceded* by *Arabic figures;* and the *latter*, when it is *followed* by *Roman numerals.* It was also formerly used along with Roman numerals, to represent the wine-pint. In *this work* the *abbreviations* representing Troy Weight are *printed* in Roman characters.

Troy.		*Avoirdupois.*
1 ℔ is	equivalent to	0·822857 *lb.*
1 oz.	,,	1·097143 *oz.*

II. French Weights.

1. *Metrical or Decimal Weights.*

Names.	Equiv. in Grammes.	Equiv. in Troy grains.	Equiv. in Avoirdupois weight.			Equiv. in Apothecaries' weight.			
			lb.	*oz.*	*gr.*	℔	oz.	dr.	gr.
Milligramme	·001	·0154							
Centigramme	·01	·1543	.	.	.	.	.	.	.
Decigramme	·1	1·5434	.	.	.	.	.	.	1·5
Gramme	1·	15·4340	.	.	.	.	.	.	15·4
Decagramme	10·	154·3402	.	0¼	45·	.	.	2	34·
Hectogramme	100·	1543·4023	.	3½	12·152	.	3	1	43·
Kilogramme or Kilo	1000·	15434·0234	2	3¼	12·173	2	8	1	14·
Myriagramme	10000·	154340·2344	22	0¾	12·	26	9	4	20·

⁎ The standard unit in the above table is the gramme. A metrical *quintal* is 10 myriagrammes. A *millier* is 1000 kilos.

2. *Binary Weights.* (Système usuel.)

French grain.	Scru-pule.	Gros.	Once.	Livre.	Kilo-gramme.	Equiv. in grammes metrique.	Round No. of the codex in grammes.	Equiv. in Avoir-dupois weight.		
								lb.	*oz.*	*gr.*
1·	.	.	.	.	.	·0542	·05	.	.	0·837
24·	1·	.	.	.	.	1·30	1·30	.	.	20·1
72·	3·	1·	.	.	.	3·906	4·	.	.	60·284
576·	24·	8·	1·	.	.	31·25	32·		1	45·
9216·	384·	128·	16·	1·	.	500·	500·	1	1½	61·
18432·	768·	256·	32·	2·	1·	1000·	1000·	2	3¼	13·

⁂ The old French grain is equal to 0·820 of an imperial troy grain; hence 1 troy grain is equal to 1·21 old French grains. The gros, once, and other multiples of the grain are of course proportionate. The new French grain (of 1812) is equal to 0·0542 gramme, or 0·8365228 gr. troy. It is said, in some works, to be equal to 0·878 gr. troy; or in round numbers, 0·9, but this is much too high.

III. CONTINENTAL MEDICINAL WEIGHTS, *in Troy Grains.*

(From Dr. Christison's Dispensatory.)

Country.	Pounds.	Ounces.	Drachms.	Scruples consisting of		Grains.
				24 med. grs.	20 med. grs.	
French . .	5670·5	470·50	59·10	19·7	—	0·820
Spanish . .	5326·3	443·49	55·14	18·47	—	0·769
Tuscan . .	5240·3	436·67	54·58	18·19	—	0·758
Roman . .	5235·0	436·25	54·58	18·17	—	0·757
Austrian . .	6495·1	541·25	67·65	—	22·5	1·127
German . .	5524·8	460·40	57·55	—	19·18	0·960
Russian . .	5524·8	460·40	57·55	—	19·18	0·960
Prussian . .	5415·1	451·26	56·40	—	18·80	0·940
Dutch . .	5695·8	474·64	59·33	—	19·78	0·988
Belgian . .	5695·8	474·64	59·33	—	19·78	0·988
Swedish . .	5500·2	458·34	57·29	—	19·09	0·954
Piedmontese. .	4744·7	395·39	49·45	—	16·48	0·824
Venetian . .	4661·4	388·45	48·55	—	16·18	0·809

WELCH RAREBIT. *Prep.* Cut slices of *bread*, toast and butter them; then cover them with *slices* of *rich cheese*, spread a little *mustard* over the cheese, put the bread in a cheese-toaster before the fire, and in a short time serve it up very hot.

WELD. Syn. *Woald.* The *reseda luteola* (Linn.), an herbaceous annual employed by the dyers. A *decoction* of the *stems* and *leaves* gives a rich YELLOW to goods mordanted with *alum*, *tartar*, or *muriate of tin.* See *Luteoline* and *Yellow Pigments.*

WEN. The popular name of pulpy encysted and fleshy tumours of the face and neck.

WHEAT. Syn. *Triticum*,—Lat. The *ripe seed* or *fruit* of several varieties of *triticum vulgare* (Linn.), of which the principal are *triticum æstivum* or spring wheat, *triticum hybernum* or winter wheat, and *triticum turgidum* or turgid wheat, the last two of which include several red and white sub-varieties. Of all the cereal grains *wheat* appears to be that best adapted for bread corn, not merely on account of its highly nutritious character, but also on account of the power it possesses, from its richness in gluten, of forming a light and agreeable loaf by the process of fermentation.

According to Sir H. Davy, good English wheat contains of *gluten*, 19%; *starch*, 77%; *insoluble matter*, 4 to 5%.

The *average weight* of *good wheat* per *bushel* is from 58 to 60 *lb.;* and its *average yield* of *flour* is fully 12½ *lb.* for every 14 *lb.* The *weight* of the *straw* is said to be about double that of the grain. The *produce* per *acre* varies from 12 to 60, or even 64 bushels an acre. See *Flour, Starch, &c.*

WHEAT (Buckwheat). Syn. *Fagopyrum.* The *seed* of *polygonum fagopyrum* (Linn.), a plant of the natural order *polygoneæ* (De Cand.) It makes excellent cakes, crumpets, and gruel. In North America, *buckwheat cakes*, or rather *fritters*, are in general use at breakfast, eaten with molasses.

WHEAT (Indian). See *Maize.*

WHEAT (Steeps for). *Quicklime, sulphate of zinc* or white vitriol, *sulphate of copper* or blue vitriol, and *arsenious acid* or white arsenic, are the substances chiefly employed for this purpose. About 5 *lb.* of the *first* (slaked and made into a milk with water), 1¼ *lb.* of the *second*, 1 *lb.* of the *third*, and 3 or 4 *oz.* of the last, are regarded as sufficient for each sack of seed. The *method* of *applying them* is either to dissolve or mix them with just sufficient *water* to cover the *seed*, which is then to be soaked in the mixture for a few hours, or a less quantity of water is employed, and the more concentrated solution is, at intervals, well sprinkled, by means of a "watering pot," over the *seed wheat* spread upon the barn floor, the action being promoted by occasional stirring.

Obs. The first two substances above named have been separately proved to be amply sufficient to destroy the "*smut*" in seed wheat, and are perfectly harmless in their effects, which renders them greatly preferable to arsenic, or even to sulphate of copper. Nearly all the numerous advertised "*Anti-smuts*" or nostrums to prevent the smut in wheat, contain one or other of the last three of the above substances. "*Down's Farmer's Friend*" is an old and well-tried compound, and deserves the extensive and high patronage which it has received.

WHEY. Syn. *Petit-lait*,—Fr. *Serum Lactis*,—Lat. The liquid portion of milk after the curd has been separated. It consists chiefly of *water*, holding in solution 3 or 4% of *sugar of milk.* A pound of milk, mixed with a table-spoonful of proof spirit, allowed to become sour, and the whey filtered from the sediment, yields, in the course of a few weeks, a good vinegar (*whey vinegar*) free from lactic acid. (Scheele.) Skimmed milk may be used.

WHEY (Alum). Syn. *Serum Lactis Aluminatum*,—Lat. *Prep.* Take of *powdered alum* 1 dr.; *hot milk*, 1 pint; simmer a few seconds, let it repose for a short time, and strain the whey from the coagulum. *Used* in diarrhœa, &c.; a wine-glassful after every motion. *Acid whey* (*serum lactis acidum*) may be prepared in a similar manner, by substituting ½ dr. of tartaric or citric acid for the alum. *Orange whey* and *lemon whey* are prepared from the juice of the respective fruits, with a little of the yellow peel to impart flavour.

WHEY POWDER. *Prep.* 1. From *whey* gently evaporated to dryness, and powdered along with about 1-3rd of its weight of *lump sugar.*

2. *Sugar*, 7 *oz.*; *sugar of milk*, 2 *oz.*; *gum arabic*, 1 *oz.* (all in fine powder); mix well. 1 *oz.* dissolved in 1¼ pint of water forms *extemporaneous whey.*

WHISKEY. Dilute alcohol obtained from the fermented wort of malt or grain. That from the *former* is the most esteemed. The *inferior qualities* of this spirit are prepared from *barley, oats*, or *rye*, a small portion only of which is malted, or from *potatoes* mashed with a portion of barley malt, the resulting wash being carelessly fermented and distilled, and purposely suffered to burn, to impart the peculiar empyreumatic or smoky flavour so much relished by the lower orders of whiskey-drinkers. The malt whiskey (sold as such) of the principal Scotch and Irish distillers, is fully equal in quality to London gin, from which it merely differs in flavour. The peculiar flavour of *whiskey* may be nicely imitated by adding a *few drops* each of *pure creasote* and *purified fusel oil* to 2 or 3 gallons of *good London gin*; and the imitation will be still more perfect if the liquor be kept for some months before drinking it. See *Gin, Spirits*, and *Usquebaugh.*

WHITE ARSENIC. See *page* 87.

WHITE BAIT. The *clupea latulus* (clupea alba,—Yarrell), a very small and delicate fish, common in the brackish waters of the Thames from April to September. When fried in oil it is esteemed a great luxury by epicures.

WHITE COPPER. See *German Silver* and *Packfong.*

WHITE HELLEBORE. Syn. *Veratrum*, —Ph. L. & E. *Veratri Albi Radix*,—Ph. D. 1826, & Ph. E. 1817. "The *rhizome* of *veratrum album*, Linn., or white hellebore." (Ph. L.) A powerful acrid cathartic, emetic, and sternutatory. It is now seldom exhibited internally, and its external use over a large or ulcerated surface is not unaccompanied with danger. *Dose.* ½ to 2 gr. of the powder, made into a pill; in gout, mania, &c.; or 1 to 3 gr., carefully triturated with 12 or 15 gr. of liquorice powder, as an errhine, in amaurosis, &c.

WHITE LEAD. See *below.*

WHITE PIGMENTS. Among these are—

Alum White, Baumé's do. Take of *powdered Roman alum*, 2 *lb.*; *honey*, 1 *lb.*; mix, dry, powder, calcine in a shallow dish to whiteness, cool, wash, and dry. A beautiful and permanent white both in oil and water.

Derbyshire White. From *cawk* or *heavy spar*, by grinding and elutriation.

Flake White. The finer kinds of white lead are so called.

Mineral White. Precipitated carbonate of lead.

Newcastle White. White lead made with molasses vinegar.

Nottingham White. White lead made with alegar. Permanent white is now commonly sold for it.

Pearl White, Fard's Spanish White. Trisnitrate of bismuth.

Permanent White. Artificial sulphate of baryta, *prepared* by precipitating *chloride of barium* with *dilute sulphuric acid*, or a *solution of glauber salts.* A good fast white, unchanged by sulphurous fumes. *Used* to mark jars and bottles for containing acids or alkalies, as it is affected by very few substances; also to adulterate white lead.

Spanish White; Blanc d'Espagne, Blanc de Troyes. The softest and purest white chalk, elutriated, made into balls, and well dried. *Used* as a cheap white paint.

White Lead, Fine White, Flake do., Carbonate of Lead, Subcarbonate of Lead, Basic Carbonate of do., White Oxide of do., Ceruse, Magistery of Lead; Cerussa, Plumbi Subcarbonas; Plumbi Carbonas,—Ph. E. & D., & Ph. L. 1836. Made by suspending *rolls* of *thin sheet-lead* over *malt vinegar*, or *pyroligneous acid*, in close vessels, the evaporation from the acid being kept up by the vessels being placed in a heap of dung, or a steam bath.—*Obs.* Commercial carbonate of lead is never quite pure, and is generally *largely adulterated* with native sulphate of baryta (*heavy spar*), and sometimes with *chalk.* The *former* may be detected by its insolubility in dilute nitric acid, and the *latter* by the nitric solution yielding a white precipitate with dilute sulphuric acid, or a solution of oxalic acid or oxalate of ammonia, after having been treated with sulphuretted hydrogen, or a hydrosulphuret, to throw down the lead. "*Pure carbonate of lead* does not lose weight at a temperature of 212° Fahr.; 68 gr. are entirely dissolved in 150 minims of acetic acid diluted with 1 fl. oz. of distilled water; and the solution is *not entirely* precipitated by a solution of 60 gr. of phosphate of soda." (Ph. E.) The solution in nitric acid should not yield a precipitate when treated with a solution of sulphate of soda.—*Used* as a superior white paint, and in *medicine*, as an external astringent, refrigerant, and desiccant.—The numerous synonoymes acquired by this substance have arisen from the indeterminate ideas which have prevailed as to its composition. It is now ascertained that the *best white lead*, prepared by the slow process referred to above, is a mixture of 2 atoms of *carbonate of lead* and 1 atom of *oxide of lead* hydrated with 1 atom or about 2½ % of *water*, the compound being in a pulverulent and absolutely amorphous condition. The particles of white lead prepared by precipitation (see *p.* 680), or by any of the quick processes, are in a somewhat crystalline and semitranslucent condition, and hence, do not cover so well as that just noticed.

Dutch White Lead.—*a.* (Finest). From *flake white*, 1 cwt.; *cawk*, 3 cwt.—*b.* (Ordinary.) *Flake white*, 1 cwt.; *cawk*, 7 cwt. These form the best white lead of the shops.

English White Lead. Flake white *lowered* with *chalk.* Covers badly, and the colour is inferior to the preceding.

French White Lead; Blanc de Plomb. From *litharge* dissolved in *vinegar*, and the lead thrown down by a current of *carbonic acid gas* from coke. Does not cover so well as flake white.

Grace's White Lead. Made from *sheet lead*, with the *refuse water* of the *starch-makers, soured brewer's grains, &c.*

Hamburg White, Hamburg White Lead. From *flake white*, 1 cwt.; *cawk*, 2 cwt. Also sold for *best Dutch white lead.*

Venetian White, Venetian White lead; Cerussa Veneta. From *flake white*, or *pure white lead* and *cawk*, equal parts.

White Precipitate of Lead, Miniature Painter's White, Sulphate of Lead. From an *acetic* or *nitric solution of litharge*, precipitated by adding *dilute sulphuric acid*, and the white powder washed and dried. The clear liquid decanted from the precipitate is poured on fresh litharge, when a second solution takes place; and this may be repeated for any number of times. *Used* in miniature painting, being a beautiful and durable white.

Whiting. The same as prepared chalk, but prepared more carelessly, in horse-mills.

Wilkinson's White. From *litharge* ground with *sea water* until it ceases to whiten, and then washed and dried.

Zinc White (Hubbock's). A hydrated oxide of zinc. It possesses the advantage of being innocuous in use, and not being blackened by sulphuretted hydrogen like white lead.

WHITE SWELLING. Syn. *Hydarthrus,*—Lat. A variety of indolent, malignant, scrofulous tumour attacking the knee, ankle, wrist, and elbow, especially the first.

WHITES. See *Leucorrhœa.*

WHITES (Sharp). *Prep.* 1. From *wheaten flour* and *powdered alum*, equal parts, ground together.

2. (*Stuff; Baker's Stuff.*) From *alum*, ground to the coarseness of common salt, 1 *lb.; common salt*, 3 *lb.;* mixed together. Both the above are used by bakers for the purpose of clandestinely introducing alum into their bread.

WHITEWASH. *Whiting* made into a milk with *water*, holding in solution a little *fresh size.* When employed as a *disinfectant*, *milk of lime*, made from *freshly slaked lime* and *water*, should alone be used.

WHITING. See *White Pigments.*

WHITING. The *gadus merlangus* (Linn.), a member of the cod family of fishes (*gadidæ*). It is a very light and nutritious fish, and well adapted to dyspeptics and invalids; but it has too little flavour to be a favorite with gourmands.

WHITLOW. Syn. *Whitloe; Paronychia.* A painful inflammation, tending to suppuration and abscess, at the ends of the fingers, and mostly under or about the nails. Emollient poultices are useful in this affection; extreme tension and pain may be relieved by an incision so as to allow the exit of the pus or matter from under the nail. The *treatment* must also be directed to establish the general health, as without this, local remedies often fail.

WHOOPING-COUGH. Syn. *Chin-cough, Kin-cough; Pertussis,*—Lat. A convulsive strangling cough, characterised by peculiar sonorous or whooping inspirations, from which its popular name is taken. It comes on in fits, which are usually terminated by vomiting. It is infectious, chiefly attacks children, and, like the small-pox, only occurs once during life.

The *treatment* of *whooping-cough* consists, chiefly, in obviating irritation, and in exciting nausea, and occasional vomiting. For the first, *aperients* and *sedatives* (hemlock or henbane) in *small doses* may be given; for the *second* intention, an *extremely weak* sweetened solution of *tartarized antimony*, or a *mixture* containing *squills* or *ipecacuanha* may be administered in small doses every hour or two, according to the effect produced. In full habits *blisters* and *leeches* may be resorted to; and in all cases *opiate* and *stimulating embrocations* may be applied to the chest and spine with advantage. Whenever the head is affected the use of narcotics is contra-indicated. The *hot bath* is often serviceable. A mixture of cochineal and carbonate of potassa is by some regarded as almost a *specific* for this disease; but our own observations lead us to look with more favour on antimonial nauseants and emetics. See *Antimonials, Draughts, Mixtures, Oxymels, Syrups, Wines, &c.*

WHORTLEBERRY (Bear's). Syn. *Uva Ursi,* — Ph. L. E. & D. The *leaf* of *arctostaphylos uva ursi, trailing arbutus*, or *bear-berry.* Astringent. *Dose.* 10 to 30 gr. of the powder, thrice daily. See *Decoctions* and *Extracts.*

WIKANA. Syn. *Wacaka des Indes,*—Fr. *Prep.* (Guibourt.) *Roasted chocolate nuts* (ground), 2 oz.; *powdered cinnamon,* 2 dr.; *powdered vanilla,* ½ dr.; *ambergris,* 3 gr.; *musk,* 1½ gr.; *sugar,* 6 oz.; well mixed together. A tea-spoonful is boiled with ½ pint of milk, or arrow-root, as a stimulating diet for convalescents.

WILDFIRE RASH. Strophulus volaticus.

WILLOW. Syn. *Salix,*—Lat. The *barks* of *salix alba* (Linn.) or white willow, *salix fragilis* (Linn.) or crack willow, and *salix caprea* (Linn.) or great round-leaved willow (*willow bark; salicis corticis,*—Ph. E.), were officinal in the Ph. D. 1826; and with that of *salix Russelliana*, and other species, are rich in salicine, and hence possess considerable febrifuge power. *Dose.* ½ to 1 dr., either in powder, or made into a decoction; as a substitute for Peruvian bark, in agues, hectics, debility, dyspepsia, &c.

WINDOWS. A *prismatic* or *crystalline appearance*, may be imparted to windows by several expedients.—

1. Mix a *hot solution of sulphate of magnesia* (Epsom salt) with a *clear solution of gum arabic*, and lay it on hot. For a *margin*, or for *figures*, wipe off the part you wish to remain clear with a wet towel as soon as the surface has become cold and hard. The effect is very pretty, and may be varied by substituting *oxalic acid, red* or *yellow prussiate of potash*, or any other salt (not efflorescent), for the sulphate of magnesia. *Sulphate of copper* gives a very beautiful crystallization of a *blue colour.*

2. Evenly cover the *surface of the glass* with a layer of *thin gum water*, and sprinkle any of the saline crystals before noticed over it whilst wet. The *gum water* may be tinged of any colour to vary the effect.

A *blinded appearance* more or less resembling ground glass may be given as follows:—

1. By evenly dabbing the surface with a *piece* of *soft glazier's putty.*

2. A *coating* of *stained rice jelly*, laid on with a painter's brush (*sash tool*), and after-

wards dabbed with a duster brush, applied endways.

3. *Tissue paper*, either white or coloured, applied by means of clear *gum water* or some *pale varnish.* The pattern may be lined with a pencil, and when the whole is somewhat dry, but not hard, the lines may be cut through, and the pattern stripped off with the flat point of a knife.

4. The *surface of the glass* being coated with *mucilage*, or any *pale varnish*, as before, coarsely powdered *glass* or *quartz* reduced to a uniform state of grain by a sieve, may be sprinkled over it; when dry, the loose portion should be removed with a soft brush.

WINE. Syn. *Vin*,—Fr. *Vinum*,—Lat. The fermented juice of the grape. The general characters and quality of wine are principally influenced by climate, soil, and aspect, the nature and maturity of the grape, and the method of conducting the fermentation. The sp. gr. of the *must* varies from 1·063 to 1·285, from which the proportion of *saccharine matter* and the ultimate alcoholic richness of the wine resulting from its fermentation, may be inferred. That of Rhenish grapes seldom exceeds 1·095 to 1·100. Want of space compels us to confine our remarks chiefly to the *properties*, *uses*, and *management* of grape juice after it has passed through the stage of fermentation, or, in reality, become *wine*.

Officinal Wine. The only wine ordered by the British Colleges is sherry (*white wine; vinum Xericum*,—Ph. L.; *vinum album*,—Ph. E.; *vinum Hispanicum*,—Ph. D.); but several other wines are employed in medicine, as tonics, stimulants, antispasmodics, and restoratives, according to the circumstances of the case, or the taste of the patient. In *pharmacy*, the less expensive *Cape* or *marsala*, or even *raisin wine*, is usually substituted for sherry in the preparation of the *medicated wines* of the pharmacopœias.

Varieties, characteristics, &c. The following Tables will convey much useful information on this subject in a condensed form:—

I. Table *of the Quantity of Alcohol in Wine.* By Dr. Christison.

Names, &c.			Alcohol of 0·7939 per cent., by weight.	Proof Spirit per cent., by volume.
Port	Weakest		14·97	31·31
	Mean of 7 samples		16·20	34·91
	Strongest		17·10	37·27
	White		14·97	31·31
Sherry	Weakest		13·98	30·84
	Mean of 13 wines, excluding those very long kept in cask		15·37	33·59
	Strongest		16·17	35·12
	Mean of 9 wines long kept in cask in the East Indies		14·72	31·30
	Madre da Xeres		16·90	37·06
Madeira	Long kept in cask in the East Indies	Strongest	16·90	37·06
		Weakest	14·09	30·86
Teneriffe long in cask at Calcutta			13·84	30·21
Cercial			15·45	33·65
Lisbon (dry)			16·14	34·71
Shiraz			12·95	28·30
Amontillado			12·63	27·60
Claret. A first growth of 1811			7·72	16·95
Chateau-Latour. Do. 1825			7·78	17·06
Rosan. Second growth 1825			7·61	16·74
Ordinary Claret. (Vin Ordinaire.)			8·99	18·96
Rivesaltes			9·31	22·35
Malmsey			12·86	28·17
Rüdesheimer. 1st quality			8·40	18·44
,, Inferior			6·90	15·19
Hambacher. Superior quality			7·35	16·15

II. *Quantity of Alcohol* (sp. gr. 0·825* at 60° Fahr.) *in* 100 *parts of Wine by volume.*

Names of Wine.	Alcoholic Content.	Authority.
Alba Flora	17·26	Brande.
Barsac	13·86	do.
Bucellas	18·49	do.
Burgundy (average)	14·57	do.
Ditto	12·16	Prout.
Calcavella (average)	18·65	Brande.
Cape Madeira (do.)	20·51	do.
Cape Muschat	18·25	do.
Champagne (average)	12·61	do.
Ditto	12·20	Fontenelle.
Claret (average)	15·10	Brande.
Colares	19·75	do.
Constantia (White)	19·75	do.
Ditto (Red)	18·92	do.
Ditto (average)	14·50	Prout.
Côte Rôtie	12·32	Brande.
Currant	20·55	do.
Elder	8·79	do.
Frontignac (Rivesalte)	12·79	do.
Gooseberry	11·84	do.
Grape (English)	18·11	do.
Hermitage (Red)	12·32	do.
Ditto (White)	17·43	do.
Hock (average)	12·08	do.
Lachryma Christi	19·70	do.
Lisbon	18·94	do.
Lissa (average)	25·41	do.
Ditto (do.)	15·90	Prout.
Lunel	15·52	Brande.
Madeira (average)	22·27	do.
Ditto (do.)	21·20	Prout.
Malaga	17·26	Brande.
Ditto	18·94	do.
Malmsey Madeira	16·40	do.
Marsala (average)	25·09	do.
Ditto (do.)	18·40	Prout.
Nice	14·63	Brande.
Orange (average)	11·26	do.
Port (do.)	20·64	Prout.
Ditto (do.)	22·96	Brande.
Raisin (do.)	25·41	do.
Ditto (do.)	15·90	Prout.
Red Madeira (do.)	20·35	Brande.
Roussillon (do.)	18·13	do.
Sauterne	14·22	do.
Shiraz	15·52	do.
Sherry (average)	19·17	do.
Ditto (do.)	23·80	Prout.
Syracuse	20·00	do.
Ditto	15·28	Brande.
Teneriffe	19·79	do.
Tent	13·30	do.
Tokay	9·88	do.
Vidonia	19·25	do.
Vin de Grave	13·94	do.
Zante	17·05	do.

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* Alcohol of 0·825 contains 92·6% of *real* or *anhydrous alcohol;* or, in the *language of the Excise,* is about 62½% o. p., and in round numbers may be said to be of about *twice* the *strength* of *brandy* or *rum,* as usually sold.

Composition. The constituents of wine are—*Alcohol*, which is one of its principal ingredients, and on which its power of producing intoxication chiefly depends;—*Sugar* which has escaped the process of fermentation, and which is most abundant in the sweet wines, as tokay, tent, frontignac, &c.;—*Extractive*, derived chiefly from the husk of the grape;—*Colouring matter*, also derived from the husk of the grape, and is extracted from it by the newly formed alcohol;—*Tartar*, or *bitartrate of potassa*, which constitutes the most important portion of the saline matter of wine;—*Odoriferous matter*, imparting the characteristic *vinous odour*, depending chiefly upon the presence of œnanthic acid and ether;—*Bouquet*, arising from essential oil, or amyl-compounds, probably existing under the form of ethers. Besides these, small quantities of *tannin*, *gum*, *acetic* and *malic acid*, *acetic ether*, *lime*, *&c.*, are found in wine. The *specific gravity* of *wine* depends on the richness and ripeness of the grapes used in its manufacture, the nature of the fermentation, and its age. It varies from about 0·970 to 1·041. That of *port* averages about 0·975; of *sherry*, 0·978; of *claret*, 0·972; of *Madeira*, 0·976. That of *Rhenish wine* ranges from 0·9925 to 0·9985, and is sometimes as high as 1·0022 to 1·0027. The sp. gr. of some rich samples of *mountain*, *malaga*, *tent*, and *lachryma Christi*, is occasionally so high as 1·039 or 1·040.

Purity. The most frequent species of *fraud in the wine trade* is the *mixing of wines of inferior quality* with those of a *superior grade.* In many cases the inferior kinds of foreign wine are flavoured and substituted for the more expensive ones. This is commonly practised with *Cape wine*, which, after having a slight "*nuttiness*" communicated to it by bitter almonds or peach kernels, a *lusciousness* or *fulness*, by honey, and *additional strength* by a little plain spirit or pale brandy, is made to undergo the operation of "*fretting in*," and is then sold for *sherry*, Formerly, it was a common practice of ignorant wine-dealers to add a little *litharge* or *acetate of lead* to their inferior wines to correct their acidity, but it is believed that this *highly poisonous substance* is now never employed in this country, *salt of tartar* being made to perform the same duty. The lead which is frequently detected in bottled wine, and which often causes serious indisposition, may be generally traced to shot being carelessly left in the bottles, and not to wilful fraud. *Sherry* is commonly *coloured*, in Spain, by the addition of *must* boiled down to $\frac{1}{5}$ of its original volume; and in England, by *burnt brown sugar*, or spirit colouring. *Amontillado* (a very nutty wine) is frequently added to *sherries* deficient in flavour. Various other ingredients, as the essential *oil of almonds*, *bitter almonds* in substance, *cherry-laurel leaves*, *cherry-laurel water*, *&c.*, are also employed for a like purpose. In Portugal the *juice of elderberries* is very commonly added to *Port wine* to increase its *colour*, and *extract of rhatany* for the double purpose of *improving its colour* and imparting an *astringent taste.* In England, *beet-root*, *Brazil wood*, the *juices of elderberries* and *bilberries*, the *pressed cake of elder wine*, *extract of logwood*, *&c.*, are frequently added to port to deepen its colour; and *oak sawdust*, *kino*, *alum*, and *extract of rhatany* to increase its astringency. But the most *common adulterant of Port wine*, both in Portugal and this country, is "*jerupiga*" or "*geropiga*," a componnd of elder juice, brown sugar, grape juice, and crude Portuguese brandy. That imported here contains about 45$\frac{0}{0}$ of proof spirit, and is allowed by the Customs-house authorities to be mixed with Port wine in bond. A *factitious bouquet* is also commonly given to wine by the addition of *sweetbriar*, *orris root*, *clary*, *orange flowers*, *elder-flowers*, *esprit de petit grain*, *&c.*

Tests. These, for the most part, are applicable to all fermented liquors:—

1. *Richness in Alcohol.* This may be found by any of the methods noticed under *alcoholmetry*, *porter*, and *tinctures*. The *carbonate of potash test* (p. 36, No. 6) is easily applied, and gives good approximate results. The *boiling point*, or the *ebullioscope*, will give the same still more correctly. When greater accuracy is required, the method of M. Gay-Lussac (No. 7) may be adopted with complete success.

2. *Saccharine* and *Extractive matter.* The *sp. gr.* corresponding to the alcoholic strength, last found, is deducted from the *real sp. gr.* of the sample, the difference divided by ·0025, or multiplied by 400, gives the weight of SOLID MATTER (chiefly sugar) in *oz.* per gallon (nearly).

3. *Narcotics.* These may be detected in the manner noticed at *page* 1029.

4. *Lead.* The *presence* of *lead* or *litharge* in wine may be readily detected by *sulphuretted hydrogen*, or a *solution* of any *hydrosulphuret*, which will, in that case, produce a black precipitate. (See *p.* 1316.)

5. *Potash* or *Soda* improperly present.

A *portion of the wine* is evaporated nearly to dryness, and then agitated with *rectified spirit;* the *filtered tincture*, holding in solution acetate of potassa, is then divided into two portions, one of which is tested for ACETIC ACID, and the other for the ALKALI.

6. *Alum.* A portion of the wine is evaporated to dryness, and ignited; the residuum is then treated with a small quantity of *hydrochloric acid*, the mixture evaporated to dryness, again treated with *dilute hydrochloric acid*, and tested with *liquor of potassa.* If a white bulky precipitate forms, which is soluble in an excess of caustic potassa, and which is re-precipitated by a *solution of sal ammoniac*, the sample examined contained ALUM.

7. *Oil of Vitriol.—a.* A drop or two of the *suspected wine* may be poured upon a piece of paper, which must then be dried before the fire. *Pure wine* at most only *stains* the paper, but one containing SULPHURIC ACID causes it to become *charred* and *rotten.* The effect is more marked on paper which has been previously smeared with starch-paste.

b. According to M. Lassaigne, *pure red wine* leaves, by *spontaneous evaporation*, a *violet* or *purple stain* on paper; whilst that to which SULPHURIC ACID has been added, even in quantity only equal to $\frac{1}{2000}$ to $\frac{1}{3000}$th part, leaves a *pink stain* in drying.

8. *Spurious Colouring-matter.—a.* Genuine red wines yield GREENISH GRAY precipitates with *sugar of lead*, and GREENISH ones with *potassa;* but those coloured with *elderberries, bilberries, litmus, logwood*, and *mulberries*, give DEEP BLUE OR VIOLET precipitates, and those coloured with *Brazil wood, red sanders wood*, or *red beet*, give RED ones.

b. Pure red wine is *perfectly decoloured* by agitation with *recent hydrate of lime.*

9. *Artificial Flavouring.* This can only be detected by a discriminating and sensitive palate.

10. *Artificial Bouquet.* The substances added for this purpose may often be readily detected by a comparison of the sample with another of known purity.

Uses. The *uses* of *wine* as a *beverage* are too well known to require description. As a *medicine*, PORT WINE is most esteemed as an *astringent* and *tonic;* and SHERRY and MADEIRA as *stimulants* and *restoratives*, in diseases where the acidity of the former would be objectionable; CHAMPAGNE is reputed diuretic and excitant, but its effects are not of long duration; and the RHENISH WINES are regarded as refrigerant, diuretic, and slightly aperient. *Claret, Rhenish*, and *Moselle wines* are said to be the most wholesome. In *pharmacy*, wine is used as a menstruum.

MANAGEMENT OF WINE. *Age.* The sparkling wines are in their prime in from 18 to 30 months after the vintage, depending on the cellaring and climate. Weak wines, of inferior growths, should be drunk within 12 or 15 months, and be preserved in a very cool cellar. Sound, well-fermented, full-bodied still wines are improved by age, within reasonable limits, provided they be well preserved from the air, and stored in a cool place, having a pretty uniform temperature. See *Maturation* (below).

Bottling. The secret of bottling wine with success consists in the simple exercise of care and cleanliness. The BOTTLES should be all *sound, clean*, and *dry*, and perfectly free from the least *mustiness* or other odour. The CORKS should be of the best quality, and immediately before being placed in the bottles should be compressed by means of a "cork-squeezer." For superior or very delicate wines, the corks are usually prepared by placing them in a copper or tub, covering them with weights to keep them down, and then pouring over them boiling water, holding a little pearlash in solution. In this state they are allowed to remain for 24 hours, when they are well stirred about in the liquor, drained, and re-immersed for a second 24 hours in hot water, after which they are well washed and soaked in several successive portions of clean and warm rain water, drained, dried out of contact with dust, put into paper bags, and hung up in a dry place for use. The WINE should be *clear* and *brilliant*, and if it be not so, it must undergo the process of "fining" before being bottled. In fact, it is a common practice with some persons to perform this operation whether the wine require it or not; as, if it has been mixed and doctored, it "amalgamates and ameliorates the various flavours." The *bottles, corks*, and *wine* being ready, a fine clear day should be preferably chosen for the bottling, and the utmost cleanliness and care should be exercised during the process. Great caution should also be observed to avoid shaking the cask so as to disturb the bottoms. The remaining portion that cannot be drawn off clear should be passed through the "wine-bag," and when bottled, should be set apart as inferior to the rest. The coopers, to prevent breakage and loss, place each bottle, before corking it, in a small bucket having a bottom made of soft cork, and which is strapped on the knee of the bottler. They thus seldom break a bottle, though they "flog" in the corks very hard. When the process is complete, the *bottles of wine* are stored in a cool cellar, and on *no account upright*, or in *damp straw*, but *on their sides*, in *sweet, dry sawdust* or *sand*.

Bouquet. See *Flavouring* and *Perfuming.*

Brandying. Brandy is frequently added to *weak* or *vapid wines*, to *increase* their *strength*, or to *promote* their *preservation.* In Portugal, *one third* of brandy is commonly added to *port* before shipping it for England, as without this addition it generally passes into the acetous fermentation during the voyage. A little good brandy is also usually added to *sherry* before it leaves Spain. By recent *regulations* of the *Customs of England*, 10$\frac{0}{0}$ of brandy may be added to wines in bond, and the increased quantity is only charged the usual duty on wine. The addition of brandy to wine injures its proper flavour, and hence it is chiefly made to *port*, *sherry*, and *other wines*, whose flavour is so strong as not to be easily injured. Even when brandy is added to wines of the latter description they require to be kept for some time to recover their natural flavour. To promote this object, the *wine-doctors* employ the process called "*fretting in*," by which they effect the same change in 3 or 4 weeks, as would otherwise require some months, at the very least.

Cellaring. A wine-cellar should be dry at bottom, and either covered with good hard gravel, or be paved with flags. Its gratings or windows should open toward the north, and it should be sunk sufficiently below the surface to ensure an equable temperature. It should also be sufficiently removed from any public thoroughfare, so as not to suffer vibration from the passing of carriages. Should it not be in a position to maintain a regular temperature, arrangements should be made to apply artificial heat in winter, and proper ventilation in summer. In a celebrated wine-establishment known to the writer, where the cellars are above ground, a number of thermometers are suspended on the walls, and whenever the mercury sinks below 48° Fahr., several Arnot's stoves, arranged for that purpose, are immediately lighted, and their action properly watched and regulated.

Colouring. Wines are as commonly doctored in their colour as their flavour. A FAWN YELLOW and GOLDEN-SHERRY YELLOW are given by means of *tincture* or *infusion of saffron, turmeric*, or *safflower*, followed by a little spirit colouring, to prevent the colour being too lively. All shades of AMBER and FAWN to DEEP BROWN and BRANDY colour, are given by *burnt sugar. Cochineal* (either alone or with a little alum) gives a PINK colour;—*beet root* and *red sanders* give a RED colour;—the *extracts of rhatany* and *logwood*, and the *juice of elderberries, bilberries, &c.*, give a PORT-WINE colour. A *hogshead of inferior pale sherry* or *white cape* is commonly converted into a *full-flavoured brown sherry* by the "honest" wine-dealer, by the addition of $\frac{1}{4}$ pint of *spirit colouring*, a gallon of *brandy*, and a few drops of the *essential oil of almonds* dissolved in a little *rectified spirit;* the whole being well mixed, and in a few days fined down.

Crusting. To make *port wine* form a *crust* on the *inside of the bottles*, a spoonful of *powdered catechu* or $\frac{1}{2}$ a spoonful of *finely powdered cream of tartar* is added to each bottle before corking it, after which the whole is well agitated. It is also a common practice to put the *crust* on the bottle *before putting the wine into it*, by employing a *hot saturated solution of red tartar*, thickened with *gum* and some *powdered tartar.*

Deacetification. This is effected by the cautious addition of either *salt of tartar* or *carbonate of soda.* Wine so treated soon gets insipid by exposure and age; and, without care, the colour of red wines is thus frequently spoiled.

Deacidification. See *Detartarization* (below).

Decanting. This only refers to small quantities of wine, ready for consumption. In decanting wine, care must be taken not to shake or disturb the crust when moving it about or drawing the cork, particularly of port wine. Never decant wine without a wine-strainer, with some clean fine cambric in it, to prevent the crust and bits of cork going into the decanter. In decanting *port wine* do not drain it too close; as there are generally two thirds of a wine-glassful of thick dregs in each bottle, which ought to be rejected. In *white wine* there is not much settling; but it should nevertheless be poured off very slowly, the bottle being raised gradually.

Decolouring. The *colour of wine* is precipitated by *age* and by *exposure* to the *light.* It is also *artificially removed* by the action of *skimmed milk, lime-water, milk of lime*, and *fresh-burnt charcoal.* Wine-merchants avail themselves of this property for the purpose of whitening wines that have acquired a brown colour from the cask, or which are esteemed pale; and also for turning "pricked" red or dark-coloured wines into white wines, in which a small degree of acidity is not so much perceived. In this way *brown sherry* is commonly converted into *pale* or *gold-coloured sherry.* For the latter purpose, 2 to 3 pints of *skimmed milk* are usually sufficient; but to *decolour red wine* 2 to 3 quarts or more will be required, according to the nature and intensity of the colour, or the shade of paleness desired. *Charcoal* is seldom used, as it removes the flavour as well as colour, but a little *milk of lime* may sometimes be advantageously substituted for milk, when the wine has much acidity, more particularly for *red wines,* which may even be rendered quite colourless by it.

Detartarization. Rhenish wines, even of the most propitious growths, and in the best condition, besides their tartar, contain a certain quantity of *free tartaric acid,* on the presence of which many of their leading properties depend. The excess of tartar is gradually deposited during the first years of the vatting, the sides of the vessels becoming more and more encrusted with it; but owing to the continual addition of new wine, and other causes, the liquid often gains such an excess of free tartaric acid, as to acquire the faculty of redissolving the deposited tartar, which thus again disappears after a certain period. The *taste* and *flavour* of the wine are thus exalted, but the excess of acid makes the wine less agreeable in use, and probably less wholesome. Amateurs and manufacturers should therefore welcome a means of taking away the free tartaric acid, without altering, in any respect, the quality of the wine. This is pure *neutral tartrate of potash.* When this salt, in *concentrated* solution, is added to such a fluid as the above, the *free acid* combines with the neutral salt, and *separates* from the *liquid* under the form of the sparingly soluble bitartrate of potash. "If to 100 parts of a *wine* which contains one part of free tartaric acid, we add $1\frac{1}{2}$ part of *neutral tartrate of potash,* there will separate on repose at 70 to 75° Fahr., 2 parts of *crystallized tartar;* and the *wine will then contain only* $\frac{1}{2}$ part of *tartar dissolved,* in which there are only 0·2 part of the original free acid; 0·8 part of the original free acid having been withdrawn from the wine." (*Liebig's Annalen.*) This method is particularly applicable to recent *must* and to wines which do not contain much free acetic acid; but when this last is the case, so much acetate of potash is formed, as occasionally to vitiate the taste of the liquor.

Fining. Wine is clarified in a similar manner to beer. WHITE WINES are usually fined by *isinglass,* in the proportion of about $1\frac{1}{2}$ *oz.* (dissolved in $1\frac{1}{2}$ pint of water, and thinned with some of the wine) to the hogshead. RED WINES are generally fined with the *whites of eggs,* in the proportion of 15 to 20 to the pipe. Sometimes *hartshorn shavings,* or *pale sweet glue* is substituted for isinglass; and for *port* and other *strong red wines* abounding in tannin, a little sheep's or bullock's blood is very commonly employed. The use of blood is not, however, to be recommended, as it communicates a very trifling, but still an unpleasant flavour and odour, which is easily recognised by the palate of a professed "wine-taster;" besides which, the practice is dirty and disgusting. *Gypsum* and *milk of lime* are frequently used to clear muddy *white wines.* See *Finings.*

Flatness. This is removed by the addition of a little *new brisk wine* of the same kind; or by rousing in 2 or 3 *lb.* of *honey;* or by adding 5 or 6 *lb.* of *bruised sultana raisins,* and 3 or 4 quarts of good brandy per hogshead. By this treatment the wine will usually be recovered in about a fortnight, except in very cold weather. Should it be wanted sooner, a table-spoonful or two of *yeast* may be added, and the cask removed to a warmer situation.

Flavouring. Various ingredients are added to inferior wines to give them the *flavour* of others *more expensive,* and to British wines to make them resemble those *imported.* Substances are also added in a similar manner to communicate the *aroma* of the *high-flavoured grape wines.* Among the *first* are *bitter almonds, almond cake,* or the *essential oil of almonds,* or preferably, its *alcoholic solution,* which are used to impart a SHERRY or NUTTY taste to weak-flavoured wines, as *poor sherry, white cape,* and *malt, raisin, parsnip,* and other similar British wines;—*rhatany, kino, oak sawdust* and *bark, alum,* &c., to convey ASTRINGENCY, and—*tincture of the seeds of raisins* to impart a PORT WINE flavour. Among the substances employed to communicate the BOUQUET of the *finer wines,* may be mentioned — *orris root, eau de fleurs d'oranges, neroli, essence de petit grain, ambergris, vanilla, violet petals, essence of cedrat, sweet briar, clary,* and *elder flowers, quinces, cherry-laurel water,* &c. By the skilful, though fraudulent use of the above flavouring substances and perfumes, the experienced wine-brewer manages to produce, in the dark cellars of London, from white cape, currant, gooseberry, raisin, rhubarb, parsnip, and malt wine, very excellent imitations of foreign wine, and which pass current among the majority of English wine-drinkers as the choicest productions of the grape, "*genuine as imported*."—A grain or two of *ambergris*, well rubbed down with sugar, and added to a hogshead of claret, gives it a flavour and bouquet much esteemed by some connoisseurs.

Improving. This is the cant-term of the wine trade, under which all the adulteration and "doctoring" of wine is carried on. A *poor sherry* is *improved* by the addition of a little *almond flavour*, *honey*, and *spirit*;—a *port deficient in body* and *astringency*, by the addition of some *red tartar* (dissolved in boiling water), some *rhatany*, *kino*, or *catechu*, and a little *honey* or *foots*, and brandy. See *Mixing* (below).

Insensible Fermentation. See *Maturation.*

Insipidity. See *Flatness.*

Maturation. The natural *maturation* or *ripening* of *wine* and *beer* by age, depends upon the *slow conversion* of the *sugar* which *escaped decomposition* in the *gyle tun*, or *fermenting vessel*, into alcohol. This conversion proceeds most perfectly in vessels which *entirely* exclude the air, as in the case of wine in bottles; as when air is present, and the temperature sufficiently high, it is accompanied by slow acetification. This is the case of wine in casks; the porosity of the wood allowing the very gradual permeation of the air. Hence the superiority of *bottled* wine over *draught* wine, or that which has matured in wood. Good wine, or well-fermented beer, is vastly improved by age, when properly preserved; but *inferior* liquor, or even superior liquor, when preserved in improper vessels or situations, becomes acidulous, from the conversion of its alcohol into vinegar. *Tartness* or *acidity* is consequently very generally, though *wrongly* regarded by the ignorant, as a sign of *age* in liquor. The peculiar change by which fermented liquors become mature or ripe by age, is termed the "*insensible fermentation*." It is the alcoholic fermentation impeded by the presence of the already-formed spirit in the liquor, and by the lowness of the temperature. See *Ripening* (below).

Mixing. Few wines are sold without admixture. It is found that the *intoxicating properties* of *wine* are *increased* by *mixing them* with other wines of a different age and growth. In many cases the flavour is at the same time improved. Thus, a *thin port* is improved by the addition of a similar wine having a full body, or by a little Malaga, Teneriffe, or rich sherry; and an *inferior old sherry* may be improved by admixture with a little full-bodied wine of the last vintage. In this consists the great art of "*cellar management*," and to such an extent is this carried, both abroad and in England, that it may be confidently asserted that no wine ever reaches the consumer in an *unmixed* or *natural* state.

Mustiness. This may generally be removed by violently agitating the wine for some time with a little of the sweetest olive or almond oil. The cause of the bad taste is the presence of an essential oil, which the fixed oil seizes on, and rises with to the surface, when it may be skimmed off; or the liquor under it may be drawn off. A little *coarsely powdered fresh-burnt charcoal*, or even some *slices of bread toasted black*, will frequently have a like effect. A little *bruised mustard seed*, is also occasionally used for the same purpose.

Perfuming. This is chiefly performed on *British wines* for family use. For its application to foreign wines, see *Flavouring*. *Wines* may be *perfumed* by the simple addition of any *odorous substances* previously well mixed with a *little of the wine*, or dissolved in a few fl. oz. of *rectified spirit*.

Racking. This should be performed in cool weather, and preferably early in the spring. A *clean syphon*, well managed, answers better for this purpose than a cock or faucet. The bottoms, or foul portion, may be strained through a wine-bag, and added to some other inferior wine.

Ripening. To *promote* the *maturation* or *ripening* of wine, various plans are adopted by the growers and dealers. One of the *safest ways* of *hastening* this, especially for *strong wines*, is not to rack them until they have stood 15 or 18 months upon the lees; or whether "*crude*" or "*racked*," keeping them at a temperature ranging between 50 and 60° Fahr., in a cellar free from draughts and not too dry. *Another method*, is to *remove* the *corks* or *bungs*, and to substitute *bladder* tied or fastened air-tight over the openings. *Bottled wine*, treated in this way, ripens very quickly in a temperate situation. *Some dealers* add a little *dilute sulphuric acid* to the *coarser wines* for the same purpose; but a small quantity of *concentrated acetic acid* or *tartaric acid*, would be preferable, since these acids are found in all wines. 4 or 5 drops of the former, added to a bottle of some kinds of new wine, immediately give it the appearance of being 2 or 3 years old.

Ropiness, viscidity; Graisse. This arises from the *wine containing* too little tannin or astringent matter to precipitate the gluten, albumen, or other azotized substance, occasioning the malady. Such wine cannot be clarified in the ordinary way, because it is incapable of causing the coagulation or precipitation of the finings. The remedy is to supply the principle in which it is deficient. M. François, of Nantes, prescribes the *bruised berries of the mountain ash* (1 *lb.* to the barrel) for this purpose. A little *catechu*, *kino*, or better still, *rhatany*, or the *bruised footstalks* of the grape, may also be conveniently and advantageously used in the same way. For *pale white wines*, which are the ones chiefly attacked by the malady, nothing equals a little *pure tannin* or *tannic acid* dissolved in *proof spirit*. See *Viscous Fermentation*, *Malt Liquors*, *&c.*

Roughening. See *Flavouring.*

Second Fermentation; La-pousse. Inordinate fermentation, either primary or secondary, in *wine* or any other *fermented liquor*, may be readily checked by *sulphuration*, or by the addition of *mustard seed* or *sulphite of lime*. 1 *oz.* of *brimstone*, ¾ to 1 *lb.* of *bruised mustard seed*, and about 4 to 8 *oz.* of *sulphite of lime*, are fully sufficient for a hogshead. This substance seldom fails of arresting the fermentation.—In addition to the above remedies, a little sulphuric acid is sometimes employed, and the use of black oxide of manganese, or chlorate of potash, has been proposed on theoretical grounds.

Souring. This is either *occasioned* by the *wine* having been *imperfectly fermented*, or from its having been kept in too warm a cellar where it has been exposed to draughts of air, or to continual vibrations, occasioned by the passage of loaded vehicles through the adjoining thoroughfare. The remedy commonly recommended in books for this purpose, is to saturate the acid with chalk, milk of lime, or calcined oyster shells; but such additions, made in sufficient quantity to effect this object, destroy the character of the wine, and render it sickly and vapid. The *best* and only *safe remedy* is a little *neutral tartrate of potash*, cautiously added; or it may be mixed with a considerable portion of *full-bodied new wine* of its class, adding at the same time a *little brandy*, and in 2 or 3 weeks *fining* it down, when it should be either *at once* put into bottles, or consumed as soon as possible.

Sparkling, creaming, and briskness. These properties are conveyed to wine by *racking* it into closed vessels *before* the *fermentation is complete*, and while there still remains a considerable portion of undecomposed sugar. Wine of this description which has lost its briskness, may be restored by adding to each bottle a few grains of *white lump-sugar* or *sugar-candy*. This is the way in which champagne is treated in France. The bottles are afterwards inverted, by which means any sediment that forms falls into the necks, when the corks are *partially* withdrawn, and the sediment is immediately expelled by the elastic force of the compressed carbonic acid. If the wine remains muddy, a little solution of sugar and finings are added, and the bottles are again placed in a vertical position, and, after two or three months, the sediment is discharged, as before.

Sweating in. The technical terms "*sweating in*" and "*fretting in*," are applied to the partial production of a second fermentation, for the purpose of mellowing down the flavour of foreign ingredients (chiefly brandy) added to wine. For this purpose 4 or 5 *lb.* of *sugar* or *honey*, with a *little crude tartar* (dissolved), are commonly added per hogshead; and when the wine is *wanted* in *haste*, a spoonful or two of *yeast*, or a few *bruised vine leaves*, are also mixed in, the cask being placed in a moderately warm situation until the new fermentation is established, when it is removed to the wine-cellar, and, after a few days, *fined down*.

Taste of Cask. The remedies for this malady are the same as those for *mustiness*. In the case of a large and valuable vat of *old Christmas beer* thus affected, on which we were consulted, we recommended agitation with three 4-*lb. loaves of bread*, cut into *thin slices*, highly toasted (scorched), and then crumbled in the hands. The effect was most satisfactory, and almost immediate; the beer was sold within a fortnight, and highly approved of.

⁂ For *further information* connected with the *nature* and *management* of *wines*, and other *fermented liquors*, see *Brewing*, *Fermentation*, *Malt Liquors*, *Porter*, *Sugar*, *Syrups*, *Vinous Fermentation*, *Viscous do.*, *Worts*, *Yeast*, *&c.* (and *below*.)

WINE (British). The various *processes* in *British wine-making* depend upon the same principles, and resemble those employed for foreign wine.

The FRUIT should be preferably gathered in fine weather, and not until *mature*, as evinced by its flavour; for if it be employed whilst *unripe*, the resulting wine will be harsh, disagreeable, and unwholesome, and a larger quantity of sugar and spirit will be required to render it palatable. The common practice of employing *unripe gooseberries* for the manufacture of British champagne, arises from a total ignorance of the scientific principles of wine-making. On the other hand, if ordinary British fruit be employed in *too ripe* a state, the wine is apt to be inferior, and deficient in the flavour of the fruit.

The *fruit* being *gathered*, at once undergoes the operation of PICKING or GARBLING, for the purpose of removing the stalks and unripe or damaged portions. It is *next* placed in a tub, and is *well bruised*, to facilitate the solvent action of the water. *Raisins* are commonly permitted to soak about 24 hours previously to bruising them, but they may be advantageously bruised or minced in the dry state. The *bruised fruit* is then put into a *vat* or *vessel* with a guard placed over the tap-hole, to keep back the husks and seeds of the fruit when the *must*, *juice*, or *extract* is drawn off. The WATER is now added, and the whole is allowed to macerate for 30 or 40 hours, more or less, during which time the magma is frequently roused up with a suitable wooden stirrer. The *liquid portion* is next drawn off, and the *residuary pulp* is placed in hair bags, and undergoes the operation of PRESSING, to expel the fluid which it contains. The *sugar*, *tartar* (in *very fine powder*, or in *solution*), *&c.*, are now added to the mixed liquors, and the whole is well stirred or "rummaged" up for some time. The *temperature being suitable*, the VINOUS FERMENTATION soon commences, when the liquor is frequently skimmed (if necessary), and well "roused" up, and, after 3 or 4 days of this treatment, it is run into CASKS, which should be quite filled, and left purging at the bung-hole. In about a week the FLAVOURING INGREDIENTS, in the *state of coarse powder*, are commonly added, and well stirred in; and in about another week, depending upon the state of the fermentation, and the attenuation of the must, the BRANDY or *spirit* is added, and the cask is filled up, and bunged down close. In four or five weeks more, the cask is again filled up, and, after some weeks (the longer the better), it is "pegged" or "spiled," to ascertain if it be fine or transparent; if so, it undergoes the operation of RACKING; but if, on the contrary, it still continues muddy, it must be either again bunged up, and allowed to repose for a few weeks longer, or it must pass through the process of FINING. Its future treatment is similar to that already noticed under Foreign Wine.

The *must* of many of the *strong-flavoured fruits*, as black currants, mulberries, &c., is improved by being *boiled* before being made into wine. The flavour and bouquet of the *more delicate fruits* are either greatly diminished or utterly dissipated by boiling.

General Formulæ for the *Preparation of British Wines.*

1. From *ripe saccharine fruits.* Take of the *ripe fruit*, 4 to 6 *lb.; clear soft water*, 1 gall.; *sugar*, 3 to 5 *lb.; cream of tartar* (dissolved in boiling water), 1¼ *oz.; brandy*, 2 to 3$^o/_0$; *flavouring*, as required. If the full proportions of fruit and sugar are used the product will be good *without* the brandy, but better with it. 1½ *lb.* of *raisins* may be substituted for each pound of sugar.

In the above way are made the following wines—GOOSEBERRY WINE (British *Champagne*);—CURRANT WINE (*red*, *white*, or *black*);—MIXED FRUIT WINE (*currants* and *gooseberries*, or *black*, *red*, and *white currants*, ripe *black-heart cherries*, and *raspberries*, equal parts;) a good family wine; —CHERRY WINE;—COLEPRESS'S WINE (from *apples* and *mulberries*, equal parts); —ELDER WINE;—STRAWBERRY WINE; —RASPBERRY WINE;—MULBERRY WINE (when flavoured makes *British port*);—WHORTLEBERRY WINE (*bilberry wine*), makes a good *factitious port;*—BLACKBERRY WINE;—DAMSON WINE (makes good *factitious port*);—MORELLA WINE;— —APRICOT WINE;—APPLE WINE;—GRAPE WINE; &c.

2. From *dry saccharine fruit* (as raisins). Take of the *dried fruit*, 4½ to 7½ *lb.*; *clear soft water*, 1 gall.; *cream of tartar* (dissolved), 1 *oz.; brandy*, 1½ to 4$^o/_0$. Should the *dried fruit* employed be at all deficient in saccharine matter, 2 to 3 *lb.* of it may be omitted, and *half* that quantity of *sugar*, or *two thirds* of *raisins* added. In the above way are made—DATE WINE,—FIG WINE,—RAISIN WINE, &c.

3. From *acidulous*, *astringent*, or *scarcely ripe fruits*, or those which are *deficient in saccharine matter.* Take of the *picked fruit*, 2½ to 3½ *lb.; sugar*, 3½ to 5½ *lb.; cream of tartar* (dissolved), ½ *oz.; water*, 1 gall.; *brandy*, 2 to 6$^o/_0$.

In the above way are made—GOOSEBERRY WINE (*English champagne*);—BULLACE WINE (makes an excellent *factitious port*); —DAMSON WINE; &c.

4. From *footstalks*, *leaves*, *cuttings*, *&c.* By infusing them in *water*, in the proportion of 3 to 6 *lb.* to the gall., or q. s. to give a proper flavour, or to form a good saccharine liquor; and adding 2½ to 4 *lb.* of *sugar* to each gall. of the *strained liquor.* 1½ *lb.* of *raisins* may be substituted for each *lb.* of sugar.

In the above way are made—RAPE WINE

(from the *pressed cake of grapes*);—ENGLISH GRAPE WINE;—RHUBARB WINE (*Bath champagne, patent do.*), from garden rhubarb;—CELERY WINE;—PARSNIP WINE; &c.

5. From *saccharine roots* and *stems of plants.* Take of the *bruised, rasped,* or *sliced vegetable*, 4 to 6 *lb.; boiling water*, 1 gall.; infuse until cold, press out the liquor, and to each gall. add of *sugar*, 3 to 4 *lb.; cream of tartar*, 1 *oz.; brandy*, 2 to 5%. For some roots and stems the water must not be very hot, as they are thus rendered troublesome to press.

In the above way are made—BEET-ROOT WINE (*British Roussillon*);—PARSNIP WINE (*British Malmsey*);—TURNIP DO.; &c.

6. From *flowers, spices, aromatics, &c.* These are prepared by simply infusing a sufficient quantity of the bruised ingredients for a few days in any simple wine (as that from sugar, honey, raisins, &c.) after the active fermentation is complete, or at all events, a few weeks before racking them.

In the above way are made—CLARY WINE (*muscadel*), from *flowers*, 1 quart to the gall.; COWSLIP WINE (*flowers*, 2 quarts to the gall.);—ELDER-FLOWER WINE (*Frontignac*), flowers of *white-berried elder*, ¾ pint, and *lemon juice*, 3 fl. *oz.*, to the gall.;—GINGER WINE (1¼ *oz.* of *ginger* to the gall.);—ORANGE WINE (1 dozen *sliced oranges* per gall.);—LEMON WINE (juice of 12 and rinds of 6 *lemons* to the gall.);—SPRUCE WINE (¼ *oz.* of *essence of spruce* per gall.);—JUNIPER WINE (*berries*, ¾ pint per gall.);—PEACH WINE (4 or 5 sliced, and the *stones broken*, to the gall.);—APRICOT WINE (as peach wine, or with more fruit);—QUINCE WINE (12 to the gall.);—ROSE, CLOVE-GILLYFLOWER, CARNATION, LAVENDER, VIOLET, PRIMROSE, and OTHER FLOWER WINES (*distilled water*, 1½ pint, or *flowers*, 1 pint, to the gall.);—BALM WINE (*balm tops*, 4 *oz.* per gall.); &c.

7. From *saccharine juices*, or *infusions*, or from *fermented liquors.* Take of the *juice* or *liquor*, 1 gall.; *honey* or *sugar*, 2 to 3 *lb.* (or *raisins*, 3 to 5 *lb.*); *cream of tartar*, 1¼ *oz.; brandy*, 2 to 4%.

In this way are made—ENGLISH GRAPE WINE;—MIXED FRUIT WINE;—PINE APPLE WINE;—CIDER WINE;—ELDER WINE;—BIRCH WINE (from the sap at the end of February or beginning of March);—SYCAMORE WINE (from the sap);—MALT WINE (*English Madeira*), from strong wort;—and the wines of any of the saccharine juices of ripe fruit.

8. From *simple saccharine matter.* Take of *sugar*, 3 to 4 *lb.; cream of tartar*, ½ *oz.; water*, 1 gall.; *honey*, 1 *lb.; brandy*, 2 to 4%. A handful of *grape leaves* or *cuttings, bruised*, or a pint of *good malt wort*, or *mild ale*, may be substituted for the honey. Chiefly used as the basis for other wines, as it has little flavour of its own; but makes a good *British champagne.*

Obs. In all the preceding formulæ *lump sugar* is intended when the wines are required very pale, and good *Muscovado sugar* when this is not the case. Some of the *preceding wines* are vastly improved by substituting good *cider, perry,* or *pale ale* or *malt wort,* for the whole or a portion of the water. Good *porter* may also be advantageously used in this way for some of the *deep-coloured red wines.* When expense is no object, and very strong wines are wanted, the *expressed juices* of the *ripe fruits,* with the addition of 3 or 4 *lb.* of *sugar* per gall., may be substituted for the fruit in substance, and the water.

EXAMPLES of *British imitations* of FOREIGN WINES:—

American Honey Wine. From *good honey*, 21 *lb.; cider*, 12 gall.; ferment, then add of *rum*, 5 pints; *brandy*, 2 quarts; *red* or *white tartar* (dissolved), 6 *oz.; bitter almonds* and *cloves*, of each, bruised, ¼ *oz.; powdered capsicum*, 3 dr. This is also called "*Mead wine.*" With the addition of 3 *oz.* of *unbleached Jamaica ginger* (finely grated), it forms the best *American ginger wine.*

British Burgundy. By adding a little *lemon juice*, and a "*streak*" of *orris* or *orange-flower water* to *British port*, the ingenious wine-brewer converts it into "*British Burgundy.*" It is also made by mixing together equal parts of *British port* and *claret.*

British Cape. 1. (White.) *Raisin wine*, well attenuated by fermentation, either alone, or worked up with a little *cider* and *pale malt-wort.*

2. (Red.) *British white-cape*, sound *rough cider*, and *mulberry wine*, equal parts; well mixed, and *fined down.*

British Champagne. 1. From *stoned raisins*, 7 *lb.; loaf sugar*, 21 *lb.; water*, 9 gall.; *crystallized tartaric acid*, 1 *oz.; cream of tartar*, ½ *oz.; Narbonne honey*, 1 *lb.; sweet yeast*, ¼ pint; ferment, skimming frequently, and when the fermentation is nearly over, add of *coarsely powdered orris root*, 1 dr.; *eau de fleurs d'oranges*, ¼ pint; and *lemon juice*, 1 pint; in 3 months fine it down with *isinglass*, ¼ *oz.;* in 1 month more, if not sparkling, again fine it down, and in another fortnight bottle it, observing to put a piece of *double-refined white sugar*, the size of a pea, into each bottle; lastly, wire down the corks, and cover them with *tin-foil*, after the manner of champagne.

2. As the preceding, but substituting 32 *lb.* of *double-refined sugar* for the sugar and raisins therein ordered, with the addition of 3 gall. of *rich pale-coloured perry.*

3. From *amber hairy champagne gooseberries, English grape juice*, or the *stalks* of *garden rhubarb*, and *lump sugar;* with a little *sweetbriar, orris*, or *orange-flower water*, to impart a slight bouquet. The *last* forms the *patent* or *Bath champagne*, of the Champagne Wine Company.

4. (*Pink.*) To either of the preceding add *red currant juice*, q. s. to colour; or 1 *oz.* of *coarsely-powdered cochineal* to each 10 or 12 gall. at the time of racking.

Obs. It is notorious that *two* bottles of wine out of every *three* sold for *genuine champagne* in England, is of British manufacture. We have ourselves seen sparkling gooseberry, rhubarb, and white sugar wines, sold for imported champagne, at 7*s.* 6*d.* per bottle, and the fraud has passed undetected, even by habitual wine drinkers.

British Claret. 1. *Rich old cider* or *perry* and *port wine*, equal parts.

2. To each gall. of the last add of *cream of tartar* (genuine), 3 *dr.;* with the *juice* of 1 *lemon.* Sometimes ¼ pint of *French brandy* is also added.

Obs. If these mixtures are well fined-down, and not bottled for at least a month or 5 weeks, they closely resemble good "*Bordeaux.*" A mixture of 4 parts of *raisin wine*, with 1 part each of *raspberry* and *barberry* or *damson wine*, also forms, when so treated, an excellent *factitious claret.*

British Cyprus. From the *juice of white elderberries*, 1 quart; and *Lisbon sugar*, 4 *lb.;* to *water*, 1 gall.; together with ½ *dr.* each of *bruised ginger* and *cloves.* When racked add *minced raisins* and *brandy*, of each, 2 *oz.*

British Hock, British Red Hock. From *cream of tartar*, 1¼ *oz.; tartaric acid*, ½ *oz.* (both in extremely fine powder); *juices* of the *purple plum, ripe apples*, and *red-beet*, of each (warmed), 5 pints; *lemon-juice*, 1 pint; with *white sugar*, 2½ *lb.* per gall.

British Madeira. From very strong *pale-malt wort*, 36 gall.; *sugar-candy*, 28 *lb.;* and *cream of tartar*, 3 *oz.;* fermented with *yeast*, 2 *lb.;* adding, when the fermentation is nearly finished, *raisin wine*, 2½ gall.; *brandy* and *sherry wine*, of each, 2 gall.; *rum* and *brandy*, of each, 3 pints; after 6 or 9 months, fine it down, and in another month, bottle it. See *British Sherry.*

British Malmsey. From *sliced* or *grated parsneps*, 4 *lb.; boiling water*, 1 gall.; when cold press out the liquor, and to each gallon add of *cream of tartar*, ½ *oz*, and *good Muscovado sugar*, 3*lb.;* ferment, rack, and add of *brandy*, 3 to 5%. Good *Malaga raisins* may be substituted for the sugar.

British Sparkling Moselle. From *rich cider apples* (carefully peeled and garbled), pressed with 1-4th of their weight of *white magnum-bonum plums* (previously stoned), and the juice fermented with 2½ *lb.* of *double-refined sugar* per gall., as champagne.

British Red Moselle. The last, coloured with *clarified elderberry juice.*

British Muscadel. As *sparkling Moselle*, with some *infusion of clary*, or of the *musk plant*, to flavour it.

British Port, London do., Southampton do. 1. From *red cape*, 2 gall.; *damson* or *elder wine*, 1 gall.; *brandy*, ½ pint; *powdered kino*, ½ *oz.*

2. *Strong old cider*, 6 gall.; *elderberry juice*, 4 gall.; *sloe juice*, 3 gall.; *sugar*, 28 *lb.; powdered extract of rhatany*, 1 *lb.;* at the time of racking, add *brandy*, ½ gall.; *good port wine*, 2 gall.

3. *Good port*, 12 gall.; *rectified spirit*, 6 gall.; *French brandy*, 3 gall.; *strong rough cider*, 42 gall.; mix in a well-sulphured cask. (*Publican's Guide.*)

4. *Port wine*, 8 gall.; *brandy*, 6 gall.; *sloe juice*, 4 gall.; *strong rough cider*, 45 gall.; as the last. (*Licensed Victualler's Companion.*)

5. *Cider*, 24 gall.; *juice of elderberries*, 6 gall.; *sloe juice*, 4 gall.; *rectified spirit*, 3 gall.; *brandy*, 1½ gall.; *powdered rhatany*, 7 *lb.; isinglass*, 4 *oz.*, dissolved in a gall. of the cider; bung it down; in 3 months it will be fit to bottle, but should not be drank until the next year; if a rougher flavour is required, the quantity of *rhatany* may be increased, or *alum*, 5 or 6 *oz.* (dissolved), may be added.

British Sherry.—1. From *Cape* or *raisin wine*, slightly flavoured with a *very little bitter-almond cake*, or, what is more convenient, a little of the essential oil dissolved in alcohol (*essence of bitter almonds*). A mere "streak" or "thread" of *sweet-briar, eau de fleurs d'oranges*, or *orris*, is occasionally added by way of *bouquet;* but care must be taken not to *overdo* it.

2. To each gallon of strong *raisin must*, add, when racking, 1 *Seville orange*, and 3 or 4 *bitter almonds*, both sliced. By omitting the almonds, and adding 1 *green citron* to each 2 or 3 gallons, this forms *British Madeira.*

3. Very strong *pale-malt wort*, 36 gall.; *finest muscovado sugar*, 1 cwt.; *yeast*, 1 pint; ferment; on the third day add of *raisins*, stoned, 14 *lb.;* and in another week, add of

rectified spirit, 1 gall.; *rum,* ½ gall.; and *bitter almonds,* grated, 1¼ oz.; bung down for 4 months, then draw it off into another cask, add of *brandy,* 1 gall., and in 3 months bottle it.

4. *Teneriffe,* slightly flavoured with *cherry-laurel* or *bitter almonds,* forms an excellent *British sherry,* either alone or diluted with an equal quantity of *Cape* or *raisin* wine, or good *perry.*

British Tokay. To *good cider,* 18 gall.; add of *elderberry juice,* ½ gall.; *honey,* 28*lb.; sugar,* 14 *lb.; red argol* (powdered), ¾ *lb.; crystallized tartaric acid,* 3 *oz.;* mix, boil, ferment, and when the active fermentation is complete, add of *brandy,* 1 gall.; and suspend in the liquor from the bunghole, a mixture of *cassia* and *ginger,* of each, ½ *oz.; cloves* and *capsicum,* of each, ¼ oz.; the whole bruised, and loosely inclosed in a coarse muslin bag. It will be ripe in 12 months.

Obs. Some of the preceding formulæ, by skilful management, produce very good imitations of some of the imported wines; but (prejudice aside) many of the British fruit wines possess an equally agreeable flavour, and are frequently more wholesome. All British wines require to be kept at least a year to "*mellow.*" Much of the superiority of foreign wine arises from its *age.*

WINE (Culinary). Syn. *Wines for Kitchen use.* These are *prepared* in a similar manner to the *medicated wines* noticed below:—

Basil Wine. From *green basil leaves,* 4 or 5 *oz.; sherry, Cape,* or *raisin wine,* 1 pint; digest for 10 days, press, and strain. *Used* to give a turtle flavour to soups and gravies. In a similar way may be made the *wines* of *celery leaves, celery seed, sage, shallots,* and the various *green* and *dried herbs* used in cookery.

Cayenne Wine. From *capsicum* or *cayenne,* 1 *oz.; Cape,* 1 pint; steep for a fortnight, and strain. In a similar way may be made *Currie* (powder), *ragout* (spice), and several other similar wines used in the kitchen.

WINE (Impregnated). See *Culinary Wines, Medicated do., &c.*

WINE (Medicated). Syn. *Impregnated Wine; Vinum Medicatum,*—Lat. The medicated wines (*vina medicata*) are prepared by cold maceration, in well-closed vessels, in precisely the same way as *tinctures.* In the Ph. L. of 1824 a *diluted spirit* was substituted for wine, without altering the name of the preparation; but the use of wine (*sherry*) was restored in that of 1836. The druggists commonly use *Cape* or *raisin wine* as a menstruum, from it being cheaper than sherry, and, perhaps, scarcely less powerful as a solvent. The "*vinum*" of the Ph. U. S. was formerly *Teneriffe.*

"*Medicated wines* should be kept in stoppered glass vessels, and be *frequently shaken* during maceration." (Ph. L.)

The following are the principal medicated wines at present in use:—

WINE (Aloes). Syn. *Tinctura Sacra,*—Ph. L. 1746. *Tinct. Hieræ Picræ,*—Ph. L. 1721. *Vinum Aloës,*—Ph. L. & E., & Ph. D. 1826. *Prep.* (Ph. L.) *Powdered Socotrine* or *hepatic aloes,* 2 oz.; *powdered canella,* ½ oz.; *sherry,* 1 quart; macerate for 14 days, and filter. In the Ph. E. *cardamoms* and *ginger,* of each, 1½ dr., are substituted for *canella. Dose.* As a purgative, ½ to 2 fl. oz.; as a stomachic, 1 to 2 fl. dr.

WINE (Aloes,—Alkaline). Syn. *Vinum Aloës Alkalinum; Vin. Aloeticum Alkalinum,*—Ph. L. 1746. *Prep.* (Dr A. T. Thomson.) *Carbonate of soda,* 3 oz.; *myrrh* and *extract of aloes,* of each, 6 dr.; *sesquicarbonate of ammonia,* 4½ dr.; *sherry,* 24 fl. oz. (say, 1¼ pint); macerate, as before. In dyspepsia, chlorosis, &c. *Dose.* As the last.

WINE (Antimonial). Syn. *Tartar Emetic Wine, Wine of Potassio-tartrate of Antimony; Vinum Antimonii Potassio-tartratis,*—Ph. L. *Vinum Antimoniale,*—Ph. E. *Vinum Antimonii Tartarizati,*—Ph. L. 1788. *Prep.* (Ph. L. & E.) *Potassio-tartrate of antimony,* 40 gr.; *sherry,* 1 pint; dissolve. Each *fluid oz.* contains 2 gr. of emetic tartar. *Dose.* As a *diaphoretic* and *expectorant,* 10 to 30 drops, frequently; as a *nauseant,* 1 to 2 fl. dr.; as an *emetic,* 2 to 4 fl. dr. The corresponding compound of the Ph. D. is *antimonii tartarizati liquor.* (See *p.* 1164.)

WINE (Chalybeate). See *Wine of Iron.*

WINE (Colchicum). Syn. *Wine of Colchicum Root; Vinum Radicis Colchici; Vinum Colchici,*—Ph. L. &. E. *Prep.* (Ph. L.) *Dried corms* of *meadow saffron* (sliced), 8 oz.; *sherry wine,* 1 quart; macerate 7 days, and strain; (press strongly the residuum, and filter the mixed liquors,—Ph. E.) A powerful sedative and purgative. *Dose.* ½ to 1 fl. dr.; in gout, acute rheumatism, and other painful inflammatory and nervous affections.

Obs. The celebrated *eau médicinale* of M. Husson (*aqua medicinalis Hussonii*) resembles, in composition and action, the above *preparation* in every point except its strength, which, we believe, is much above that of the wine of the British Colleges.

WINE (Colchicum Seed). Syn. *Vinum Seminis Colchici, Vin. Seminum C.,*—Lat. *Prep.* (Ph. U. S. & Dr. Williams.) *Seeds of* *meadow saffron* (preferably ground in a coffee-mill), 2 oz.; *sherry*, 16 fl. oz.; macerate for 14 days. *Dose.* 1 to 1½ fl. dr.; in gout, &c.

WINE (Emetic). See *Antimonial Wine*, *Ipecacuanha do.*, *&c.*

WINE (Gentian). Syn. *Bitter Wine*, *Tonic do.; Vinum Amara; Vinum Gentianæ*, —Ph. E. *Prep.* (Ph. E.) *Gentian*, in coarse powder, ½ oz.; *yellow bark* (do.), 1 oz.; *dried orange-peel*, 2 dr.; *canella*, in coarse powder, 1 dr.; *proof spirit*, 4½ fl. oz.; digest for 24 hours, then add of *sherry*, 1 pint and 16 fl. oz.; and further digest for 7 days. Tonic and stomachic. *Dose.* ½ to ¾ fl. oz.

WINE (Hellebore,—White). See *Wine of White Hellebore.*

WINE (Ipecacuanha). Syn. *Emetic Wine; Vinum Ipecacuanhæ*,—Ph. L. E. & D. *Ipecacuanha root*, bruised, 2½ oz.; *sherry*, 1 quart; macerate for 7 days, (14 days, and strain with expression,—Ph. D.) This is a mild and excellent preparation. *Dose.* As a *diaphoretic* and *expectorant*, 10 to 40 drops, in coughs, diarrhœa, dysentery, dyspepsia, &c.; as an *emetic*, 2 fl. dr. to 1 fl. oz., in divided doses; as an emetic for infants and young children, ½ tea-spoonful every 10 or 15 minutes until it operates.

WINE (Iron). Syn. *Chalybeate Wine*, *Steel do.; Vinum Ferri*,—Ph. L. *Prep.* 1. (Ph. L.) *Iron wire*, 1 oz.; *sherry*, 1 quart; digest with frequent agitation for 30 days, and strain. Each fl. oz. contains less than 1½ gr. of metallic iron.

2. *Ammonio-tartrate of iron* (Aikin's), 1½ dr.; *sherry*, 1 pint; dissolve. Frequently substituted for the last, especially when the preparation is required in a hurry. *Dose.* 1 to 5 fl. dr.; as a mild chalybeate.

Obs. The formula for *wine* of *iron* was modified in the Ph. L. 1824, omitted in that of 1836, and restored, in its original character, in that of 1851.

WINE (Meadow Saffron). See *p.* 1314.

WINE (Opium). Syn. *Vinum Opii*,—Ph. L. E. & D. *Tinctura Thebaica*,—Ph. L. 1746. *Laudanum Liquidum Sydenhami*,—Ph. L. 1721. *Sydenham's Liquid Laudanum, &c.*,—Obs. *Prep.* 1. (Ph. L.) *Extract of opium* (Ph. L.), 2½ oz.; *cinnamon* and *cloves*, of each bruised, 2½ dr.; *sherry*, 1 quart; macerate for 7 days (14 days,—Ph. D.) and filter. In the Ph. E. *opium*, 3 oz.; and in the Ph. D., *opium* in coarse powder, 3 *oz.;* are ordered instead of extract of opium. The Dublin College also omits the aromatics.

2. (*Wholesale.*) From *extract of opium*, 11 *oz.; oil of cassia*, 25 drops; *oil of cloves*, 20 drops; *wine*, 1 gall.; (or *rectified spirit*, 1½ pint; *water*, 6½ pints; *colouring*, q. s.;) digest with agitation until dissolved. Milder than the tincture. *Dose.* 10 to 40 drops; as an anodyne and hypnotic.

WINE (Opium,—Fermented). Syn. *Rousseau's Laudanum, Black-drop; Vinum Opii Fermentatione Paratum, Gutta Nigra*, —Lat. *Prep.* (P. Cod.) *Opium*, 4 oz.; *boiling water*, 5 ℔; dissolve, add of *honey*, 1 ℔; *yeast*, 2 dr.; keep it at 86° Fahr. for a month, or until the fermentation is complete; then press, filter, distil off 16 oz., and evaporate the residuum to 10 oz.; distil the 16 oz. of spirit obtained above, until 12 oz. have passed over; and from this, by a third distillation, obtain 4½ oz.; which add to the *evaporated solution* (10 oz.), and filter. About *four times* as strong as *tincture of opium.* See *Black Drop.*

WINE (Potassio-tartrate of Antimony). See *Antimonial Wine.*

WINE (Quinine). Syn. *Vinum Quinæ*, Lat. *Prep.* (Magendie.) *Disulphate of quinine*, 14 gr.; *sherry*, 1 quart; agitate frequently for some time. *Dose.* 1 wine-glassful, as a tonic and stomachic.

WINE (Rhubarb). Syn. *Vinum Rhabarbari, Tinctura Rhæi Vinosa; Vinum Rhei*,—Ph. E. & D. *Prep.* 1. (Ph. E.) *Rhubarb*, in coarse powder, 5 oz.; *canella*, in coarse powder, 2 dr.; *proof spirit*, 5 fl. oz.; *sherry*, 1¾ pint; macerate for 7 days, press, and filter.

2. (Ph. D.) *Rhubarb*, 3 *oz.; canella*, 2 dr.; *sherry*, 1 quart; macerate 14 days. Weaker than the last. *Dose.* As a *stomachic*, 1 to 3 fl. dr.; as a *purgative*, ½ to 1 fl. oz., or more. It does not keep well.

WINE (Tobacco). Syn. *Vinum Tabaci*, —Ph. E. *Prep.* (Ph. E.) *Tobacco*, 3½ oz.; *sherry*, 1 quart; digest 7 days, strain with strong pressure, and filter. A powerful sedative and diuretic. *Dose.* 10 to 30 drops; in dropsy, lead colic, ileus, &c.

WINE (White Hellebore.) Syn. *Vinum Veratri*,—Ph. L. *Tinctura Veratri Albi*,—Obs. *Prep.* (Ph. L.) *White hellebore*, sliced, 8 oz.; *sherry wine*, 1 quart; digest for 7 days, press and filter. *Dose.* 10 drops, gradually increased to 25 or 30; as a substitute for colchicum, in gout and rheumatism, &c. It is less manageable than wine of colchicum, and is now seldom employed.

WINE (White Hellebore,—Opiated). Syn. *Mr. Moore's Eau Médicinale; Vinum Veratri Opiatum*,—Lat. *Prep.* From *wine of white hellebore*, 3 fl. dr.; *tincture of opium*, 1 fl. dr. *Dose.* As the last.

WINES (Medicated,—Dr. B. Lane's). Syn.

Vinous Essences; Essentiæ Vinosæ, Liquores Vinosi,—Lat. *Prep.* From an *infusion* or *solution of the drug,* of about 3 or 4 times the usual strength, fermented with a little *yeast,* and about 3 or 4 *lb.* of *sugar* per gallon; the fermented liquor being afterwards set in a cool cellar until fit for bottling. Compounds of *calumba, cascarilla, gentian, opium, rhubarb, senna,* and *valerian,* have been thus prepared. That of opium is made of *only twice* the strength of the common tincture.

WINE-STONE. Crude tartar, or argol.

WINE TESTS. *Prep.* 1. (*Hahnemann's.*) From *quicklime,* 1 oz.; *flowers of sulphur,* 1½ oz.; mix and heat them in a covered crucible for 5 or 6 minutes; put 2 dr. of the *product* and an equal weight of *tartaric acid* (separately powdered), into a stoppered bottle, with a pint of *water,* and shake them well; let the liquid settle, pour off the clear portion, and add of *tartaric acid,* 1½ dr.

2. (*Dr. Paris's.*) From *sulphuret* of *calcium* and *cream of tartar,* of each (in powder), ½ oz.; *hot water,* 1 pint; agitate, &c., as before; decant the *cold clear liquid* into 1-*oz. phials,* and add 20 drops of *hydrochloric acid* to each of them.

Obs. The above tests will throw down the least quantity of lead from wines, as a very sensible black precipitate. As iron might be accidentally contained in the wine, the hydrochloric acid is added to the last test, to prevent the precipitation of that metal.

WINTER-GREEN (American). Syn. *Pipsissewa; Chimaphila,*—Ph. L. & E. *Pyrola,*—Ph. D. The *herb* of *chimaphila umbellata* (pyrola umbellata,—Linn.) It is astringent, diuretic, tonic, and stomachic; and has been successfully administered in loss of appetite, dyspepsia, dropsy, chronic affections of the urinary organs, scrofula, &c. It must not be confounded with ordinary *winter-green* (box-berry, chequer do., partridge do., mountain tea), which is the *gaultheria procumbens* (Linn.), a plant belonging to the *ericaceæ* (De Cand.); whilst the former plant belongs to a genus of the *pyrolaceæ* (De Cand.) See *Decoctions, Extracts,* and *Oils* (Essential).

WITCH MEAL. Syn. *Vegetable Sulphur, Lycopodium.* The *pollen* of *lycopodium clavatum* or *club moss.* (See *p.* 372.)

WOAD. Syn. *Dyer's Woad; Pastel,*—Fr. The *isatis tinctoria* (Linn.) To prepare them for the dyer, the *leaves* are partially dried, and ground to a paste which is made into balls; these are placed in heaps, and occasionally sprinkled with *water,* to promote the fermentation; when this is finished, the woad is allowed to fall down into lumps, which are afterwards reground and made into cakes for sale. On mixing the prepared woad with *boiling water,* and, after standing for some hours in a close vessel. adding about 1-20th its weight of *newly slaked lime,* digesting in a gentle warmth, and stirring the whole together every 3 or 4 hours, a new fermentation begins; a blue froth rises to the surface, and the liquor, though it appears itself of a reddish colour, dyes *woollens* of a *green;* which, like the green from indigo, changes in the air to a BLUE. This is said to be one of the nicest processes in the art of dyeing, and does not well succeed on the small scale, Woad is now mostly used in combination with indigo. 50 *lb.* of *woad* are reckoned equal to 1 *lb.* of *indigo.*

WOLFRAMIUM. See *Tungsten.*

WOLFSBANE. See *Aconite.*

WOOD is *polished* by carefully rubbing down the grain with fine *glass paper,* or *pumice-stone,* and then rubbing it, *first* with *finely powdered pumice-stone* and *water,* and *afterwards* with *tripoli* and *linseed oil,* until a proper surface is obtained. For common purposes, *glass paper,* followed by a *metal burnisher,* is employed.

WOOD is *stained* by the application of any of the ordinary *liquid dyes* employed for wool or cotton. They sink deeper into the wood when they are applied hot. When the surface is properly stained and dried, it is commonly cleaned with a *rag* dipped in *oil of turpentine* or *boiled oil,* after which it is either *varnished* or *polished* with bees' wax. *Musical instruments, articles of the toilette,* &c., are usually treated in this way.

Wood is *preserved* by any agents which destroy the tendency to putrefaction of the matter within its pores, or which enables it to resist the attack of insects, or renders it unsuited to the growth of minute fungi. Under Mr. Bethell's patent, *coal tar* or *crude pyrolignite of iron,* and other *bituminous matters* containing *creasote* are forced into it, under powerful pressure. See *Kyanizing, Paynizing, &c.*

WOODY FIBRE. See *Lignine.*

WOOD ETHER. See *page* 406.

WOODY NIGHTSHADE. See *page* 820.

WOOL. Syn. *Lana,*—Lat. Wool is a fine, soft, elastic variety of hair, is cellulated in its structure, and each of its little cells is the separate casket of a collection of air. Its filaments are cylindrical, like those of silk; but the surface is covered with thin scales or epidermic cells. In the finer qualities, these filaments vary in thickness from $\frac{1}{1100}$ to $\frac{1}{1500}$ of an inch; and under a good microscope, distinctly exhibit, at intervals of about $\frac{1}{300}$ of an inch, a series of serrated rings, imbricated towards each other, "like the joints of equisetum, or rather, like the scaly zones of a serpent's skin." These appearances render it almost impossible to mistake *wool* for *silk*, *linen*, or *cotton*. From experiments made by different competent authorities, it is found, that wool is one of the *worst* conductors, and one of the *best* radiators of heat known. These properties render textile fabrics composed of it particularly adapted for clothing in cold, damp, and changeable climates; since, from its peculiar structure and other conditions, it not merely gently excites the arterial circulation of the skin, but prevents the loss of heat by radiation, and thus materially assists in maintaining the surface of the body at a proper and equable temperature. It sometimes, however, proves too irritative for highly sensitive skins, and, moreover, disturbs the electricity of the cutaneous surface, on friction, more than even silk. On these accounts there are persons who find it unpleasant to wear woollen garments, of any description, next the skin; in which cases, all the advantages that such parties can derive from their use, may be obtained by wearing them outside one of linen or cotton. According to Erasmus Wilson, this method "is preferable in warm weather, since the *linen* absorbs the perspiration, while the *woollen* garment preserves the warmth of the body, and prevents the inconvenience resulting from its evaporation." See *Flannel.*

Identif. 1. By the microscope. (See *above.*)

2. Its fibres, when inflamed, shrivel up, and burn with difficulty, and evolve the peculiar and characteristic odour of hair when similarly treated, leaving a bulky charcoal; whereas cotton and linen burn rapidly, leave no charcoal, and evolve little or no odour. *Silk* acts in nearly the same manner as wool.

3. Nitric acid, picric acid, and gaseous chlorine stain the fibres of wool and silk yellow. Dr. J. J. Pohl recommends an aqueous or alcoholic solution of picric acid as well adapted for a test.—After immersion of a small portion of the fabric or yarn for from 5 to 10 minutes in the solution, it is to be taken out, and washed in warm water. The *linen* and *cotton* in it will then appear *white*, but the *wool*, *silk*, or other animal fibre, will retain its yellow colour. In stuffs, cloths, flannels, &c., the mixed threads may be readily observed by means of a pocket lens, and their relative numbers may be ascertained by means of a "thread counter." This test acts best with white, but is also applicable to many other colours. For *dark colours* nitric acid is preferable.

4. A square inch of the fabric, or a small portion of the yarn, is boiled for a short time in a solution of caustic soda or potassa, and then withdrawn and washed. If it be of *pure wool*, it will be dissolved, and wholly disappear; if any threads or fibres are left undissolved, they consist of either *cotton* or *linen;* of these, such as have acquired a dark yellow tinge, are LINEN, whilst those which have retained their whiteness, or which are only slightly discoloured, are COTTON. The relative proportion of the adulteration may be ascertained as before. See *Cotton*, *Linen*, and *Silk.*

Wool and *woollen goods* exhibit a greater affinity for colouring matter, than either cotton or linen, and in many cases, this exceeds even that of silk. The most difficult dye to impart to wool is a rich, deep, and permanent black. See *Dyeing*, *Mordants*, *&c.*

Woollen goods are cleaned and scoured in the manner noticed under *Bleaching*, *Fulling*, and *Scouring.*

WOOL (Spanish). See *Rouge crepons* (*p.* 1111).

WOORARA. Syn. *Ourari*, *Wourali.* A deadly poison employed in Guiana, obtained from a species of *strychnos.* See *Upas.*

WOOTZ. The Indian name of steel; applied in this country to the steel imported from Bengal.

WORMS (Intestinal). Syn. *Vermes; Intestinalia*,—Cuvier; *Entozoa*,—Rudolphi. The parasites which are generated and nourished in the human intestinal canal, are the—*Ascaris lumbricoides* (Gmelin; *ascaris*,—Rudolphi), or *long round-worm*, found in the small intestines, and which is generally of the thickness of a goose-quill, and varies in length from 10 to 15 inches;—*ascaris vermicularis* (Gmelin; *oxyurus*,—Rud.), *maw*, or *thread-worm*, the ascaris (*ascarides*) of medical writers, which is thread-like in appearance, varies from 1½ to 5 lines in length, and confines itself chiefly to the rectum;—*trichocephalus hominis* (Gmelin; *t. dispar*,—Rud.), or *long thread-worm*, varying from 1¼ to 2 inches in length, and found chiefly in the cœcum;—*tænia solium* (Gmelin), or common *tape-worm*, having a flattened riband-like appearance, varying in length from 3 or 4, to 15 or 20 feet, and occupying the small intestines, especially of females and the debilitated;—*tænia vul-*

garis (Gmelin), or *broad tape-worm*, a variety seldom found in this country, but common in Switzerland and the north of Europe.

Causes. A debilitated state of the digestive organs; improper food; sedentary habits; impure air; bad water; and, apparently, an occasional hereditary tendency to worms.

Symp. Griping pains, especially about the navel; acid eructations; slimy stools; occasional nausea and vomiting, without any manifest cause; heat and itching about the anus; tenesmus; emaciation; disturbed dreams; grinding of the teeth during sleep; pallor of countenance; discoloration round the eyes; feverishness; headache; vertigo; &c. In many cases these symptoms are often highly aggravated, and mistaken for primary diseases. The only absolutely positive evidence of the existence of worms is, however, their being seen in the fæces.

Treat. In common cases, an occasional moderately strong dose of *calomel* overnight, followed by a smart purgative the next morning, is an excellent remedy, where the use of mercurials is not contra-indicated. *Cowhage*, made into an electuary with honey or treacle, is also an excellent vermifuge. *Oil of turpentine* is useful against nearly every variety of worms, and when taken in sufficient doses to reach the rectum, is almost specific in *ascarides.* When this is inconvenient, an occasional *enema of oil of turpentine* is even more effective. *Enemas of aloes* are also very useful in such cases. *Scammony*, under the form of *Basilic powder*, has long been employed to expel worms in children. *Aloes, castor oil, worm-seed, tin filings*, and *sulphur*, are likewise popular remedies. *Cabbage-tree bark* is a powerful anthelmintic; but its use requires caution. Most of the *quack vermifuges* contain either *aloes* and *gamboge*, or *calomel* and *jalap.* The substances which have been most highly extolled for the destruction or expulsion of *tape-worm* (tænia) are *koussa, oil of turpentine, male-fern, pomegranate*, and *tin-filings.* The first two are those on which the most dependence may be placed. *Madame Nouffer's* celebrated "*Swiss remedy*" for *tape-worm*, for which Louis XVI gave 18,000 francs, consisted of 2 or 3 dr. of *powdered male-fern*, taken in ½ pint of *water* in the morning, *fasting*, followed in 2 hours by a bolus made of *calomel* and *scammony*, of each, 10 gr.; *gamboge*, 6 or 7 gr. "*Swain's Vermifuge*" is prepared from *worm-seed*, 2 oz.; *valerian, rhubarb, pink root*, and *white agaric*, of each, 1½ oz.; boiled in *water*, q. s. to yield 3 quarts of *decoction*, to which 30 drops of *oil of tansy*, and 45 drops of *oil of cloves*, dissolved in a quart of *rectified spirit*, are added. *All purgatives* may be regarded as *vermifuges.* Besides our efforts to destroy and expel the worms, the tone of the primæ viæ should be raised by the use of stomachics and tonics, by which the tendency to their equivocal generation will be either removed or lessened. See *Anthelmintics, Decoctions, Enemas, Pills, Patent Medicines*, &c.; and also the several vermifuges under their *respective names.*

WORM BARK. Syn. *Cabbage-tree Bark; Geoffræa Inermis*,—Ph. D. 1826. *Geoffræya Inermis*,—Ph. E. 1817. A powerful astringent, purgative, anthelmintic, and narcotic. *Dose.* 10 to 30 gr. In larger doses, or if cold water be drunk during its action, it is apt to occasion sickness, vomiting, and delirium. The remedy for this is copious draughts of warm water.

WORM SEED. Syn. *Semen Contra, Semen Cinæ*,—Lat. The broken peduncles, mixed with the calyces and flower buds of *artemisia santonica*, and some other species of artemisia, imported from the Levant. *Dose.* 10 to 30 gr., in powder; as a vermifuge. See *Santonine.*

WORM TEA. A preparation sold in the shops of the United States, and much used, consisting, according to Brande, of *spigelia* or *pink-root, savine, senna*, and *manna.*

WORMWOOD. Syn. *Absinthium*,—Ph. L. & E. The *flowering herb* of *artemisia absinthium* (Linn.), a well known plant indigenous to this country, and largely cultivated for medicinal purposes. It is a bitter tonic and stomachic, and also anthelmintic. *Dose.* 20 to 40 gr., of the dried herb, either in powder, or made into a tea or infusion; in dyspepsia, dropsy, scurvy, sympathetic epilepsy, &c. See *Absinthine* and *Absinthic Acid.*

WORT. The technical name for the fermentable infusion of malted grain.

The *strength* of *worts* is ascertained by means of an instrument commonly termed a saccharometer. (See *p.* 1114.) "Brewers, distillers, and the Excise, *sometimes* denote by the term '*gravity*' the *excess* of weight of 1000 parts of a liquid by volume above the weight of a like volume of distilled water, so that if the specific gravity be 1045, 1070, 1090, &c., the gravity is said to be 45, 70, or 90; at *others*, they thereby denote the *weight* of *saccharine matter* in a barrel (36 gall.) of wort; and *again*, they denote, the *excess* in weight of a barrel of wort over a barrel of water, equal to 36 gallons, or 360 *lb.* This and the first statement are identical, only 1000 is the standard in the *first* case, and 360 in the *second*." (Ure.) The last is that commonly adopted by the brewers.

According to Dr. Ure, the *solid dry extract of malt*, or *saccharine*, has the *specific gravity* 1·264; and the *specific volume* 0·7911; "that is, 10 *lb.* of it will occupy the volume of 7·911 *lb.* of water. The mean sp. gr.. by *computation* of a solution of that extract in its own weight of water, is 1·116; but by *experiment*, the sp. gr. of that solution is 1·216 (?—1·231), showing considerable condensation of volume in the act of combination with water." The *quantity* of *solid saccharine* or *sugar* in a *wort* may be determined in the manner mentioned under *Syrup*.

According to the compilers of the tables accompanying Field's Alcoholmeter, 1·8 *lb.* of *saccharine* is decomposed for the production of $1\frac{0}{0}$ of *proof spirit;* but according to our experiments, the proportion of saccharine named is rather below the true equivalent.

The rapid *cooling* of *worts* is an important object with the brewer and distiller. On the *large scale*, the old system, in which shallow coolers are employed, with all its numerous inconveniences and accidents, is now for the most part abandoned, being supplanted by the method introduced by Mr. Yandall about 30 years ago. This consists in the use of a "refrigerator," which is an apparatus so constructed that any hot liquid may be cooled by about its own volume of cold water, in a very short space of time. The principle is that of passing the two fluids through very shallow and very long passages, in opposite directions, being essentially that of a *Liebig's refrigerator* on a gigantic scale. The apparatus may consist of zigzag passages, flattened tubes or convoluted curves, of any convenient shape, so that they possess little capacity in one direction, but great breadth and length. A refrigerator having the passages for the fluids $\frac{1}{8}$ of an inch thick, is said to require a run of about 80 feet. The success of this method is such as to leave nothing more to desire. See *Brewing, Fermentation, Malt, &c.*

WOUND. Syn. *Vulnus*,—Lat. A solution of continuity in any of the soft parts of the body, arising from external violence.

Wounds are *distinguished* by surgeons into *contused wounds*, *incised do.*, *lacerated do.*, *poisoned do.*, *punctured do.*, *&c.;* terms which explain themselves. *Sword-cuts* are incised wounds; *gun-shot wounds*, lacerated and contused ones. *Slight wounds*, and indeed all those not demanding material surgical assistance, after dirt and foreign substances have been removed, may be treated in the manner noticed under *cuts* and *abrasions*.

WOUND BALSAM. See *page* 1230.

WRITING executed in the ordinary tanno-gallic ink, and which has been rendered illegible by age, may be restored by carefully moistening it, by means of a feather, with an *infusion of galls*, or a *solution of prussiate of potash* slightly acidulated with *hydrochloric acid*, observing so to apply the liquid as to prevent the ink spreading.

WRITING FLUIDS. A term commonly applied, of late years, to easy-flowing inks adapted for metallic pens; in contradistinction to the old tanno-gallic compounds at one time exclusively employed for writing.

Prep. 1. Dissolve *pure basic* or *soluble Prussian blue* in *pure distilled water*, and dilute the resulting solution with *pure water* until the desired shade of colour is obtained. Very permanent and beautiful. It is not affected by the addition of alcohol, but is immediately precipitated by saline matter. The precipitate, however, still possesses the property of dissolving in *pure* water.

2. From the *soluble ferrocyanide of potassium and iron*, dissolved in *pure water*. Resembles the last, but it is precipitated from its solution by alcohol.

3. *Powdered Prussian blue*, 1 *oz.; concentrated hydrochloric acid*, 1½ fl. oz.; mix in a matrass or glass bottle, and after 24 or 30 hours, dilute the mass with a sufficient quantity of water.

4. Dissolve *ceruleo-sulphate of potassa* or *ammonia* (or blue carmine or soluble indigo)in *hot water*, and when cold decant the clear portion. It is an intense blue, and dries nearly black; is perfectly incorrosive, and very permanent and easy flowing.

5. (Horning.) *Perchloride of iron*, 4 parts, *water*, 750 parts; dissolve, add of *cyanide of potassium*, 4 parts, dissolved in a little *water*; collect the precipitate, wash it with several effusions of *pure water*, allow it to drain until it weighs about 200 parts, then add of *oxalic acid*, 1 part; and promote solution by agitating the bottle or vessel containing it.

6. (Mohr.) *Pure Prussian blue*, 6 parts; *oxalic acid*, 1 part; triturate with a little water to *a perfectly smooth* paste, then dilute the mass with a proper quantity of soft water. The *product* resembles Stephen's "*patent-blue ink.*"

7. (Rev. J. B. Reade.)—*a.* A *solution* of his *soluble Prussian blue* in *distilled water.* Blue.

b. Prepared by adding to good *gall ink* a strong *solution* of his *soluble Prussian blue.* This addition "makes the ink, which was previously proof against *alkalies,* equally proof against *acids,* and forms a writing fluid, which cannot be erased from paper by any common method of fraudulent obliteration, without the destruction of the paper." This ink writes greenish blue, but afterwards turns intensely black. Stephen's "*patent ink,*" which does the same, is a similar compound.

8. (Prof. Runge.) *Logwood,* in fine chips, ¼ *lb.; boiling water,* 3 pints; digest for 12 hours, then simmer the liquid down gently to 1 quart, carefully observing to avoid dust, grease, and smoke; when cold decant the decoction, and add to it of *yellow chromate of potash,* 20 gr.; dissolve by agitation, after which it will be fit for use. Cheap and good. It resists the action of all ordinary destructive agents better than the tanno-gallic inks; it may be washed after use with a wet sponge, or steeped for twenty-four hours in water, or even tested with dilute acids, and yet preserve its original blackness. It is perfectly liquid, it scarcely thickens by age, and neither deposits a sediment, nor corrodes steel pens.

9. (Ure.) From *vanadate of ammonia* decomposed with *infusion of galls.* It is of a perfectly black hue, flows freely from the pen, is rendered blue by acids, is unaffected by dilute alkaline solutions, and resists the action of chlorine.

Obs. The preceding formulæ, under proper management, produce excellent products, all of which are extremely moble, and most of them of a more or less beautiful colour. The *blue* ones, when concentrated, dry of a blue black, whilst two or three of the others, though at first pale, rapidly pass into a deep black, when exposed to the air. Care must be taken in all cases that the ingredients be pure. The Prussian blue, except when directly prepared for the purpose, should be washed in dilute hydrochloric acid before attempting its solution by means of oxalic acid. Unless these precautions are attended to, success is unlikely. A little gum may be added, if required, to prevent the fluid spreading on the paper; but in most cases the addition is no improvement. Most of the *blue fluids* may be used as *indelible ink* to mark linen, and will be found very permanent, provided the part be first moistened with *alum water,* and dried.

XANTHATES. See *below.*

XANTHIC ACID. Syn. *Hydroxanthic Acid, Bisulphocarbonate of Oxide of Ethyle.* A peculiar acid, composed of sulphur, carbon, hydrogen, and oxygen, discovered by Zeise.

Prep. Dry *xanthate of potassa* is mixed with *dilute sulphuric* or *hydrochloric acid;* after a time a milky liquid is formed, from which, by the addition of more *water,* a heavy oily substance is deposited, which is quickly washed with *water,* and dried by standing over *chloride of calcium;* this is *hydrated xanthic acid.*

Prop., &c. A nearly colourless, inflammable, oily liquid, having a bitter taste, and a peculiar, penetrating, disagreeable odour. It is decomposed into alcohol and bisulphuret of carbon at a temperature above 75° Fahr. The *compounds* of *xanthic acid* are mostly of a yellow colour; hence its name.—*Xanthate of Potassa* (*Bisulphocarbonate of oxide of ethyle and potassa,*—Liebig) is obtained by adding *bisulphuret of carbon* to a solution of *fused caustic potassa,* 1 part; in *alcohol,* sp. gr. 0·800, 12 parts; as long as it is dissolved; by cooling the solution to 32°, or better, to 0° Fahr., the salt separates as a semi-solid mass of brilliant, slender, colourless, prismatic crystals, which, after being washed with ether, and pressed between bibulous paper, must be dried out of contact with the air. Soluble in water and alcohol; insoluble in ether; decomposed by exposure to the air. The *xanthates* of *soda, potassa,* and *baryta,* are soluble and crystallizable; those of *lead, mercury,* and *zinc,* white and nearly insoluble; that of *lime* is uncrystallizable; that of *copper* is a flocculent, insoluble substance, of a rich yellow colour.

XANTHIC ACID. A peculiar substance, found by Dr. Marcet in a *urinary calculus,* and so named from its *solution* in *nitric acid* furnishing a bright lemon-coloured residuum on evaporation.

XANTHINE. The name given by Kuhlmann to the yellow tinctorial principle of madder. (See *p.* 733.)

XANTHOGEN. The hypothetical radical of *xanthic acid.*

XANTHOPHYLLINE. The yellow colouring matter of autumn leaves.

XANTHOPICRITE. A crystallizable bitter principle obtained from the *bark* of *xanthoxylum Caribæum,* which, according to Brande, is used in the *Antilles* as a febrifuge. This name has been erroneously spelled *xanthopichroite* and *xanthopicrine.*

XANTHOPROTEINE. A yellow organic acid, formed by the action of nitric acid on fibrine, and some other proteine compounds.

XANTHORHAMNINE. The pure yellow colouring principle of the fruit of *rhamnus tinctoria*, or French berries.

XYLIDINE. A peculiar unexamined compound of *carbon, hydrogen*, and *oxygen.*

XYLOIDINE. When *starch* is immersed in *concentrated nitric acid* (sp. gr. 1·45 to 1·50), it is converted, without disengagement of gas, into a colourless, tremulous jelly, which when treated with an excess of *water*, yields a white curdy insoluble substance, which, after being edulcorated with *pure water*, until every trace of acid is removed, is *xyloidine* or *starch-xyloidine.* Cotton, when so treated, yields a precisely similar compound, in a pulverulent form, termed, by way of distinction, *cotton xyloidine.* Paper, sugar, gum, *mannite*, and several other substances, yield xyloidine compounds of greater or less purity.

Prop., &c. Pure xyloidine *differs* from *pyroxyline*, or *pure gun-cotton*, in the mode of its combustion, in leaving a residuum on explosion, and in being freely soluble in ether, and in ether containing a little alcohol. In other points these substances bear a considerable resemblance, and either pure or mixed, are continually confounded with each other.

Obs. A mixed xyloidine compound, recently employed under the name of *sugar-resin*, to render gunpowder, percussion caps, and the tips of lucifer matches waterproof, is prepared as follows: — *Oil of vitriol*, 2 parts; is mixed with *nitric acid* (1·50), 1 part; and when the mixture has cooled to the temperature of the atmosphere, *powdered sugar*, 1 part, is stirred in; after a few seconds, or as soon as it becomes pasty, it is removed, thrown into cold water, and well washed; the mixed acids being, in the mean time, treated with *more sugar*, as before; the product (sugar-resin) *carefully* dried at about 180° Fahr., is formed into a varnish by solution in a mixture of alcohol and ether.

Another substance belonging to the above class of bodies is *Nitro-glycerine*, or *Glonoïne*, which was discovered by M. Sobrèro, soon after the discovery of gun-cotton. According to M. J. E. Vrij, the best formulæ for its preparation is that given below:—*Glycerine* (sp. gr. 1·262), 1543 gr.; is added *cautiously*, and in small portions at a time, to *monohydrated nitric acid*, 18 oz.; previously immersed in a powerful freezing mixture, observing to allow the mixture to cool to about 15° Fahr. between each addition, as if it rises to 32° Fahr., a fearful explosion occurs; when a homogeneous fluid is formed, promoted by frequent stirring with a glass rod, *concentrated sulphuric acid*, 18 oz.; is cautiously and slowly added, with agitation, as before; the *glonoïne* separates after a time, and floats on the surface as an oily liquid, which is decanted; (more may be obtained by the addition of *water* to the residual acid liquor;) it is next purified by solution in *ether*, agitating the ethereal solution with water to remove acid; and, lastly, expelling the ether by the heat of a water-bath. *Prod.* 2840 gr.—*Prop.* A transparent, oily liquid; sp. gr. 1·595 to 1·600; heated to about 245° Fahr., it is decomposed into red vapours; at higher temperatures it explodes violently, or it suddenly inflames without detonation. It also explodes by percussion. (*Journ. de Pharm.)*

XYLOLE. A hydrocarbon, homologous to benzole, found in *wood-tar* and *coal-gas naphtha.*

XYLORETINE. Syn. *Turf Resin.* A crystallizable resin-like substance, found in certain varieties of natural turf.

YAWS. Syn. *Frambœsia.* A peculiar disease of the skin common in the Antilles and some parts of Africa. It is characterised by mulberry-like excrescences, which discharge a watery humour. The *treatment* chiefly consists in alleviating urgent symptoms (if any), and the adoption of a temperate diet and regimen, until the eruptions, having run their course, begin to dry, when *tonics* and *alteratives*, as cinchona bark, quinine, and sarsaparilla, with occasional small doses of mercurials, generally prove advantageous. The *master* (or principal) *yaw*, which frequently remains troublesome after the others have disappeared, may be dressed with the *ointment of nitric-oxide of mercury*, or of *nitrate of mercury*, diluted with an equal weight of lard.

The *yaws* is not a dangerous, although a very disgusting disease. It is contagious by contact, and, like the small-pox, only occurs once during life.

YEAST. Syn. *Barm, Ferment, Zumine; Fermentum*, — Lat. Yeast is either the froth or the deposit of fermenting worts, according to the character of the fermentation. Liebig regards yeast as a substance in a state of putrefaction or fermentation, the atoms of which are in continual motion, a condition which it communicates by contact, to fermentable substances. According to Dr. Lüdersdorff, yeast is an organic body, and acts by means of its organs on the sugar contained in the saccharine solution, and not by mere contact and communication of its own condition. This view receives considerable support from the construction of its particles, as shown by the microscope, as well as from the fact that its power of causing fermentation is destroyed by trituration and by strong pressure. Our own investigations induce us to believe, that both these views are, to a certain extent, correct, and that the "atoms in a state of contiuual motion or change," referred to by Liebig, are elaborated by the organs of *vital yeast*, when in contact with sugar under circumstances favorable to fermentation.

The *oberhefe*, *top yeast*, or *superficial ferment* which covers the *surface* of fermenting worts, is oxidized gluten in a state of *putrefaction;* and the *unterhefe*, *bottom yeast*, or the *ferment of deposit*, is oxidized gluten in a state of *eremacausis.* (Liebig.) The first is the common yeast of the English brewer; the other, that used in Bavaria for the fermentation of worts from below (*untergährung*). Both varieties yield their own kind under proper conditions. Wort fermented with *top yeast* at from 46 to 50° Fahr., yields both varieties, and each of these furnishes its own kind, nearly pure, by a second fermentation. See *Brewing*, *Fermentation*, *&c.*

Pres. 1. Ordinary beer yeast may be kept fresh and fit for use for several months, by placing it in a close canvass bag, and gently and gradually squeezing out the moisture in a screw press, until the remaining matter acquires the consistence of clay or soft cheese, in which state it must be preserved in close vessels, or wrapped in *waxed* cloth. This is the method generally adopted for the best *Flanders* and *German yeast.*

2. Whisk the *yeast* until it forms a uniform liquid mass, and then lay it with a clean and soft painter's brush evenly and thinly on *flat dishes*, or any convenient surface, on which it can be exposed to the sun or air; this operation must be repeated as soon as the first coat is sufficiently solid, and so on, until the layers acquire a proper thickness, when it must be detached and preserved as before. If rendered quite dry, its power of exciting fermentation will be destroyed.

3. By employing strips of *clean new flannel* (well-washed), as above; and when sufficiently dry, rolling these up, and covering them with *waxed cloth* or *paper*, or placing them in tin canisters or boxes. For *use*, a few inches of one of the strips is cut off, and soaked in *luke-warm water*, when the *barm* leaves the flannel, and mixes with the water, which may then be stirred up with the flour.

YEAST (Artificial). "Although the conversion of a small into a larger quantity of yeast is a very easy thing, yet to produce that substance from the beginning is very difficult." (Berzelius.) Both cases are met in the formulæ below.

Prep. 1. *Without a Ferment.*—*a.* (Fownes.) *Wheat-flour* is to be mixed with *water* into a thick paste, which is to be slightly covered, in a moderately warm place; about the third day, it begins to emit a little gas, and to exhale a disagreeable, sour odour; about the sixth or seventh day, the smell changes, much gas is evolved, accompanied by a distinct and agreeable vinous odour, and it is then in a state to excite either the vinous or panary fermentation, and may be either at once employed for that purpose, or formed into small and very thin cakes, dried in the air, and preserved for future use. Wort fermented with it in the ordinary way, yields a large quantity of yeast, of excellent quality, which is found at the bottom of the vessel. "This is a revival of a method which, although he (Mr. Fownes) seems to regard it as new, is to be found in the *Chemistry* of Boerhaave." (Lancet.) It is, indeed, a mere modification of the mode of preparing *leaven*, as practised from the most remote ages of antiquity; but is not the less valuable on that account.

2. (*With a Ferment.*)—*a.* Take of *bean-flour*, ¼ *lb*,; *water*, 6 quarts; boil for ½ an hour, pour the *decoction* into any suitable vessel, add of *wheat-flour*, 3½ *lb.;* stir the whole well together, and when the temperature reaches 55° Fahr., add of *beer yeast*, 2 quarts; mix well, and in 24 hours after the commencement of the fermentation, add of *barley* or *bean-flour*, 7 *lb.;* make a uniform dough by thorough kneading, form it into small cakes, as above, and then preserve these in a dry situation. For *use*, one of these discs is to be broken into pieces, laid in tepid water, and set in a warm place during 12 hours, when the soft mass will serve the purpose of beer yeast.

b. (*Patent Yeast.*) Take of *hops*, 6 *oz.;* *water*, 3 gall.; simmer for 3 hours, strain, and in 10 minutes, stir in of *ground malt*, ½ peck; next reboil the *hops* in *water*, as before, and let the strained liquor run into the first mash, which must then be well-stirred up, covered over, and left for 4 hours; after that time drain off the wort, and when the temperature has fallen to 90° Fahr., set it to work with *yeast* (preferably patent), 1 pint; after standing for 20 to 24 hours in a warm place, take off the *scum*, strain it through a coarse hair sieve, and it will be fit for use. 1 pint is said to be enough for 1 bushel of bread.

Obs. The preparation of artificial yeast and substitutes for yeast, has long engaged the attention of both the scientific chemist and the practical tradesman. The subject is, undoubtedly, of great importance to emigrants and voyagers; though less so than formerly, owing to the introduction of *Jones's Patent Flour.* At one time the periodicals absolutely teemed with receipts for "substitutes for yeast;" and even at the present day, some of the minor publications amuse their readers in the same way. The above processes, by good managemont, yield products which are all that can be desired.

YELLOW DYES. The following substances impart a YELLOW to goods, either at once, or after they have been mordanted with alumina or tin:—*annotta, barberry root, dyer's broom, French berries, fustic, fustet, quercitron bark,* and *turmeric.* Goods *mordanted* with *acetate of lead,* and afterwards passed through a *bath* of *chromate of potash,* acquire a brilliant CHROME YELLOW colour;—*solution of sulphate* or *acetate of iron,* followed by immersion in *potash* or *lime-water,* gives a BUFF or ORANGE;—*orpiment,* dissolved in *ammonia water,* imparts a GOLDEN YELLOW. (See the above-named substances in their alphabetical places.)

YELLOW FEVER. The bilious remittent fever of hot climates. It is very common in the West Indies and the Southern states of America. New Orleans has been several times nearly depopulated by it. Various pretended specifics for this disease have from time to time been brought before the public. We are told in the *Journ. do Commerico,* that "Senhora Orfila has discovered an infallible remedy for the cure of yellow fever and black vomit." This is the *expressed juice* of the *verbena,* which is "to be given to the patient, in small doses, two or three times a day, accompanied by injections of the same juice every two hours, until the bowels are cleansed." "There are two species of verbena, male and female; the latter is the sort to be used for this purpose." (See *p.* 1102.)

YELLOW PIGMENTS. Of these the principal are—

Brown Pink. Take of *French berries* and *pearlash,* of each, 1 *lb.; fustic chips,* ½ *lb.; water,* 2 gallons; boil in a *tin* or *pewter vessel,* and strain the decoction through flannel, whilst hot; then dissolve of *alum,* 1½ *lb.,* in *hot water,* 2½ gall.; add the *solution* to the *strained decoction* as long as a precipitate falls, which must afterwards be washed, drained, and dried. Some manufacturers omit the fustic. A good glazing colour when ground in linseed, and used with drying oil.

Chrome Yellow, Chromate of Lead, Yellow do.; Plumbi Chromas, Plumbi Chromas Flavum,—Lat. The preparation of the pure salt is noticed at *pages* 680-1; that of the *commercial pigment* is as follows:—

1. Add a *filtered solution* of *nitrate* or *acetate of lead,* to a like *solution of neutral chromate of potash,* as long as a precipitate falls; then collect this, wash it well with clean *soft water,* and dry it out of the reach of sulphuretted vapours.

2. To the *lye of chromate of potash,* prepared by roasting the chrome ore with nitre, and lixiviation with water, add a *solution of acetate of lead,* and otherwise proceed as before.

3. Dissolve *acetate of lead* in *warm water,* and add of *sulphuric acid,* q. s., to convert it into sulphate of lead; decant the clear liquid (*vinegar*), wash the residuum with *soft water,* and digest it, with agitation, in a *hot solution of neutral* (yellow) *chromate of potash,* containing 1 part of that salt to every three parts of sulphate of lead operated on; afterwards decant the liquid, which is a solution of sulphate of potash, and carefully drain, wash, and dry the newly formed pigment. The *product* contains much sulphate of lead, but covers as well, and has as good a colour as pure chromate of lead, whilst it is much cheaper. The shade may be varied by increasing or lessening the quantity of the chromate. (Armengaud's *Génie Industriel,* April, 1853.)

Obs. Four shades of this beautiful pigment are met with in the shops; viz., *Pale yellow* or straw colour, *yellow, deep yellow,* and *orange.* The *former* are made by adding a little alum or sulphuric acid to the solution of the chromate before mixing it with the solution of lead; the last, by the addition of a little subacetate of lead, or by washing the precipitate with a weak alkaline lye. The darker colour appears to arise from a little dichromate being thrown down intimately mixed with the neutral chromate, and the paler shades from a *slight* excess of acid, or from the presence of water, sulphate of lead, and, occasionally, alumina. The colour is also influenced by the temperature of the solutions at the time of admixture. Anthon has found, that when *hot* solutions of equal equivalents of *acetate of lead* (190 parts) and *chromate of potash* (100 parts, both neutral and in crystals) are mixed, the *yellow precipitate*, when dried, is *anhydrous;* but when the mixture is made at ordinary temperatures, the precipitate has a *paler* yellow, and when dried contains 1 eq., or nearly 5¼% of water. (Buch. *Rept.*) It thus appears that the shades of colour of chrome yellow may be varied without any foreign addition. In practice, the *third* formula will be found very satisfactory. See *Orange Chrome* and *Chrome Red.*

Dutch Pink. Take of *French berries* 1 *lb.*; *turmeric*, ½ *lb.; alum*, ½ *lb.; water*, 1½ *gall.;* boil ½ an hour, strain, evaporate to 2 quarts, add of *whiting*, 3 *lb.*, and dry by a gentle heat. *Starch* or *white lead* is sometimes employed, instead of whiting, to give it a body. Golden yellow. Used as a pigment; but will not glaze like brown pink.

English Pink, Light Pink. As the last, but using 5 *lb.* of *whiting.*

Indian Yellow. See *Purree.*

King's Yellow. Factitious tersulphuret of arsenic. (See *p.* 86 and 917.)

Naples Yellow, Mineral do.. Take of *metallic antimony*, in powder, 3 *lb.; red lead*, 2 *lb.; oxide of zinc*, 1 *lb.;* mix, calcine, well triturate the calx, and fuse it in a covered crucible; the fused mass must be reduced to an impalpable powder by grinding and elutriation.

2. *Flake white*, 1½ *lb.; diaphoretic antimony*, ¼ *lb.; calcined alum*, 1 *oz.; sal ammoniac*, 2 *oz.;* calcine in a covered crucible with a moderate heat for 3 hours, so that at the end, it may be barely red hot. More antimony and sal ammoniac turn it on the gold colour.

3. (*M. Guimel.*) *Washed diaphoretic antimony*, 1 part; *pure red lead*, 2 parts; grind them to a paste with *water*, and expose this mixture to a moderate red heat for 4 or 5 hours, as before. *Used* in oil, porcelain, and enamel painting. Chrome has now nearly superseded it for ordinary purposes.

Patent Yellow, Cassel do., Montpellier do., Turner's do. Take of dry *chloride of lead*, 28 parts; *pure carbonate of lead*, 27 parts; grind them together, fuse and powder.

2. *Common salt*, 1 part; and *litharge*, 4 parts; are ground together with *water*, and digested at a gentle heat for some time, *water* being added to supply the loss by evaporation; the carbonate of soda formed is then washed out with more water, and the white residuum heated until it acquires a fine yellow colour. Works well in oil. Chiefly used in coach-painting.

Weld Yellow. Prepared from a *decoction of weld* brightened with a little *alum*, in the same manner as Dutch pink. *Used* chiefly for paper hangings.

YTTRIA. Syn. *Oxide of Yttrium, Protoxide of do.* A rare, white earth, discovered by Gadolin, in 1794, in a mineral from Ytterby in Sweden, since called Gadolinite. Its sp. gr. is 4·842; its salts have in general a sweetish taste, and the sulphate and several others an amethystine colour. Its solutions are precipitated by pure alkalies, but alkaline carbonates, especially carbonate of ammonia, dissolve it in the cold. It is *distinguished* from *glucina* by the colour of its sulphate, by being insoluble in pure alkalies, and by yielding a white precipitate with ferrocyanide of potassium. *Yttria* may be obtained from *Gadolinite* by a similar process to that by which *glucina* is extracted from the *beryl.*

According to Prof. Mosander, *ordinary yttria* is a mixture of the oxides of not less than three metals—*yttrium, erbium*, and *terbium.* These differ from each other in many important particulars. The first is a powerful base, and the others are said to be weak ones. They are separated with extreme difficulty, and are only interesting in a scientific point of view.

YTTRIUM. The metalic base of Yttria, discovered by Wöhler, in 1828. It may be obtained in a similar way to that described under glucinium. It is brittle, and has a dark gray colour.

ZAFFRE. Syn. *Saffra, Safflor.* Crude *oxide of cobalt*, obtained by roasting *cobalt ore*, reduced to an impalpable powder, and then ground with 2 or 3 parts of very pure *quartzose* or *siliceous sand. Used* as a blue colour by enamellers and painters on porcelain and glass. Chiefly imported from Saxony. See *Smalts.*

Zanthopicrine. See *Xanthopicrite.*

ZEINE. A name given by Gorham to a yellow waxy substance, obtained by treating the portion of *maize* or *Indian corn*, which is insoluble in water, with *alcohol*, and evaporating the solution.

ZEISE'S PLATINUM SALTS. Syn. *Combustible Platinum-salts*, of Zeise. *Prep.* (Fownes.) A *solution of bichloride of platinum* in *alcohol* is mixed with a little *chloride of potassium* dissolved in *hydrochloric acid*, and the whole digested some hours at a high temperature; the alcohol is distilled off, the *acid residue* neutralized by *carbonate of potassa*, and left to crystallize. Yellow, transparent, prismatic crystals, which become opaque on heating from loss of water; introduced into the flame of a spirit-lamp, it burns vividly, leaving metallic platinum; it is soluble in 5 parts of warm water.

ZERO. See *Thermometer.*

ZESTS. See *Powders, Sauces, Spices, &c.*

ZIEGA. Syn. *Serai.* The *curd* which separates from *milk* on the addition of *acetic acid*, after rennet ceases to produce a coagulum.

ZIMOME. The name given by Taddei to the portion of *wheat gluten*, which is insoluble in alcohol. See *Gluten.*

ZINC. Syn. *Zink, Spelter, Indian Tin, Golden Marcasite; Zincum*,—Ph. L. E. & D. This metal was first noticed by Paracelsus, in the 16th century, who called it *zinetum;* but its ores must have been known at a much earlier period, as the ancients were acquainted with the manufacture of brass. *Prep.* The *zinc* of *commerce* is obtained from the native sulphuret (*zinc blende*), or carbonate (*calamine*), by roasting those ores, and distilling the calx with carbonaceous matter in a covered earthen crucible, having its bottom connected with an iron tube which terminates over a vessel of water situated beneath the furnace. The first portion that passes over, contains cadmium and arsenic, and is indicated by what is technically called the "*brown blaze;*" but when the metallic vapour begins to burn with a bluish white flame, or the "*blue blaze*" commences, the volatilized metal is collected.

The following method by which several pounds of chemically pure zinc may be obtained in about ¼ of an hour, will be found very useful:—Melt the *zinc of commerce* in a common crucible, and granulate it by throwing it into a tolerably deep vessel of water, taking care that the metal be very hot at the time; dry the *metallic grains*, and dispose them by layers in a *Hessian crucible* with ¼th of their weight of *nitrate of potash*, using the precaution to place a slight excess at the top and at the bottom; cover the crucible, and secure the lid, then apply heat; after the vivid deflagration, which occurs is over, remove the crucible from the fire, separate the dross with a tube, and lastly, run the zinc into an ingot mould. This zinc tested in Marsh's apparatus during entire days has never given any stain, and in solution the most sensitive reagents, such as *hydro-sulphocyanic acid*, have never indicated the least atom of iron. (*Journ. de Pharm.*)

Prop. Zinc is a bluish white metal, having the sp. gr. 6·8 to 7·2; tough when cold, ductile and malleable at from 250° to 300° Fahr.; brittle and easily pulverized at 400°; fuses at 773° (Daniell); at a white heat it boils, and sublimes unchanged in close vessels; heated to whiteness (941° Daniell) in contact with the air, it burns with a brilliant green light, and is converted into oxide (*flowers of zinc*). It is very soluble in dilute sulphuric and hydrochloric acid, with the evolution of hydrogen gas. It is little acted on by the air, even when moist. The *salts* of *zinc* are colourless.

Pur. Commercial zinc is never pure. "Its specific gravity is 6·86. It is soluble in nitric acid. What is thrown down by ammonia is again dissolved when the same is added in excess." (Ph. L.) "It is almost entirely soluble in dilute sulphuric acid, forming a colourless solution." (Ph. L. 1836.) When tested in a Marsh's apparatus it should yield no trace of arsenic.

Tests. 1. The solutions of zinc give a gelatinous white precipitate with the pure alkalies, ammonia, and carbonate of ammonia, which is completely redissolved by an excess of the precipitant.—2. The carbonates of potassa and soda give a permanent *white* precipitate of carbonate of zinc. All the above precipitates acquire a lemon-yellow colour when dried and heated, but again become white on cooling.—3. Hydrosulphuret of ammonia gives, in neutral solutions, a *white* precipitate, insoluble in excess of the precipitant, or in solutions of potassa or ammonia; but freely soluble in the dilute mineral acids.—4. Sulphuretted hydrogen, in neutral and alkaline solutions, also gives a like white precipitate.—5. Ferrocyanide of potassium gives a gelatinous white, or bluish white precipitate.

Estim., &c.—*a.* 100 gr. are digested in dilute hydrochloric acid in excess, and the insoluble portion, which is chiefly CARBON, dried, and weighed.

b. The *acidulous solution* (see *a.*) is next treated with a current of sulphuretted hydrogen until it smells very strongly of that gas; the whole is then left for some time in a warm situation. The precipitate which subsides consists of the SULPHURETS of *arsenic, cadmium, copper, lead, &c.*, if any of these metals were present in the sample.

c. The *filtrate* from *b.*, after being boiled, is treated with a little nitric acid, after which it is again boiled, and when cold, is precipitated with carbonate of baryta added in excess; the precipitate (*sesquioxide of* *iron*) is then collected, dried, ignited, and weighed. The weight, in grains, multiplied by 0·7, gives the per centage of IRON in the sample examined.

d. The *filtrate* from *c*, is next precipitated with dilute sulphuric acid, and solution of carbonate of soda is added in excess to the filtered liquid; the whole is then boiled, after which the new precipitate is washed, dried, gently ignited for some time, and then cooled, and weighed. The weight, in grains, multiplied by 0·80247, gives the per centage of pure ZINC in the sample.

Uses, &c. Zinc is used to form galvanic plates; in fireworks, and in medicine. Of late years it has also been extensively used in the manufacture of vessels of capacity, tubing, &c., that require lightness and durability.

Obs. A new alloy of zinc has been recently patented by Mr. Anger, of Stamford Street. —"I melt in a crucible," says the inventor, "100 parts of *good copper*, and while in a perfect state of fusion, I add 17 parts of *zinc*, 6 parts of *magnesite*, or any substance of a like nature, though, perhaps, differing in name, 3·6 parts of *ammonia* or *salts of ammonia*, 1·8 parts of *quick-lime* or *other calx*, and 9 parts of *crude tartar*. I then cover up the crucible, and allow the whole to come to a complete state of fusion." The metal resulting from the above combination is said to resemble gold in several of its properties.

The "*amalgamated zinc*," as it is called, which is employed for voltaic batteries, is prepared as follows:—The *plates* having been scoured with *emery*, are immersed for a few seconds in *dilute sulphuric acid*, then rinsed in *clean soft water*, and after the loose water has drained from their surface, dipped into a *strong solution* of either *nitrate* or *bichloride of mercury;* or into equal parts of a mixture of *saturated solutions of bichloride of mercury* and *acetate of lead;* the plates are, lastly, dipped into water, and then rubbed with a soft cloth.

Platinized zinc plates are prepared in a similar manner to platinized silver plates. (See *p.* 1018.)

ZINC (Acetate of). Syn. *Zinci Acetas,* —Lat. *Prep.* 1. (Ph. D.) *Acetate of lead,* 1 *lb.;* is dissolved in *distilled water,* 2½ pints; and the *solution* being placed in a cylindrical jar, *sheet zinc,* 4 *oz.*, rolled into a coil, is immersed therein; after 24 hours, the liquid is decanted, evaporated to 15 *oz.*, and solution of *chlorinated lime,* added drop by drop, until a reddish precipitate ceases to form; the liquid is then filtered, acidulated by the addition of a few drops of acetic acid, reduced by evaporation to 10 fl. oz., and set aside to crystallize; the crystals are dried on *bibulous paper* set on a porous brick, and then preserved in a well-stopped bottle. More crystals may be obtained from the mother-liquor.

2. *Crystallized sulphate of zinc,* 143 parts; *crystallized acetate of lead,* 190 parts; dissolve each separately in *water,* mix the solutions, filter, evaporate, and crystallize.

Prop., &c. Efflorescent, white, hexagonal plates, having a powerful styptic taste; very soluble in water; less soluble in alcohol; decomposed by heat. It is tonic, antispasmodic, and emetic. *Dose.* 1 to 2 gr.; as an *emetic,* 10 to 20 gr.; externally, 2 or 3 gr. to *water* 1 fl. oz., as an astriugent lotion or injection.

ZINC (Ammonio-chloride of). Syn. *Zinci et Ammoniæ Chloridum, Zinci Ammonio-chloridum,*—Lat. *Prep. Chloride of zinc,* 68 parts; *sal ammoniac,* 54 parts; *water,* q. s.; dissolve, and crystallize. Its solution possesses the property of dissolving the oxides of copper and iron. A crude liquid of this class is used in zincing, tinning, and soldering these metals.

ZINC (Bromide of). Syn. *Zinci Bromidum,*—Lat. Prepared like the corresponding salt of iron.

ZINC (Butter of). See *page* 241.

ZINC (Carbonate of). Syu. *Zinci Carbonas Purum; Zinci Carbonas,*—Ph. D. *Prep.* 1. (Ph. D.) *Solution of chloride of zinc* (Ph. D.), 1 pint; is added, in successive portions, to a *solution* of *crystallized carbonate of soda* of commerce, 2 *lb.;* dissolved in *boiling distilled water,* 6 pints; and the whole is boiled until gas ceases to be evolved; the precipitate is then washed, and dried, at first on blotting paper, and finally, by a steam or water heat.

2. Add a solution of *carbonate of soda* to another of *pure sulphate of zinc*; and wash, and dry the precipitate, as before. *Dose.* 2 to 10 gr. For the impure or native carbonate of zinc, see *Calamine.*

ZINC (Chloride of). See *p.* 241.

ZINC (Cyanide of). Syn. *Cyanuret of Zinc, Hydro-cyanate of do.; Zinci Cyanidum, Zinci Cyanuretum,*—Lat. *Prep.* (P. Cod.) Add a *solution of cyanide of potassium* to another of *pure sulphate of zinc;* wash, and dry the precipitate. *Dose.* ⅛ to 1 gr., twice a day; in epilepsy, hysteria, and other nervous affections, heartburn, worms, &c.; and as a *substitute* for *hydrocyanic* acid.

ZINC (Ferrocyanide). Syn. *Zinci Ferrocyanidum,*—Lat. *Prep.* By adding a hot *solution of ferrocyanide of potassium* to a hot and strong *solution of pure sulphate of zinc*, and washing, and drying the precipitate. White. *Dose.* 1 to 4 gr.; in the same cases as the last.

ZINC (Flowers of). Syn. *Zinci Flores, Zinci Calcinatum,*—Ph. L. 1788. *Zinci Oxydum,*—Ph. D. 1826, & Ph. L. before 1824. *Calx of Zinc, Philosopher's Wool, Arcanum Ludemanni, Luna Frixata, Lana Philosophica, L. Philosophorum, Nil, Nihil, Nihil Album, Pompholyx, &c.,*—Obs. var. Oxide of zinc obtained by the rapid combustion of metallic zinc in a deep crucible, placed sideways in a furnace, so that the flowers may be collected as they form. Antispasmodic. *Dose.* 2 to 8 gr.; in epilepsy, &c. Also used as a white pigment, but it dries badly.

ZINC (Fluoride of). A white compound, scarcely soluble in water, obtained by acting on oxide of zinc with liquid hydrofluoric acid.

ZINC (Fulminate of). See *page* 498.

ZINC (Iodide of). Syn. *Hydriodate of Zinc, Ioduret of do.; Zinci Iodidum, Zinci Hydriodas,*—Lat. *Prep.* 1. (Duflos.) *Iodine,* 2 parts; *granulated zinc,* 1 part; *water,* 4 parts; proceed as for iodide of iron, only employing a glass or porcelain vessel.

2. (Magendie.) *Iodine,* 17 parts; *zinc* (in powder), 20 parts; mix, and sublime in a matrass.

Prop., &c. Deliquescent. Chiefly used externally; 15 gr. to *water,* 6 fl. oz., as a collyrium in scrofulous inflammation of the eye, (Poulet); 1 dr., to *lard,* 1 oz., as a powerful resolvent in scrofulous and other granular swellings, rubbed on the part twice a day. (Ure.)

ZINC (Lactate of). Syn. *Zinci Lactas,*—Lat. Prepared from *zinc* in the same way as *lactate* of iron is from that metal.

ZINC (Oxide of). Syn. *Protoxide of Zinc; Zinci Oxydum,*—Ph. L. E. & D. *Prep.* 1. (Ph. L.) *Sulphate of zinc* (pure), 1 ℔; *sesquicarbonate of ammonia,* 6½ oz.; dissolve each separately in 6 quarts of *water,* filter, mix the solutions, well wash the precipitate with *water,* and calcine it for 2 hours in a strong fire. The Ph. E. is nearly similar.

2. (Ph. D.) Place *carbonate of zinc* in a covered clay crucible, and expose it to a very low red heat, until a portion taken from the centre of the mass ceases to effervesce on being dropped into dilute sulphuric acid.

Prop., &c. A white, tasteless powder; insoluble in water; freely soluble in acids, the solution yielding colourless, and easily crystallizable salts; strongly basic. "Pulverulent, yellowish-white; it is (entirely) soluble in ammonia, potash, and hydrochloric acid." (Ph. L.) "Entirely soluble in dilute nitric acid, without effervescence; and this solution is not affected by nitrate of baryta, but yields a white precipitate with ammonia, entirely soluble in excess of the precipitant." (Ph. L. 1836.)

Uses, &c. It is tonic and antispasmodic, and has been advantageously used in chorea, epilepsy, and other nervous and spasmodic affections. *Dose.* 1 to 6 gr., twice a day. It is also used as a *dusting powder,* and to make an ointment. It has been proposed as a substitute for white lead in painting, than which it covers better, but dries slower; and hence, requires the addition of dried white vitriol. This oxide is the only compound which zinc forms with oxygen. See *Flowers of Zinc.*

ZINC (Sulphate of). Syn. *White Copperas, White Vitriol, Salt of Vitriol; Zinci Sulphas,*—Ph. L. E. & D. *Zincum Vitriolatum,*—Ph. L. 1788. *Sal Vitrioli,*—Ph. L. 1746. *Vitriolum Album Depuratum.* Ph. L. 1721. *Prep.* 1. (Ph. L.) *Granulated zinc,* 5 oz.; *diluted sulphuric acid,* 1 quart; dissolve, filter, evaporate to a pellicle, and set it aside to crystallize.

2. (Ph. D.) *Zinc* (laminated or granulated), 4 *oz.; oil of vitriol,* 3 fl. oz.; *water,* 1 pint; mix in a porcelain capsule, and when gas ceases to be evolved, boil for 10 minutes, filter through calico, and evaporate the filtrate to dryness; dissolve the *dry salt* in *water,* 1 pint; frequently agitate the solution, when cold, during 6 hours, with *prepared chalk,* ¼ *oz.;* next filter, acidulate the filtrate with *nitric acid of commerce* and *dilute sulphuric acid,* of each, 1 fl. dr.; evaporate until a pellicle forms on the surface, and set it aside to crystallize; dry the crystals on bibulous paper, without heat, and preserve them in a bottle. More crystals may be obtained from the mother-liquor.

3. The *common sulphate of zinc* of *commerce* frequently contains copper, cadmium, lead, iron, and manganese, and nearly always, one or more of them. By digesting its *concentrated solution* for some time with *metallic zinc,* it may be *freed* from COPPER, LEAD, and CADMIUM, for these metals are all reduced and precipitated in a metallic state; or, the acidulated *solution* may be treated with *sulphuretted hydrogen* as long as any precipitate forms. In order to *separate* the IRON, chlorine gas may be passed into the solution, by which the iron is converted into the protochloride; if this solu-

tion be exposed to the air for a length of time, it absorbs oxygen, and oxide of iron (basic salt?) is deposited as a yellow powder, from which the solution must be filtered. When the *sulphate* contains MANGANESE, which is not very often the case, the solution must be boiled up a few times with purified charcoal, filtered and evaporated. (*Jour. für prakt. Chem.*) The *product* of each of the above formulæ is nearly chemically pure.

4. The *crude* sulphate of zinc (*white copperas* or *white vitriol*, of the shops,) is *prepared* by roasting *native sulphuret of zinc* (zinc blende) in a reverberatory furnace, exposing the calcined mass to the *air* and humidity for some time, then lixiviating it, and evaporating the resulting solution until it forms a white semicrystalline mass on cooling.

Prop. Pure sulphate of zinc forms inodorous, colourless, transparent, quadrangular prisms, closely resembling in appearance those of Epsom salt, which effloresce slightly in the air, and contain 7 equiv. of water; it has a slightly acidulous, and very styptic metallic taste; the crystals dissolve in 2½ parts of cold, and in less than their own weight of boiling water; they are insoluble in alcohol. The *crude sulphate of zinc* of commerce (*white vitriol*) occurs in irregular granular masses, which somewhat resemble loaf sugar.

Pur. "Crystals." "It is soluble in water. The precipitate with ammonia is white, and is re-dissolved if the test be added in excess. What is thrown down by either chloride of barium or acetate of lead is not dissolved by dilute nitric acid. What is precipitated by sesquicarbonate of ammonia from 100 gr. of this salt dissolved in water, is reduced, at a high temperature, to 27·9 gr. of oxide of zinc." (Ph. L.) "When a solution of this salt, in 6 waters, is boiled with a little nitric acid, and a solution of ammonia is then added until the oxide of zinc at first precipitated is all redissolved, no yellow precipitate remains, or a trace only, and the solution is colourless." (Ph. E.)

Uses. In *medicine*, as a *tonic*, *antispasmodic*, *&c.;* in *doses* of 1 to 2 gr. twice daily; as an *emetic*, 10 to 30 gr. In large doses it is *poisonous*. It has been employed with benefit in dyspepsia, fluor albus, chorea, epilepsy, hooping-cough, and other convulsive and nervous affections, generally combined with bitters, foxglove, hemlock, henbane, or opium. As an emetic it acts almost immediately, and is therefore well suited to empty the stomach at the commencement of a fit of ague, and in cases of poisoning, &c. It is also extensively used *externally*, to form astringent and repellent collyria, injections and lotions.

ZINC (Valerianate of). Syn. *Zinci Valerianas*,—Lat. *Prep.* (Ph. D.) *Valerianate of soda*, 2½ *oz.;* and *sulphate of zinc*, 2 *oz.* 7 *dr.;* are each separately dissolved in *distilled water*, 1 pint; the solutions are then heated to 200° Fahr., mixed, and the resulting crystals skimmed off; the liquid is next evaporated at a temperature not higher than 200°, until it measures 4 fl. oz, the crystals, as they form, being removed from the surface; the salt thus obtained is steeped, for an hour, in *distilled water*, just sufficient to cover it, after which the whole is transferred to a paper filter, on which it is at first drained, and then dried at a heat not exceeding 100°.

Prop., *&c.* Brilliant white, pearly scales; very light; astringent; smells strongly of valerianic acid; only slightly soluble in cold water, more so in hot water, and freely soluble in alcohol and ether; exposure to heat rapidly decomposes; exposure to the air also decomposes it, but more slowly. It is regarded as powerfully antispasmodic and tonic. *Dose.* 1 to 3 gr., thrice daily, made into pills; in neuralgia, tic douloureux, nervous headaches (more particularly hemicrania), hysteria, palpitation of the heart, vertigo, chorea, epilepsy, &c.

Obs. Butyrate of zinc scented with valerianic acid, which is often sold for the above compound, may be detected by distilling it with sulphuric acid; the *distillate*, tested with a strong solution of acetate of copper, gives a bluish-white precipitate, if it contains butyric acid. The *valerianate* is distinguished from the other salts of zinc by its extreme lightness.

ZINC-AMYLE. See *page* 54.

ZINC-ETHYLE. A curious liquid hydrocarbon, discovered by Dr. Frankland, and formed, along with iodide of zinc, when *iodide of ethyle* is heated with *pure zinc* in a sealed glass tube. The mixed white product, by distillation in a current of *hydrogen*, yields pure *zinc-ethyle*. It is a highly volatile liquid, having a rather disagreeable odour, and is rapidly decomposed by contact with the air. Water resolves it into *hydruret of ethyle*, and other products.

ZINC-METHYLE. See *page* 786.

ZINCING. Syn. *Zinking.* Vessels of *copper* and *brass* may be covered with a firmly adherent layer of *pure zinc*, by boiling them in a *solution of chloride of zinc*, pure *zinc turnings* being at the same time present in considerable excess. The *same object* may be effected by means of *zinc*, and a *solution of sal ammoniac*, or *caustic potassa.*

Iron may be *coated* with *zinc* by means of the *electrotype*. The variety of *zinked iron* commonly known by the name of "*galvanized iron*" is prepared by immersing the *sheets of metal*, previously scoured and cleaned with *dilute hydrochloric acid*, in a *bath* of *melted zinc* covered with *powdered sal ammoniac*, and moving them about until they are sufficiently coated.

ZINCOGRAPHY. An art closely resembling lithography, in which *plates of zinc* are substituted for slabs of stone.

ZIRCON. See *Gems.*

ZIRCONIA. Syn. *Oxide of Zirconium.* A white pulverulent earth discovered in the *jargon* or *zircon*, of Ceylon, by Klaproth, in 1789. It has since been found in the *hyacinth.*

Prep. The *stone* is calcined and thrown into cold water, and then powdered in an *agate mortar;* the *powder* is mixed with 9 parts of *pure potassa*, and the *mixture* projected, by spoonfuls, into a red-hot crucible, care being taken that each portion is fused before another is added; after fusion, with an increased heat, for an hour and a half, the whole is allowed to cool; the calcined mass is next powdered, and boiled in water; the *insoluble portion* is then dissolved in *hydrochloric acid*, and the solution heated, that the silex may fall down; after which the *zirconia* is precipitated with *caustic alkali;* or, the *zirconia* may be precipitated with *carbonate of soda*, and the carbonic acid expelled by heat.

Prop., &c. Zirconia has neither taste nor odour, is insoluble in water, and forms salts with the acids. It is *distinguished* from all the *other earths*, except thorina, by being precipitated when any of its neutral salts are boiled with a saturated solution of sulphate of potassa. It is *distinguished* from *alumina* and *glucina* by its salts being precipitated by all the pure alkalies, and by being insoluble when they are added in excess. The precipitated hydrate and carbonate are readily soluble in acids.

ZIRCONIUM. The metallic base of zirconia. It was discovered by Berzelius, in 1824.

Prep. By heating in a glass tube, with a spirit lamp, a *mixture* of *potassium*, and the *double fluoride of zirconium and potassium*, carefully dried; the product is washed with *water*, and digested for some time in dilute *hydrochloric acid.*

Prop., &c. A black powder; it acquires a feeble metallic lustre under the burnisher; and takes fire when heated in the air. It has been but imperfectly examined.

ZOMIDINE. The aqueous extract of flesh.

ZOONIC ACID. A name given by Berthollet to the *acid liquid* procured by distillation from *animal substances.* It has been showed by Thénard to be merely *acetic acid* combined with *animal matter.*

ZOOTIC ACID. Hydrocyanic acid.

ZUMIC ACID. Syn. *Nanceic Acid.* The name given by Braconnot to the *acid* formed in *bread*, and in some other *vegetable substances*, which have undergone the acetous fermentation. It appears to be a mixture of acetic acid and lactic acid.

APPENDIX I.

TABLE *of* CHEMICAL *and* PHARMACEUTICAL EQUIVALENTS, *including recent revisions.*

Names of Elements and Compounds.	Symbols or Formulæ.	Hydrogen = 1.	Oxygen = 100.
Acetic Acid (*anhydrous*) .	$C_4O_3H_3$; or $\bar{A}$.	51·	637·5
,, (*glacial*) . .	$\bar{A}$, Aq.	60·	750·
Acetone	$C_3H_3\,O$.	29·	—
Acetyle	C_4H_3; or Ac.	27·	—
Aconitina	$C_{60}H_{27}O_{14}N$.	513·	—
Alcohol	$C_4H_6O_2$.	46·	—
Aldehyde	C_4H_3O, HO; or Ac O, Aq.	35·	—
ALUMINIUM . . .	Al.	13·7	171·25
Alumina	$Al\,O_{1\frac{1}{2}}$.	25·7	321·25
Alum (*anhydrous*) . .	Al_2O_3, $3SO_3$ + KO, SO_3.	258·55	—
,, (*crystallized*) . .	Alum + 24Aq.	474·55	—
,, ,, ½ . .	—	237·27	—
Amidogen	NH_2.	16·	—
Ammonium	NH_4.	18·	—
Chloride . . .	NH_4Cl.	53·5	—
Ammonia	NH_3.	17·	212·5
Acetate (*dry*) . .	NH_3, $\bar{A}$.	68·	—
Carbonate (*dry*) . .	NH_3, CO_2.	39·	—
Sesquicarb. (*ord.* or *hydrated*) . . .	NH_3, $1\frac{1}{2}CO_2$, + Aq.	59·	—
Bicarb. (*hydrated*) .	NH_3, 2CO, 2Aq.	79·	—
Hydrochlorate (see *Chloride of Ammonium*) .	NH_3, HCl; or NH_4, Cl.	53·5	—
Sulphate . . .	NH_3, SO_3, HO.	66·	—
,, (*crystallized*) .	NH_3, SO_3, 2Aq.	75·	—
Amyle	$C_{10}H_{11}$; or Ayl.	71·	—
Amylene	$C_{10}H_{10}$.	70·	—
Amylic Alcohol . . .	Ayl O, HO.	88·	—
ANTIMONY (*Stibium*) . .	Sb.	129·	1612·5*
Terchloride . . .	Sb Cl_3.	235·5	—
Teroxide . . .	Sb O_3.	153·	—
Potassio-tartrate (*effloresced*) .	Sb O_3, KO, $\overline{2T}$, + 2Aq.	350·15	—
,, ,, (*cryst.*)	Sb O_3, KO, $2\bar{T}$, + 3Aq.	359·15	—
Tersulphuret . .	Sb S_3.	177·	—

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* 64·5,—Gerhardt & Laurent.

Names of Elements and Compounds.	Symbols or Formulæ.	Hydrogen = 1.	Oxygen = 100.
Antimonious Acid . .	SbO_4.	161·	—
Antimonic Acid . . .	SbO_5.	169·	—
ARIDIUM (?)	—	—	—
ARSENIC	As.	75·	937·5[*]
Arsenious Acid . . .	AsO_3.	99·	1232·5
Arsenic Acid . . .	AsO_5.	115·	—
Atropia (*cryst.*) . . .	$C_{34}H_{23}O_6N$, HO.	298·	—
Sulphate . . .	$C_{34}H_{23}O_6N$, HO, SO_3.	338·	—
Auric Acid (see *Gold*) . .	—	—	—
BARIUM	Ba.	68·5	856·25[†]
Chloride . . .	Ba Cl.	104·	—
„ (*cryst.*) . .	Ba Cl, + 2Aq.	122·	—
Oxide (see *Baryta*) .	—	—	—
Peroxide . . .	BaO_2.	84·5	—
Baryta	Ba O.	76·5	956·25
Carbonate . . .	Ba O, CO_2.	98·5	—
Sulphate . . .	Ba O, SO_3.	116·5	—
Benzoyle	$C_{14}H_5O_2$; or Bz.	105·	—
Benzoic Acid (*anhydrous*) .	$C_{14}H_5O_3$; or Bz O.	113·	—
„ (*cryst.*) . .	Bz O, Aq.	122·	—
Benzole	$C_{12}H_6$.	78·	—
BERYLLIUM (see *Glucinium*)	Be.	—	—
BISMUTH	Bi.	213·	2662·5[‡]
Oxide	BiO_3.	237·	—
Nitrate (*basic nitrate, trisnitrate*) . .	BiO_3, NO_5HO.	300·	—
Bismuthic Acid . . .	BiO_5.	253·	—
BORON	B, or Bo.	10·9	136·25
Boracic Acid (*anhydrous*) .	BO_3.	34·9	—
„ (*cryst.*) . .	BO_3, 2Aq.	52·9	—
Borax (*dry or fused*) . .	Na O, $2BO_3$.	100·8	—
„ (*cryst.*) . . .	Borax + 10Aq.	190·8	—
BROMINE	Br.	80·	1000·[§]
Bromic Acid . . .	BrO_5.	120·	—
CADMIUM	Cd.	56·	700·[‖]
Oxide	Cd O.	64·	—
CALCIUM	Ca.	20·	250·
Chloride (*dry*) . .	Ca Cl.	55·5	—
„ (*cryst.*) . .	Ca Cl, + 6Aq.	109·5	—
Fluoride . . .	Ca Fl.	39·0	—
Oxide (see *Lime*) . .	—	—	—
Binoxide . . .	CaO_2 (?)	36·	—
Sulphuret (*cryst.*) . .	CaS_2, 2Aq.	70·	—
CARBON	C.	6·	75·
Carbonic Oxide . . .	CO.	14·	—
„ Acid . . .	CO_2.	22·	—
CERIUM	Ce.	47·	587·5[¶]
Protoxide . . .	Ce O.	55·	—
Sesquioxide . . .	$CeO_{1\frac{1}{2}}$.	59·	—
CHLORINE	Cl.	35·5	443·75
Hypochlorous Acid . .	Cl O.	43·5	—

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[*] 37·75,—Turner.

[†] 68,—Gerhardt & Laurent.

[‡] 71, — Turner; 106·6,—Berzelius; 210, — Gerhardt & Laurent.

[§] 78·4,—Turner.

[‖] 58·8,—Turner.

[¶] 46,—Brande & Turner.

Names of Elements and Compounds.	Symbols or Formulæ.	Hydrogen = 1.	Oxygen = 100.
Chlorous Acid	$Cl\,O_3$.	59·5	—
Hypochloric Acid . . .	$Cl\,O_4$.	67·5	—
Chloric Acid	$Cl\,O_5$.	75·5	—
Perchloric Acid . . .	$Cl\,O_7$.	93·5	—
Chloroform	C_2H, Cl_3.	119·5	—
CHROMIUM	Cr.	26·75	334·37*
Protoxide . . .	Cr O.	34·75	—
Sesquioxide . . .	$Cr\,O_{1\frac{1}{2}}$.	38·75	—
Chromic Acid . . .	$Cr\,O_3$.	50·75	—
Perchromic Acid . . .	$Cr\,O_{3\frac{1}{3}}$.	54·75	—
Cinchonia	$C_{20}H_{12}NO$.	154·	—
Citric Acid (*anhydrous*) .	$C_{12}H_5O_{11}$; or $\overline{C}$.	165·	—
(*commercial cryst.*)	$\overline{C}$, 3HO, + Aq.	201·	—
COBALT	Co.	29·5	368·75
Protoxide . . .	Co O.	37·5	—
Sesquioxide . . .	$Co\,O_{1\frac{1}{2}}$.	41·5	—
COLUMBIUM (see *Tantalum*) .	—	—	—
COPPER (*Cuprum*) . .	Cu.	31·75	396·87
Chloride . . .	Cu Cl.	67·25	—
Dioxide	$Cu\,O_{\frac{1}{2}}$.	35·75	—
Protoxide . . .	Cu O.	39·75	—
Peroxide . . .	$Cu\,O_2$.	47·75	—
Acetate (*dry*) . . .	Cu O, $\overline{A}$.	90·75	—
„ (*commercial* or *common cryst. verdigris*) .	Cu O, $\overline{A}$, + Aq.	99·75	—
Binacetate (*cryst.*) . .	Cu O, 2$\overline{A}$, + Aq.	150·75	—
Nitrate (*dry*) . . .	Cu O, NO_5.	93·75	—
„ (*cryst.*) . .	Cu O, NO_5, + 3 Aq.	120·75	—
Sulphate (*dry*) . .	Cu O, SO_3.	79·75	—
„ (*cryst.*) . .	Cu O, SO_3, + 5Aq.	124·75	—
Cyanogen	C_2N; or Cy.	26·	—
Dextrine	$C_{12}H_{10}O_5$.	122·	—
DIDYMIUM . . .	D, or Dy.	50·	625·†
Emetina	$C_{35}H_{25}N, O_9$.	321·	—
ERBIUM (*undetermined*) .	Er.	—	—
Ethyle	C_4H_5; or Ae.	29·	—
Ether	Ae O.	37·	—
Ferric Acid	Fe O_3.	52·	—
FLUORINE	F.	19·	237·5‡
Formic Acid	C_2HO_3, HO.	46·	—
Formyle	C_2H.	13·	—
Terchloride (see *Chloroform*)	—	—	—
Fusel Oil (see *Amylic Alcohol*)	—	—	—
Gallic Acid (*dried at* 212°) .	C_7HO_3, 2HO; or $\overline{G}$.	85·	—
„ (*cryst.*) . .	$\overline{G}$, + Aq.	94·	—
GLUCINIUM	G.	6·9	86·25
Glucina	$GO_{1\frac{1}{2}}$.	18·9	—
Glycerine (*anhydrous*) . .	$C_6H_7O_5$.	83·	—

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* 26,—Gerhardt & Laurent; 28,—Brande & Turner.

† 49·6,—Marignac.

‡ 18·60,—Gerhardt & Laurent.

Names of Elements and Compounds.	Symbols or Formulæ.	Hydrogen = 1.	Oxygen = 100.
GOLD	Au.	197·	2462·5*
Protoxide	Au O.	205·	—
Teroxide (*auric acid*)	$Au\ O_3$.	221·	—
Terchloride (*dry*)	$Au\ Cl_3$.	303·5	—
Gum Arabic	$C_{12}H_{11}O_{11}$.	171·	—
Tragacanth	$C_{12}H_{10}O_{10}$.	162·	—
Hydriodic Acid (*anhydrous*)	HI.	127·5	—
Hydrobromic Acid (*dry*)	HBr.	81·	—
Hydrochloric Acid (*anhydrous*)	HCl.	36·5	—
(*liquid*, sp. gr. 1·16)	HCl, 7HO.	99·5	—
Hydrocyanic Acid (*dry*)	H, C_2N; or HCy.	27·	—
HYDROGEN	H.	1·	12·5
Oxide (see *Water*)	—	—	—
Binoxide	HO_2. (?)	17·	—
Hydrosulphuric Acid	HS.	17·	—
Hyposulphurous Acid (see *Sulphur*)	—	—	—
IODINE	I.	126·5	1581·5†
Iodous Acid (*oxide of iodine*)	IO_3.	150·5	—
Hypoiodic Acid	IO_4.	158·5	—
Iodic Acid	IO_5.	166·5	—
Periodic Acid	IO_7.	182·5	—
IRIDIUM	Ir.	99·	1237·5
Protoxide	Ir O.	107·	—
Sesquioxide	$Ir\ O_{1\frac{1}{2}}$.	111·	—
Teroxide	$Ir\ O_3$.	121·	—
IRON (*Ferrum*)	Fe.	28·	350·
Protochloride	Fe Cl.	63·5	—
Sesquichloride	$Fe\ Cl_{1\frac{1}{2}}$.	81·25	—
Protoxide	Fe O.	36·	—
Black oxide	$\frac{1}{3}(Fe_3O_4)$.	38·67	—
Sesquioxide	$Fe\ O_{1\frac{1}{2}}$.	40·	—
Teroxide (see *Ferric Acid*)	—	—	—
Acetate (*dry*)	$Fe\ O, \overline{A}$.	87·0	—
Iodide (*dry*)	Fe I.	154·5	—
Nitrate (*dry*)	$\frac{1}{2}(Fe_2O_3, 3NO_5)$.	121·	—
Protosulphate (*dry*)	$Fe\ O, SO_3$.	76·	—
,, (*cryst.*)	$Fe\ O, SO_3, + 7Aq$.	139·	—
Potassio-tartrate	$Fe\ O_{1\frac{1}{2}}, \overline{T}, + KO, \overline{T}$.	219·15	—
LANTHANIUM	La; or Ln.	47·0	587·5
LEAD (*Plumbum*)	Pb.	103·75	1296·7‡
Chloride	Pb Cl.	139·25	—
Iodide	Pb I.	230·25	—
Dioxide	$\frac{1}{2}(Pb_2O)$.	107·75	—
Protoxide	Pb O.	111·75	—
Binoxide	$Pb\ O_2$.	119·75	—
Diacetate (*dry*)	$\frac{1}{2}(2Pb\ O, \overline{A})$.	137·25	—
,, (*cryst.*)	,, + 5Aq.	182·25	—
Acetate (*cryst.*)	$Pb\ O, \overline{A}, + 3Aq$.	189·75	—
Carbonate (*pure*)	$Pb\ O, CO_2$.	133·75	—

* 196,—Gerhardt & Laurent; 199·2,—Turner.

† 126,—Gerhardt & Laurent; 127·1,—Berzelius & Liebig.

‡ 104,—Gerhardt & Laurent.

Names of Elements and Compounds.	Symbols or Formulæ.	Hydrogen = 1.	Oxygen = 100.
Nitrate (*cryst.*) . .	$Pb\,O, NO_5$.	165·75	—
Sulphate . . .	$Pb\,O, SO_3$.	151·75	—
Lignine (*Cellulose*) . .	$C_{12}H_{10}O_{10}$.	162·0	2025·
Lime	$Ca\,O$.	28·	—
Hydrate. . . .	$Ca\,O, HO$.	37·	—
Carbonate . . .	$Ca\,O, CO_2$.	50·	—
Bone Phosphate . .	$3Ca\,O, PO_5$.	156·	—
„ . .	$\frac{1}{3}$	52·	—
Sulphate (*dry*) . .	$Ca\,O, SO_3$.	68·	—
„ (*cryst.; pure gypsum*) .	$Ca\,O, SO_3, + 2Aq$.	86·	—
Tartrate (*dry*) . .	$Ca\,O, \bar{T}$.	94·	—
LITHIUM	L.	6·5	81·25
Oxide (*lithia*) . .	LO.	14·5	—
MAGNESIUM . . .	Mg.	12·	150·[*]
Magnesia	$Mg\,O$.	20·	—
Carbonate (*dry*) . .	$Mg\,O, CO_2$.	42·	—
„ (*ord. commercial*)	$5Mg\,O, 4CO_2, + 6Aq$.	242·	—
„ (*lowest term*) .	$\frac{1}{5}$	48·4	—
Sulphate . . .	$Mg\,O, SO_3$.	60·	—
„ (*cryst.*) . .	$Mg\,O, SO_3, + 7Aq$.	123·	—
MANGANESIUM . . .	Mn.	27·6	345·[†]
Chloride . . .	$Mn\,Cl$.	63·1	—
Protoxide . . .	$Mn\,O$.	35·6	—
Sesquioxide . . .	$Mn\,O_{1\frac{1}{2}}$.	39·6	—
Red Oxide . . .	Mn_3O_4.	114·6	—
Binoxide (*black oxide*) .	$Mn\,O_2$.	43·6	—
Sulphate . . .	$Mn\,O, SO_3$.	75·6	—
Manganeseous Acid . .	$Mn\,O_3$.	51·6	—
Manganesic Acid . . .	Mn_2O_7.	111·2	—
Mannite	$C_6H_7O_6$.	91·	—
MERCURY	Hg.	200·	2500·[‡]
Chloride . . .	$Hg\,Cl$.	235·5	—
Bichloride . . .	$Hg\,Cl_2$.	271·	—
Ammonio-chloride . .	$Hg\,O_2, Hg\,Cl_2, 2NH_3$.	521·	—
Iodide	$Hg\,I$.	326·5	—
Biniodide . . .	$Hg\,I_2$.	453·	—
Protoxide . . .	$Hg\,O$.	208·	—
Binoxide . . .	$Hg\,O_2$.	216·	—
Protonitrate . . .	$Hg\,O, NO_5$.	262·	—
„ (*cryst.*) .	$Hg\,O, NO_5, + 2Aq$.	280·	—
Yellow sulphate (*bipersulphate* . . .	$Hg\,O_2, 2SO_3$.	296·	—
Sulphuret . . .	$Hg\,S$.	216·	—
Bisulphuret . . .	$Hg\,S_2$.	232·	—
Methyle	$C_2\,H_3$; or Me.	15·	—
MOLYBDENUM . . .	Mo.	46·	575·[§]
Protoxide . . .	$Mo\,O$.	54·	—
Binoxide . . .	$Mo\,O_2$.	62·	—
Molybdic Acid . . .	$Mo\,O_3$.	70·	—

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[*] 12·7,—Berzelius.

[†] 28,—Gerhardt & Laurent.

[‡] 100, — Berzelius, Brande, Kane, Gerhardt & Laurent, and some others; 200,—Phillips & Ph. L.; 202,—Turner. We have retained the double equivalent, in order to avoid confusion in the names of the mercurial compounds used in medicine. 100, appears, however, to be the true equivalent of mercury.

[§] 47·7,—Berzelius.

Names of Elements and Compounds.	Symbols or Formulæ.	Hydrogen = 1.	Oxygen = 100.
Morphia (*anhydrous*) . .	$C_{34}H_{19}O_6N$.	285·	—
(*crystallized*) .	Morph,+ 2Aq.	303·	—
Acetate (*cryst.*) . .	Morph $\overline{A}$,+ Aq.	345·	—
Hydrochlorate (*cryst.*) .	Morph HCl,+ 6Aq.	375·5	—
Sulphate (*cryst.*) . .	Morph SO_3,+ 6Aq.	379·	—
NICKEL	Ni.	29·6	370·*
Protoxide . . .	NiO.	37·6	—
Sesquioxide . . .	$NiO_{1\frac{1}{2}}$	41·6	—
NIOBIUM (*undetermined*) .	Nb.	—	—
NITROGEN	N.	14·	175·†
Protoxide (*nitrous oxide*)	NO.	22·	—
Binoxide (*nitric oxide*) .	NO_2.	30·	—
Teroxide (*hyponitrous acid*)	NO_3.	38·	—
Nitrous Acid . . .	NO_4.	46·	—
Nitric Acid (*anhydrous*) .	NO_5.	54·	—
„ (*liquid*, sp. gr. 1·5)	NO_5, HO.	63·	—
NORIUM (*undetermined*) .	No.	—	—
Olefiant Gas	CH ; or C_2H_2.	7·or 14·	—
OSMIUM	Os.	99·6	1245·
Chloride . . .	OsCl.	—	—
Protoxide . . .	OsO.	107·6	—
Sesquioxide . . .	$OsO_{1\frac{1}{2}}$.	135·1	—
Binoxide . . .	OsO_2.	143·1	—
Osmious Acid . . .	OsO_3.	151·1	—
Osmic Acid	OsO_4.	159·1	—
Oxalic Acid (*dry*) . .	C_2O_3 ; or $\overline{O}x$.	36·	—
„ (*cryst.* . .	$\overline{O}x$ HO,+ 2Aq.	63·	—
OXYGEN	O.	8·	100·
PALLADIUM . . .	Pd.	53·3	666·25
Protochloride . .	PdCl.	88·8	—
Bichloride . . .	$PdCl_2$.	124·3	—
Protoxide . . .	PdO.	61·3	—
Binoxide . . .	PdO_2.	69·3	—
PELOPIUM (*undetermined*) .	Pe.	—	—
PHOSPHORUS . . .	P.	32·	400·‡
Oxide	$\frac{1}{2}(P_2O)$.	36·	—
Hypophosphorous Acid .	PO.	40·	—
Phosphorous Acid . .	PO_3.	56·	—
Phosphoric Acid (*anhydrous*)	PO_5.	72·	—
„ (*glacial*) .	PO_5, HO.	81·	—
PLATINUM	Pt.	98·75	1234·4§
Protochloride . .	PtCl.	134·25	—
Bichloride . . .	$PtCl_2$.	169·75	—
Ammonio-chloride . .	$PtCl_2$, NH_4, Cl.	223·25	—
Potassio-chloride . .	$PtCl_2$, KCl.	244·40	—
Sodio-chloride (*dry*) .	$PtCl_2$, NaCl, 6HO.	228·25	—
POTASSIUM (*Kalium*) . .	K.	39·15	489·37‖
Bromide . . .	KBr.	119·15	—
Chloride . . .	KCl.	74·65	—
Iodide . . .	KI.	165·65	—

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* 28,—Brande ; 30,—Phillips.

† 14·15,—Turner.

‡ 15·7, — Turner ; 31, — Schrötter ; 31·4, — Berzelius.

§ 99,—Gerhardt & Laurent.

‖ 39,—Gerhardt & Laurent ; 39·17, —Berzelius ; 40,—Brande.

Names of Elements and Compounds.	Symbols or Formulæ.	Hydrogen = 1.	Oxygen = 100.
Oxide (see *Potassa*)	—	—	—
Teroxide	KO_3 (?)	55·15	—
Potassa (*anhydrous*)	KO.	47·15	—
Hydrate	KO, HO.	56·15	—
Acetate (*dry*)	KO, $\bar{A}$.	98 15	—
„ (*cryst.*)	KO, $\bar{A}$, + 2Aq.	116·15	—
Carbonate (*dry*)	KO, CO_2.	69·15	—
„ (*cryst.*)	KO, CO_2, + 2Aq.	87·15	—
„ (*granulated*)	KO, CO_2, + 1½Aq.	82·65	—
Bicarbonate (*cryst.*)	KO, $2CO_2$, + Aq.	100·15	—
Chlorate	KO, ClO_5.	122·65	—
Chromate	KO, CrO_3.	97·9	—
Bichromate	KO, $2CrO_3$.	148·65	—
Nitrate	KO, NO_5.	101·15	—
Sulphate	KO, SO_3.	87·15	—
Bisulphate (*anhydrous*)	KO, $2SO_3$.	127·15	—
„ (*ord. cryst.*)	KO, $2SO_3$, + 2Aq.	145·15	—
Tartrate (*anhyd. cryst.*)	KO, $\bar{T}$.	113·15	—
„ (*ordin. cryst.*)	KO, $\bar{T}$, + 2Aq.	131·15	—
Bitartrate (*ord. cryst.*)	KO, $2\bar{T}$, + Aq.	188·15	—
Proteine	$C_{46}H_{36}O_{14}N_6$.	508·	—
(*Mulder*)	$C_{40}H_{30}O_{12}N_5$.	436·	—
Pyrogallic Acid	$C_6H_3O_3$.	63·	—
Pyroxyline (*gun cotton*)	$C_{24}H_{15}N_5O_{40}$.	—	—
Quinia	$C_{20}H_{12}O_2N$.	162·	—
Disulphate (*cryst.*)	½(2 Quin, SO_3, + 8Aq).	218·	—
Sulphate	Quin, SO_3, + Aq.	211·	—
„ (*Fownes*)	Quin, SO_3, + 8Aq.	274·	—
Hydrochlorate	½(2 Quin, HCl, + 3Aq).	193·75	—
RHODIUM	R.	52·2	652·5
Protoxide	RO.	60·2	—
Sesquioxide	$RO_{1\frac{1}{2}}$.	64·2	—
RUTHENIUM	Ru.	52·2	652·5*
Protoxide	Ru O.	60·2	—
Sesquioxide	Ru $O_{1\frac{1}{2}}$.	64·2	—
Binoxide	Ru O_2.	68·2	—
SELENIUM	Se.	39·5	493·75†
Selenious Acid	Se O_2.	55·5	—
Selenic Acid	Se O_3.	63·5	—
SILICIUM	Si.	21·5	268·75‡
Silicic Acid (*Silica*)	Si O_3	45·5	—
SILVER (*Argentum*)	Ag.	108·	1350·
Chloride	Ag Cl.	143·5	—
Cyanide	Ag Cy.	134·	—
Iodide	Ag I.	234·5	—
Suboxide	½ (Ag_2O).	112·	—
Protoxide	Ag O.	116·	—
Binoxide	Ag O_2.	124·	—
Nitrate	Ag O, NO_5	170·	—
SODIUM (*Natrium*)	Na.	23·	287·5§
Chloride	Na Cl.	58·5	—
Iodide	Na I.	149·5	—

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* 52·163,—Claus.

† 78·5,—Gerhardt & Laurent.

‡ 14,—Gerhardt & Laurent; 22·258,—Berzelius.

§ 23·215,— Berzelius; 24,—Brande;—22·973,—Pelouze.

Names of Elements and Compounds.	Symbols or Formulæ.	Hydrogen = 1.	Oxygen = 100.
Dioxide	$\frac{1}{2}$ (2Na O).	27·	—
Protoxide (see *Soda*) .	—	—	—
Binoxide . . .	NaO_2.	39·	—
Soda (*anhydrous*) . .	Na O.	31·	—
Carbonate (*dry*) . .	NaO, CO_2.	53·	—
„ (*cryst.*) . .	$Na O, CO_2, +10Aq$.	143·	—
Sesquicarb. (*native*) .	$Na O, 1\frac{1}{2} CO_2, +2Aq$.	82·	—
Bicarbonate . . .	$Na O, HO, 2CO_2$.	84·	—
Phosphate (*cryst.*) .	$2 Na O, HO, PO_5, + 24Aq$.	359·	—
„ $\frac{1}{2}$ (*lowest term*)	—	179·5	—
Potassio-tartrate (*cryst.*) .	$Na O, KO, 2\bar{T}, + 10Aq$.	300·15	—
Starch (*dry*)	$C_{12} H_{10} O_{10}$	162·	—
STRONTIUM . . .	Sr.	43·8	547·5*
Chloride (*dry*) . .	Sr Cl.	79·3	—
„ (*cryst.*) . .	Sr Cl, + 6Aq.	133·3	—
Protoxide (see *Strontia*) .	—	—	—
Binoxide . . .	$Sr O_2$.	59·8	—
Strontia	Sr O.	51·8	—
Nitrate	$Sr O, NO_5$.	105·8	—
Strychnia	$C_{42}H_{22} O_4N_2$.	334·	—
Succinic Acid (*dry* or *anhydrous cryst.*)	$C_4H_2O_3$.	50·	—
„ (*ordinary cryst.*)	$C_4H_2O_3, + Aq$.	59·	—
Sugar (*anhydrous*) . .	$C_{12}H_9O_9$.	153·	—
(*cryst.*)	$C_{12}H_{11}O_{11}$.	171·	—
(*uncrystallizable*) . .	$C_{12}H_9O_9$.	153·	—
Grape Sugar (*Glucose*) . .	$C_{12}H_{14}O_{14}$.	198·	—
Milk Sugar (*Lactine*) . .	$C_{12}H_{12}O_{12}$.	180·	—
„ (*Anhydrous*) . .	$C_{12}H_{10}O_{10}$.	162·	—
SULPHUR	S.	16·	200 †
Chloride	SCl.	51·5	—
Iodide	SI.	142·5	—
Biniodide (*medicinal*) .	SI_2.	158·5	—
Hyposulphurous Acid . .	SO ; (or S_2O_2).	24·	—
Hyposulphuric Acid . .	$SO_{2\frac{1}{2}}$; (or S_2O_5).	36·	—
Sulphurous Acid (*anhydrous*)	SO_2.	32·	—
Sulphuric Acid (*anhydrous*) .	SO_3.	40·	—
„ (*strongest liquid*)	SO_3, HO.	49·	—
Sulphuretted Hydrogen (See *Hydrosulphuric Acid*). .	—	—	—
Tannic Acid (*dried at* 212°) .	$C_{18}H_5O_9$, 3HO.	212·	—
TANTALUM	Ta.	184·	2300·‡
Binoxide . . .	$Ta O_2$.	200·	—
Tantalic Acid . . .	$Ta O_3$.	208·	—
Tartaric Acid . . .	$C_4H_2O_5$; or $\bar{T}$.	66·	—
„ (*cryst.*) . .	$\bar{T}$, + Aq.	75·	—
TELLURIUM	Te.	64·2	802·5§
Tellurous Acid . . .	$Te O_2$.	80·2	—
Telluric Acid . . .	$Te O_3$.	88·2	—
TERBIUM	Tb.	—	—
THORIUM	Th.	59·6	745·
Thorina	Th O.	67·6	—

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* 44.—Brande, and Gerhardt & Laurent.

† 32,—Gerhardt & Laurent.

‡ 92·016,—Berzelius; 185,—Turner & Brande.

§ 128,—Gerhardt & Laurent.

Names of Elements and Compounds.	Symbols or Formulæ.	Hydrogen = 1.	Oxygen = 100.
TIN (*Stannum*)	$Sn.$	58·5	731·25*
Protochloride	$Sn\,Cl.$	94·	—
Bichloride	$Sn\,Cl_2.$	129·5	—
Protoxide	$Sn\,O.$	66·5	—
Sesquioxide	$Sn\,O_{1\frac{1}{2}}.$	70·5	—
Binoxide (*Stannic Acid*)	$Sn\,O_2.$	74·5	—
Sulphuret	$Sn\,S.$	74·5	—
Bisulphuret (*Mosaic Gold*)	$Sn\,S_2.$	90·5	—
TITANIUM	$Ti.$	25·	312·5†
Oxide	$Ti\,O.$	33·	—
Titanic Acid	$Ti\,O_2.$	41·	—
TUNGSTEN (*Wolframium*)	$W.$	95·	1187·5‡
Binoxide	$WO_2.$	111·	—
Tungstic Acid	$WO_3.$	119·	—
URANIUM	$U.$	60·	750·§
Protoxide	$UO.$	68·	—
Black Oxide	$\frac{1}{4}\,(U_4O_5).$	70·	—
Sesquioxide	$U\,O_{1\frac{1}{2}}.$	72·	—
Valerianic Acid	$C_{10}H_9O_3, HO.$	102·	—
VANADIUM	$V.$	68·5	856·25
Protoxide	$VO.$	76·5	—
Binoxide	$VO_2.$	82·5	—
Vanadic Acid	$VO_3.$	90·5	—
Veratria	$C_{34}H_{22}NO_6.$	288·	—
Water	HO; or Aq.	9·	—
Oxygenated	$HO_2.$ (?)	17·	—
Xyloidine	$C_{24}H_{17}N_3O_{32}.$	—	—
YTTRIUM	$Y.$	32·1	401·25
Yttria	$YO.$ (?)	40·	—
ZINC	$Zn.$	32·6	407·5 ‖
Chloride	$Zn\,Cl.$	68·1	—
Oxide	$Zn\,O.$	40·6	—
Carbonate	$Zn\,O, CO_2.$	62·6	—
Sulphate (*cryst.*)	$Zn\,O, SO_3, + 7Aq.$	143·6	—
ZIRCONIUM	$Zr.$	33·6	420·
Zirconia	$Zr\,O_{1\frac{1}{2}}.$	45·6	—

* 57·9,—Turner; 59,—Gerhardt & Laurent, and Brande.

† 24·158,—Berzelius.

‡ 92·1—Schneider; 96,—Gerhardt & Laurent.

§ 120,—Gerhardt & Laurent; 217,—Turner.

‖ 32·3,—Turner; 33,—Gerhardt & Laurent.

APPENDIX II.

TABLE *exhibiting the relations between the Indications of Sikes's Hydrometer, or* EXCISE STRENGTHS, *and the real* SPECIFIC GRAVITIES, at 60° Fahr.

Specific Gravity.	Per Cent. Over Proof.	Specific Gravity.	Per Cent. Over Proof.	Specific Gravity.	Per Cent. Over Proof.	Specific Gravity.	Per Cent. Over Proof
0·8095	70·0	·8291	60·4	·8427	53·3	·8560	45·4
·8156	67·0	·8294	60·2	·8431	53·1	·8563	45·2
·8160	66·8	·8298	60·0	·8434	52·9	·8566	45·0
·8163	66·6	·8301	59·8	·8438	52·7	·8570	44·8
·8167	66·5	·8305	59·6	·8441	52·5	·8573	44·6
·8170	66·3	·8308	59·5	·8445	52·3	·8577	44·4
·8174	66·1	·8312	59·3	·8448	52·1	·8581	44·2
·8178	65·6	·8315	59·1	·8452	51·9	·8583	43·9
·8181	65·8	·8319	58·9	·8455	51·7	·8587	43·7
·8185	65·6	·8322	58·7	·8459	51·5	·8590	43·5
·8188	65·5	·8326	58·6	·8462	51·3	·8594	43·3
.8192	65·3	·8329	58·4	·8465	51·1	·8597	43·1
·8196	65·1	·8333	58·2	·8469	50·9	·8601	42·8
·8199	65·0	·8336	58·0	·8472	50.7	·8604	42·6
·8203	64·8	·8340	57·8	·8476	50·5	·8608	42·4
·8206	64·7	·8344	57·7	·8480	50·3	·8611	42·2
·8210	64·5	·8347	57·5	·8482	50·1	·8615	42·0
·8214	64·3	·8351	57·3	·8486	49·9	·8618	41·7
·8218	64·1	·8354	57·1	·8490	49·7	·8622	41·5
·8221	64·0	·8358	56·9	·8493	49·5	·8625	41·3
·8224	63·8	·8362	56·8	·8496	49·3	·8629	41·1
·8227	63·6	·8365	56·6	·8499	49·1	·8632	40·9
·8231	63·4	·8369	56·4	·8503	48·9	·8636	40·6
·8234	63·2	·8372	56·2	·8506	48·7	·8639	40·4
·8238	63·1	·8376	56·0	·8510	48·5	·8643	40·2
·8242	62·9	·8379	55·9	·8513	48·3	·8646	40·0
·8245	62·7	·8383	55·7	·8516	48·0	·8650	39·8
·8249	62·5	·8386	55·5	·8520	47·8	·8653	39·5
·8252	62·3	·8390	55·3	·8523	47·6	·8657	39·3
·8256	62·2	·8393	55·1	·8527	47·4	·8660	39·1
·8259	62·0	·8396	55·0	·8530	47·2	·8664	38·9
·8263	61·8	·8400	54·8	·8533	47·0	·8667	38·7
·8266	61·6	·8403	54·6	·8537	46·8	·8671	38·4
·8270	61·4	·8407	54·4	·8540	46·6	·8674	38·2
·8273	61·3	·8410	54·2	·8543	46·4	·8678	38·0
·8277	61·1	·8413	54·1	·8547	46·2	·8681	37·8
·8280	60·9	·8417	53·9	·8550	46·0	·8685	37·6
·8284	60·7	·8420	53·7	·8553	45·8	·8688	37·3
·8287	60·5	·8424	53·5	·8556	45·6	·8692	37·1

Specific Gravity.	Per Cent. Over Proof.	Specific Gravity.	Per Cent. Over Proof.	Specific Gravity.	Per Cent. Over Proof.	Specific Gravity.	Per Cent. Under Proof
·8695	36·9	·8894	23·2	·9100	8·0	·9306	9·0
·8699	36·7	·8897	23·0	·9104	7·7	·9310	9·3
·8702	36·4	·8901	22·7	·9107	7·4	·9314	9·7
·8706	36·2	·8904	22·5	·9111	7·1	·9318	10·0
·8709	35·9	·8908	22·2	·9115	6·8	·9322	10·3
·8713	35·7	·8912	21·9	·9118	6·5	·9326	10·7
·8716	35·5	·8915	21·7	·9122	6·2	·9329	11·0
·8720	35·2	·8919	21·4	·9126	5·9	·9332	11·4
·8723	35·0	·8922	21·2	·9130	5·6	·9337	11·7
·8727	34·7	·8926	20·9	·9134	5·3	·9341	12·1
·8730	34·5	·8930	20·6	·9137	5·0	·9345	12·4
·8734	34·3	·8933	20·4	·9141	4·8	·9349	12·8
·8737	34·1	·8937	20·1	·9145	4·5	·9353	13·1
·8741	33·8	·8940	19·9	·9148	4·2	·9357	13·5
·8744	33·6	·8944	19·6	·9152	3·9	·9360	13·9
·8748	33·4	·8948	19·3	·9156	3·6	·9364	14·2
·8751	33·2	·8951	19·1	·9159	3·3	·9368	14·6
·8755	32·9	·8955	18·8	·9163	3·0	·9372	14·9
·8758	32·7	·8959	18·6	·9167	2·7	·9376	15·3
·8762	32·4	·8962	18·3	·9170	2·4	·9380	15·7
·8765	32·2	·8966	18·0	·9174	2·1	·9384	16·0
·8769	32·0	·8970	17·7	·9178	1·9	·9388	16·4
·8772	31·7	·8974	17·5	·9182	1·6	·9392	16·7
·8776	31·5	·8977	17·2	·9185	1·3	·9396	17·1
·8779	31·2	·8981	16·9	·9189	1·0	·9399	17·5
·8783	31·0	·8985	16·6	·9192	0·7	·9403	17·8
·8786	30·8	·8989	16·4	·9196	0·3	·9407	18·2
·8790	30·5	·8992	16·1	·9200	Proof.	·9411	18·5
·8793	30·3	·8996	15·9	Under	Proof.	·9415	18·9
·8797	30·0	·9000	15·6	·9204	0·3	·9419	19·3
·8800	29·8	·9004	15·3	·9207	0·6	·9422	19·7
·8804	29·5	·9008	15·0	·9210	0·9	·9426	20·0
·8807	29·3	·9011	14·8	·9214	1·3	·9430	20·4
·8811	29·0	·9015	14·5	·9218	1·6	·9434	20·8
·8814	28·8	·9019	14·2	·9222	1·9	·9437	21·2
·8818	28·5	·9023	13·9	·9226	2·2	·9441	21·6
·8822	28·3	·9026	13·6	·9229	2·5	·9445	21·9
·8825	28·0	·9030	13·4	·9233	2·8	·9448	22·2
·8829	27·8	·9034	13·1	·9237	3·1	·9452	22·7
·8832	27·5	·9038	12·8	·9241	3·4	·9456	23·1
·8836	27·3	·9041	12·5	·9244	3·7	·9460	23·5
·8840	27·0	·9045	12·2	·9248	4·0	·9464	23·9
·8843	26·8	·9049	12·0	·9252	4·4	·9468	24·3
·8847	26·5	·9052	11·7	·9255	4·7	·9472	24·7
·8850	26·3	·9056	11·4	·9259	5·0	·9476	25·1
·8854	26·0	·9060	11·1	·9263	5·3	·9480	25·5
·8858	25·8	·9064	10·8	·9267	5·7	·9484	25·9
·8861	25·5	·9067	10·6	·9270	6·0	·9488	26·3
·8865	25·3	·9071	10·3	·9274	6·4	·9492	26·7
·8869	25·0	·9075	10·0	·9278	6·7	·9496	27·1
·8872	24·8	·9079	9·7	·9282	7·0	·9499	27·5
·8876	24·5	·9082	9·4	·9286	7·3	·9503	28·0
·8879	24·3	·9085	9·2	·9291	7·7	·9507	28·4
·8883	24·0	·9089	8·9	·9295	8·0	·9511	28·8
·8886	23·8	·9093	8·6	·9299	8·3	·9515	29·2
·8890	23·5	·9097	8·3	·9302	8·6	·9519	29·7

Specific Gravity.	Per Cent. Under Proof	Specific Gravity.	Per Cent. Under Proof	Specific Gravity.	Per Cent. Under Proof	Specific Gravity.	Per Cent. Under Proof
·9522	30·1	·9642	45·5	·9766	66·0	·9886	85·2
·9526	30·6	·9646	46·1	·9770	66·7	·9890	85·8
·9530	31·0	·9650	46·7	·9774	67·4	·9894	86·3
·9534	31·4	·9654	47.3	·9778	68·0	·9898	86·9
·9539	31·1	·9657	47·9	·9782	68·7	·9902	87·4
·9542	32·3	·9661	48·5	·9786	69·4	·9906	88·0
·9546	32·8	·9665	49·1	·9790	70·1	·9910	88·5
·9550	33·2	.9669	49·7	·9794	70·8	·9914	89·1
·9553	33·7	·9674	50·3	·9798	71·4	·9918	89·6
·9557	34·2	·9677	51·0	·9802	72·1	·9922	90·2
·9561	34·6	·9681	51·6	·9806	72·8	·9926	90·7
·9565	35·1	·9685	52·2	·9810	73.5	·9930	91·2
·9569	35·6	·9689	52·9	·9814	74·1	·9934	91·7
·9573	36·1	·9693	53·3	·9816	74·8	·9938	92·3
·9577	36·6	·9697	54·2	·9822	75·4	·9942	92·8
·9580	37·1	·9701	54·8	·9826	76·1	·9946	93·3
·9584	37·6	·9705	55·5	·9830	76·7	.9950	93·8
·9588	38·1	·9709	56·2	·9834	77·3	·9954	94·3
·9592	38·6	·9713	56·9	·9838	78·0	·9958	94·9
·9596	39·1	·9718	57·6	·9842	78·6	·9962	95·4
·9599	39·6	·9722	58·3	·9846	79·2	.9966	95·9
·9603	40·1	·9726	59·0	·9850	79·8	·9970	96·4
·9607	40·6	·9730	59·7	·9854	80·4	·9974	96·8
·9611	41·1	·9734	60·4	·9858	81·1	·9978	97·3
·9615	41·7	·9738	61·1	·9862	81·7	·9982	97·7
·9619	42·2	·9742	61·8	·9866	82·3	·9986	98·2
·9623	42·8	·9746	62·5	·9870	82·9	·9990	98·7
·9627	43·3	·9750	63·2	·9874	83·5	·9993	99·1
·9631	43·9	·9754	63·9	·9878	84·0	·9997	99·6
·9635	44·4	·9758	64·6	·9882	84·6	1·0000	100·0
·9638	45·0	·9762	65·3				

⁂ This valuable Table, with the exception of about 30 lines by Mr Gutteridge, which appeared in our last edition, is reproduced from Dr. Ure's *Dict. of Arts*, *Manuf.*, *and Mines*, 4th Ed., vol. ii, p. 704-5.

APPENDIX III.

Comparison of the DEGREES of BAUMÉ'S AEROMETER with the real SPECIFIC GRAVITIES.
By M. Francœur.

1. *Hydrometer for liquids* LIGHTER *than* WATER, *or Pèse-esprit.*

Degrees Baumé.	Specific Gravity.	Degrees Baumé.	Specific Gravity.	Degrees Baumé.	Specific Gravity.	Degrees Baumé.	Specific Gravity.
10	1·000	23	0·918	36	0·849	49	0·789
11	0·993	24	0·913	37	0·844	50	0·785
12	0·986	25	0·907	38	0·839	51	0·781
13	0·980	26	0·901	39	0·834	52	0·777
14	0·973	27	0·896	40	0·830	53	9·773
15	0·967	28	0·890	41	0·825	54	0·768
16	0·960	29	0.885	42	0·820	55	0·764
17	0·954	30	0·880	43	0·816	56	0·760
18	0·948	31	0·874	44	0·811	57	0·757
19	0·942	32	0·869	45	0·807	58	0·753
20	0·936	33	0·864	46	0·802	59	0·749
21	0·930	34	0·859	47	0·798	60	0·745
22	0·924	35	0·854	48	0·794		

2. *Hydrometer for liquids* HEAVIER *than* WATER, *Pèse-acide, or Pèse-sirop.*

Degrees Baumé.	Specific Gravity.	Degrees Baumé.	Specific Gravity.	Degrees Baumé.	Specific Gravity.	Degrees Baumé.	Specific Gravity.
0	1·000	20	1·152	39	1·345	58	1·617
1	1·007	21	1·160	40	1·357	59	1·634
2	1·013	22	1·169	41	1·369	60	1·652
3	1·020	23	1·178	42	1·381	61	1·670
4	1·027	24	1·188	43	1·395	62	1·689
5	1·034	25	1·197	44	1·407	63	1·708
6	1·041	26	1·206	45	1·420	64	1·727
7	1·048	27	1·216	46	1·434	65	1 747
8	1·056	28	1·225	47	1·448	66	1·767
9	1·063	29	1·235	48	1·462	67	1·788
10	1·070	30	1·245	49	1·476	68	1·809
11	1·078	31	1·256	50	1·490	69	1·831
12	1·085	32	1·267	51	1·505	70	1·854
13	1·094	33	1·277	52	1·520	71	1·877
14	1·101	34	1·288	53	1·535	72	1·900
15	1·109	35	1·299	54	1·551	73	1·924
16	1·118	36	1·310	55	1·567	74	1·949
17	1·126	37	1·321	56	1·583	75	1·974
18	1·134	38	1·333	57	1·600	76	2·000
19	1·143						

⁂ The above Tables are taken from Liebig and Poggendorff's *Handwörterbuch der Chemie.*

3. *Corresponding* SPECIFIC GRAVITIES *and* DEGREES *of* BEAUMÉ'S AEROMETER *for heavy liquids.* From the Batavian Pharmacopœia.

Degrees Baumé.	Specific Gravity.	Degrees Baumé.	Specific Gravity.	Degrees Baumé.	Specific Gravity.	Degrees Baumé.	Specific Gravity.
0	1000	20	1161	39	1372	58	1676
1	1007	21	1171	40	1384	59	1695
2	1014	22	1180	41	1398	60	1715
3	1022	23	1190	42	1412	61	1736
4	1029	24	1199	43	1426	62	1758
5	1036	25	1210	44	1440	63	1779
6	1044	26	1221	45	1454	64	1801
7	1052	27	1231	46	1470	65	1823
8	1060	28	1242	47	1485	66	1847
9	1067	29	1252	48	1501	67	1872
10	1075	30	1261	49	1516	68	1897
11	1083	31	1275	50	1532	69	1921
12	1091	32	1286	51	1549	70	1946
13	1100	33	1298	52	1566	71	1974
14	1108	34	1309	53	1583	72	2000
15	1116	35	1321	54	1601	73	2031
16	1125	36	1334	55	1618	74	2059
17	1134	37	1346	56	1637	75	2087
18	1143	38	1359	57	1656	76	2116
19	1152						

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